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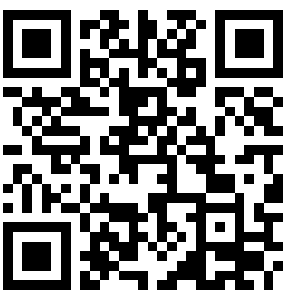

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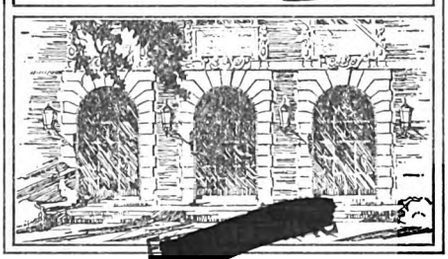

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Electric Railway Journal

Volume 63

January to June 1924

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How to Use the Index

This index is essentially a subject index, not an index of titles, and articles treating a number of different subjects are indexed under each of them. In addition, a geographical reference is published wherever the article relates to any particular railway company, or to the state matters of any particular state. The geographical method of grouping serves to locate in the index any article descriptive of practices, conditions, events, etc., when the searcher knows the electric railway, city or state to which the article applies. Groupings are made under the name of the city in which the main office of the company is located, but an exception is made in the case of electrified sections of steam railroads, such entries being made direct under the name of the railroad. City or state affairs appear under the names of the city or state involved.

In the subject index, the alphabetical method is followed, and if there is a choice of two or three keywords the one most generally used has been selected, cross references being supplied. Below will be found a list of the common keywords used in the index to this volume. This list has been subdivided for convenience into thirteen general subjects, but the general subject headings, shown in capital letters, do not appear in the body of the index unless, like "employees," they appear also in small type. As an example of how to use the index, if a reader wishes to locate an article on special trackwork he would obviously look in the list under the general subject Track and under this caption, only Special trackwork could apply to the article in question. The reader would therefore refer to this keyword under S in the body of the index.

The list of keywords is revised from time to time to keep the index abreast with developments. The following headings have been added in this volume:

"Repair shop practice for cars and car equipment."

"Repair shop practice; shop methods and shop equipment."

"Repair shops"—General articles on the layout of shops or routing of work.

"Street traffic congestion"—to cover articles dealing with relief measures of all kinds including parking ordinances, traffic surveys and discussion of problems in the use of the streets.

In addition to the groups of articles covered by these headings the papers and reports from railway associations are grouped under the names of the various organizations. Proceedings of other associations and societies are indexed in general only in accordance with the subject discussed. Short descriptions of machine tools appear only under the heading "Repair shop practice; shop methods and equipment" and are not indexed alphabetically, because of the fact that there is a wide choice in most cases of the proper keyword to be used.

CLASSIFIED LIST OF KEYWORDS

ACCIDENTS AND ACCIDENT PREVENTION

Accident claim department
Accidents (including wrecks)
Safety work
Storm and fire damage

CARS AND OTHER VEHICLES

Automobiles
Cars (including car design)
Locomotives
Motor buses
Motor trucks, gasoline
Service and tower trucks
Trackless trolley
Work and wrecking cars

CAR EQUIPMENT

Bearings
Brakes and compressors
Current collection
Electrical equipment
Fixtures
Gears and pinions
Motors
Trucks
Wheels and axles

EMPLOYEES

Employees
Labor
Strikes and arbitrations
Wage decreases
Wage increases
Wages and working agreements

FARES

Fare collection (including apparatus)
Fare decreases
Fare increases
Fares
Traffic investigations
Traffic stimulation

FINANCIAL, LEGAL AND STATISTICS

Abandoning of lines
Accounting
Appraisal of railway property
Financial (methods of financing)
Franchises
Insurance and pensions
Legal
Legislation for railways
Market conditions
Operating records and costs
Public service and regulative commissions
Statistics
Taxes

HEAVY ELECTRIC TRACTION

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Locomotives

MAINTENANCE OF EQUIPMENT

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Lubrication
Maintenance practice
Motor buses, Practice with
Painting
Repair shop practice for cars and car equipment
Repair shop practice; shop methods and equipment
Repair shops
Stores
Tests of materials and equipment
Welding

POWER

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Energy consumption
Fuel
Overhead contact system
Power distribution
Power generation
Power stations and equipment
Power transmission
Substations and equipment

STRUCTURES

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Power stations and equipment
Repair shops and equipment
Substations and equipment
Terminals
Waiting stations

TRACK

Pavements
Poles
Rail joints and bonds
Rails
Special trackwork
Ties
Track construction
Track maintenance

TRAFFIC AND TRANSPORTATION

Freight and express
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Merchandising transportation
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Public, Relations with
Rapid transit (elevated and subway)
Schedules and timetables
Signals
Street traffic congestion
Traffic investigations
Traffic regulation
Traffic stimulation
Transportation, Metropolitan (general studies)

MISCELLANEOUS

Engineers
Living costs
Management
Municipal ownership
Railways (general)
Snow removal
Standardization
Wood preservation

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Consolidation of Street Railway Journal and Electric Railway Review

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Engineering Library

A Great Year for the Electric Railways

ELECTRIC railways purchased 4,029 new cars and locomotives in 1923—more than in any year since 1913, and 14 per cent more than in 1922. In addition they rebuilt 1,256 cars and purchased 621 new motor buses. They built and rebuilt 1,114 miles of track—more than in any year since 1915. Of this, 260 miles was extension of lines, which is the most in any year since 1919.

Though many felt that the advent of the bus spelled the doom of the railway, the railways are not only extending their rail lines but they are rapidly taking up the bus as an auxiliary and feeder, thus making complete the transportation service in their communities.

There occurred during the year twelve receiverships—two less than in 1922, the fewest in any year since 1910, and involving the lowest totals of track mileage and of capitalization in any year in the records of this paper, which date back through 1909. Furthermore, the total number of companies lifted out of receivership or otherwise removed from bankruptcy was thirty-one—the largest in any year in the record, and involving the imposing totals of 1,794 miles of track and $305,000,000 in par value of securities.

Finally, the electric railways of the United States expended $282,000,000 during 1923, aside from the enormous amounts for labor, in the purchase of new plant and equipment and maintenance materials. For the same items they plan to expend $262,000,000 in 1924. Of these amounts, $180,000,000 in 1923 and $150,000,000 in 1924 may be said to be for improvements and expansions, while the remainders are for current maintenance materials.

Thus it is seen that despite the lingering difficulty of disposing of new electric railway securities through the bankers—a condition which lags behind the improved situation and reflects the past rather than the present and future—the industry is forging ahead with its rehabilitation program, both physically and financially.

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Trends in Rolling Stock as Shown by Purchases

A STUDY of the rolling stock statistics published in this issue shows that the return to buying which began last year has continued throughout 1923 with increased impetus. The number of new cars ordered this year has exceeded the 4,000 mark which in pre-war days was looked upon as close to the average for yearly car purchases. In 1914 the number of new cars bought dropped to 3,000 and the bottom was reached in 1921 with but 1,276 new cars for the year. The number purchased in 1922 was 3,538 and for 1923 it was 4,029, which is higher than any year since 1913. The nearest approach to this record was in 1916 with 3,942 new cars and electric locomotives.

Another evidence of returning prosperity comes from the fact that there has also been a considerable increase in the number of companies buying new cars. There were 167 for 1923 as compared with 145 for 1922 and but 94 in 1921. There is no doubt that electric railways are becoming more and more able to purchase much-needed rolling stock and to discard obsolete equipment.

The outstanding feature shown by the statistics as to trend of car design is the exceedingly large number of one-man, two-man cars ordered. The popularity prophesied for this type of car in this paper last year has been more than fulfilled. The 1,114 cars of this type ordered during 1923 is about one-half of the total passenger motor cars ordered for city service and nearly as many as the total number of all types of cars purchased in 1921. This type of car is meeting the demand for a unit that can be operated by one man during off-peak periods and still give the advantages of two-man operation during heavy load hours. It also provides a better unit for one-man operation than the single-truck type with which one-man operation was first introduced. The purchases of one-man, single-truck cars with 28-ft. body which were so popular in 1920 fell off materially during 1923, the number being 312 as compared with 772 in 1922.

The number of one-man double-truck cars ordered in 1923 remains about the same as for the year preceding. There were 184 for 1923 as compared with 196 for 1922. In size, the one-man double-truck cars ordered are of about the same length and seating capacity as the one-man, two-man cars. An average length for the two types is about 45 ft. and the average seating capacity is about forty-four. It is interesting to compare this size of car with the double-truck design prepared by last year's committee of the American Electric Railway Engineering Association on unification of car design, which has an over-all length of 42 ft. 1 in. with body 28 ft. 7 in. over all and platforms 6 ft. 9 in. long. The windows are spaced 2 ft. 5½ in. and there are eleven on each side. By adding one more window the length would be 44 ft. 6½ in. and seats for forty-eight passengers would be provided inside the car body. This is about the same as the average for the double-truck, one-man cars, or the one-man, two-man cars ordered last year.

The largest increase of passenger cars ordered last year as compared with preceeding years was for interurban service. There were 427 of these as compared with 187 for 1922. There was also a large increase in the number of freight and express cars ordered for interurban service. These figures show that the interurban roads were active in buying new rolling stock and this augurs well for their continued prosperity.

While much new rolling stock has been added railways have also been busy in remodeling old cars. A total of 1,256 cars were reported as being rebuilt. Of these 581 were remodeled for one-man and seventy-seven for one-man, two-man operation.

The Present Position of the Bus in the Railway Field

TWELVE hundred and seven buses are now being operated by 121 electric railway companies in a variety of services. This number has increased from forty-four companies and 300 buses since October, 1922. Thirty additional railways have definitely indicated to the JOURNAL that they expect to start operation of buses during 1924. And purchases of new buses during next year to the extent of at least 50 per cent of the present total are indicated, but it is probably safe so say that the number will double. Electric railways purchased 621 motor buses during 1923, according to the JOURNAL'S survey which is published in this issue on page 40.

Some of the leading men of the electric railway industry and the principal bus manufacturers believe that in time the electric railways will dominate the bus situation in its major operations and that the electric railways are to be the great market for buses. At the last national convention of the electric railways 24 per cent of all the exhibit space was occupied by buses and bus equipment.

The American Electric Railway Association has formally taken the position that all of the transportation requirements of any community should be furnished by one agency; that that agency should be the electric railway company; that it is the duty of the railways to study and consider the availability of every feasible unit or method for furnishing transportation service; that there is a field in which the bus can furnish service satisfactory alike in operation and economy; that the electric railways should be alive to the possibilities of bus operation, both to handle all the transportation needs of a community and to prevent wasteful competition; that traction officials should not allow an antagonism aroused by jitney competition to blind them to the fact that they must keep pace with developments in the transportation field if they expect to continue to be the recognized agency of transportation in a community; that the motor bus is needed to feed and supplement the rail lines, to open up new territory, and to round out and make complete the passenger transportation on the highways.

It was commonly agreed among railway men that the last convention of the American Electric Railway Association marked the turning point in the predominant sentiment of the railway men from one of antagonism toward the bus to one of appreciation that it is a new transportation tool which they may well endeavor generally to bring into use in its proper sphere. The desire to quash the bus by fair means or foul has now largely been replaced by a more constructive attitude of studying how best to capitalize on the new vehicle. To this end, committees of the American Electric Railway Association and the affiliated Transportation &

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Traffic, Engineering, and Accountants' Associations are all working on various phases of the subject.

The president of the American Association recently said in public print that "as soon as the electric railway industry gets to the point—and I think it has reached that point now—where it will utilize the bus to the extent that seems advisable and necessary, then the ELECTRIC RAILWAY JOURNAL would be helping along the idea that it is an accepted practice of electric railways to utilize the bus" by publishing bus articles in the JOURNAL. Continuing, he said "and it will be in the best interests of the industry when that idea is generally accepted. It was too bad it was not accepted, in my opinion, two or three years ago. I think it would have saved a lot of grief and trouble that we may be a long time in remedying."

In view of all this, does it not appear obvious that the industry paper—ELECTRIC RAILWAY JOURNAL—should treat comprehensively the activities of the railways in taking up the bus?

Railway Operation of Buses to Be Treated in the "Journal"

BEGINNING with this issue, the ELECTRIC RAILWAY JOURNAL will publish more fully than heretofore articles dealing with the operation of buses by electric railway companies. By so doing, it is believed the present needs of the electric railways will be better served. The JOURNAL will be better able to record the extent and kind of bus service undertaken by the railways and to aid the railways by pointing out where and under what conditions the bus should be utilized.

Since *Bus Transportation*, offspring and associate of the JOURNAL, was created two years ago, the latter has carried only editorials discussing the broad economics and place of the bus, and brief news items telling of the inauguration of bus operation by railways. Papers on bus operation presented at railway association meetings have been briefly summarized in this paper, frequently with a notation that they would be published more fully in *Bus Transportation.*

Prior to the establishment of *Bus Transportation*, the early progress of the bus was treated to some extent in the JOURNAL, for this paper saw the bus as a useful ally or a troublesome competitor. At that time there was considerable resentment on the part of some railway men at seeing such articles in the paper they had been reading for nearly forty years and happily had come to feel was "their" paper.

While not wishing to incur the disapproval of its lifelong readers, the JOURNAL nevertheless was confident that the bus was coming and that a great service could be performed for both the railways and the independent bus operators by advocating its development along lines in keeping with the established principles of sound economics and regulation. So it was decided to treat bus matters in a separate but associated publication—*Bus Transportation.*

At the time of the establishment of this paper in January, 1922, fears were expressed by a few that the same publishers could not successfully produce a paper devoted to the electric railway interests and another to the bus interests. These fears, based on the idea that there was an ineradicable antipathy between bus and electric railway, have been found entirely groundless. *Bus Transportation* has now been published monthly for two years, and it is generally accredited with having done a very constructive piece of work.

Preaching, like the ELECTRIC RAILWAY JOURNAL, the idea of co-ordination of all local means of transportation, and otherwise following along the same lines of editorial policy, it has undoubtedly been a steadying force in the direction of sound bus development. It is probably not too much to say that the policy adopted upon the establishment of *Bus Transportation* and strongly advocated by both that paper and ELECTRIC RAILWAY JOURNAL has had a great deal to do with the present reconciliation of what might have been antagonistic forces.

The rapid development of the bus and its acceptance as a transportation agent by many electric railway companies during the past two years call now for a more extensive treatment of the bus in the JOURNAL. So many electric railway companies now run bus services and so many others are contemplating doing so that it is evident that there has been a profound change in the attitude of the railway men toward the bus. The previous editorial gives a more definite summary of this evidence. Railway men are coming to take the position that they are "transportation men" and that if there is anything to the bus they are the ones who should make use of it. They want now to keep advised on what the industry is doing with the bus, and they expect the industry paper—the JOURNAL—to supply this information. Conforming with this need, the JOURNAL will undertake to do so from now on.

Bus Transportation will continue to be the all-bus paper, covering all important news and developments of the bus everywhere by whomever operated. ELECTRIC RAILWAY JOURNAL will treat only of such bus operation as is carried on by electric railway and affiliated companies. It will promote the utilization of the bus as an auxiliary of the railway in a co-ordinated transportation plan, for it believes thoroughly that the public can best be served—in fact, can be served satisfactorily only when all the transportation facilities of a community or territory are under a single management.

The JOURNAL will treat primarily the economics of the bus, the kinds of service in which railways put it to use, the conditions of such use, how it is co-ordinated with the railway service, questions of policy and such broad matters as regulation, taxation, etc., depending upon *Bus Transportation* for the technical material, such as detail bus design, bus maintenance, and the technique of bus operation in general.

From this it will be seen that the railway man who is operating buses and wishes to keep informed on all phases of bus operation and all developments of the bus will want to read *Bus Transportation* as well as the JOURNAL.

To start off on this program, the JOURNAL has undertaken to bring together a comprehensive summary of the present operation of buses by electric railways. A survey of the entire industry has been made to determine the number of railways that have taken up the bus and the kind of service in which they have placed it, as well as to learn the general feeling up to the present time about the advantages, limitations, and possibilities of the bus, as railway men view it. This summary, including a tabulation of the data, is published in this issue, beginning on page 5.

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$262,000,000 for New Plant and Equipment and Maintenance Materials

CITY and interurban electric railways of the United States will spend the sum of $262,000,000 for new plant and equipment and for maintenance materials during 1924. Of this, the estimated expenditure for new plant and equipment, such as new cars, buildings, power apparatus, shop tools and track machines, new paving, new materials for track construction or reconstruction, various car devices, etc., amounts to $150,000,000. This compares with $180,000,000 for the similar expenditures actually made during 1923.

For materials and supplies for routine maintenance work, it is estimated that the electric railways in the United States will spend $112,000,000 in 1924, as compared with actual expenditures of $102,000,000 in 1923.

The total proposed expenditure of $262,000,000 in 1924 compares with $282,000,000 spent in 1923. These expenditures will be divided among the three main accounts of the standard A.E.R.A. classifications, as shown in the accompanying table.

From the estimates summarized herewith, it appears that the electric railways will expend some $30,000,000 less for new plant and equipment in 1924 than they did in 1923. What this probably reflects is that the tremendous need for reconstruction and rehabilitation and new equipment in all departments which existed for the first few years subsequent to the war has in part been met, and that the program of expenditures is dropping back slightly to what is more nearly a normal program of replacement and improvement. This is probably particularly true of way and structures expenditures, which in this estimate shows the largest drop. The expenditures for new cars holds up fairly well on account of the extensive trend toward new cars of the one-man and one-man, two-man type. Similarly, the expenditures for power accounts is holding up large, probably on account of the extensive adoption of automatic substation equipment.

How the Figures Were Obtained

The JOURNAL undertook last year for the first time to get an estimate of the budget of the industry covering expenditures to be made for new plant and equipment. Information was requested from the 107 Class A companies as to 1922 and 1923 expenditures. Forty-seven companies supplied figures as to their actual 1922 expenditures and their proposed 1923 expenditures. The figures for the entire industry were then calculated from the summaries of these forty-seven companies, the estimates being based proportionately on track mileage and cars operated. Both track and cars were used because neither alone gives a proper measure of the buying power of the industry.

This year, similar information was requested from the same list of companies and fifty supplied their actual expenditures for 1923 and proposed expenditures for 1924. From these the corresponding figures for the entire industry were calculated as before. This new figure for 1923 provides a check on the budget estimate published in the JOURNAL last year.

Based on what the roads estimated they would expend during 1923 for new plant and equipment, an industry budget of $240,000,000 was estimated. Based on what the roads report as having actually expended during 1923 in the present canvass, the figure is $180,000,000. While this discrepancy is large, it can probably be accounted for in major part by two things.

In the first place, the JOURNAL asked for separate figures on expenditures for maintenance materials and supplies this year, but did not ask for these at all last year. It is quite possible that some of the companies included maintenance materials in their figures for 1923, and segregated them this year. There is opportunity for some confusion here. It is impossible definitely to define the two classifications. It is not a division between expenditures for capital account and expenditures for operating account that the JOURNAL was seeking, but rather what the railways are going to spend during the year, so far as it means purchasing of new materials and equipment from the manufacturers, regardless of the account to which it is charged.

The second item in accounting for the difference is that it is known that a number of companies planned to do considerably more work in 1923 than they were able to get completed, so that the actual expenditures reported reflect this. Furthermore, the budget of a company often provides for the purchase of new equipment which may not be delivered on account of delays until the following year and therefore the expenditure is not made, as planned in the budget.

The figures reported by the companies last year, covering actual expenditures for 1922 for new plant and equipment, and expanded for the industry estimate were: Way and structures, $85,000,000; equipment, $38,000,000; power, $28,000,000; total, $151,000,000.

It is perhaps worth noting that the figures included herewith covering the expenditures for maintenance materials and supplies represent the first definite attempt, it is believed, to find out what the electric railways spend annually for routine maintenance materials.

Electric Railway Journal's Estimate of Industry Expenditures During 1923 and 1924

For New Plant and Equipment

	1923	1924
Way and structures	$74,000,000	$53,000,000
Equipment	78,000,000	70,000,000
Power	28,000,000	27,000,000
Total	$180,000,000	$150,000,000

For Maintenance Materials and Supplies

	1923	1924
Way and structures	$42,000,000	$44,000,000
Equipment	44,000,000	53,000,000
Power	16,000,000	15,000,000
Total	$102,000,000	$112,000,000

Total for New Plant and Equipment and Maintenance Materials

	1923	1924
Way and structures	$116,000,000	$97,000,000
Equipment	122,000,000	123,000,000
Power	44,000,000	42,000,000
Total	$282,000,000	$262,000,000

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Extent and Kind of Bus Operation by Electric Railways

A Summary of the Methods of 121 Companies Based on a Nation-Wide Survey of the Industry Shows that Feeder Service Is the Most Common Form of Operation—Great Expansion Is Planned for 1924—The Railway, However, Remains the Cornerstone of the Transportation System in the General Opinion, Though Finding the Bus Useful as an Auxiliary.

AS THE result of a nation-wide survey just completed by the ELECTRIC RAILWAY JOURNAL, it has been found that the electric railways in the United States and Canada are now operating more than 1,200 motor buses. This is nearly three times the number which were reported to be in operation during the year 1922, and is an increase of 30 per cent over the number reported at the time of the American Electric Railway Association convention in October, 1923. A year ago there were fewer than fifty railways engaged in bus operation, while now there are 121. Much of this expansion has come during the past few months, a number of railways having inaugurated bus service since Nov. 1. Besides the companies which are already engaged in bus operation, thirty other electric railways have signified their intention of commencing such operation during the coming year. Many of the companies now operating buses are planning during 1924 to add materially to the number in use.

Bus operation is handled in a number of cases by subsidiary companies controlled by the railways. On the other hand an equal number of railways operate buses directly in their own names, so that there seems to be no general rule in this matter. In addition to the buses mentioned in the foregoing paragraph there are known to be several hundred operated under the indirect control of railway companies but which for various reasons are not included in their reports.

Many classes of service are comprised in the bus operations of the electric railways. By far the most common service, however, is that of feeder to the railway lines. A number of companies have inaugurated bus service instead of extending their tracks into new territory. Bus service has replaced railway service in some cases when an extensive program of track and paving rehabilitation would have had to be undertaken in order to continue railway operation. In some cases buses have been used for operation on crosstown feeder routes connecting with several railway lines. The complete substitution of bus service for railway service in small towns has been tried by two or three companies. Interurban and boulevard service are also included among the various uses to which the electric railways are putting the bus, but instances of such operation are not numerous.

When buses are operated as feeders to the existing street railway systems the same fare is usually charged as is charged on the cars. In many such cases free transfers are issued interchangeably. Where buses are operated on boulevard service the fare is almost invariably higher than the local railway rate and ordinarily there are no transfers issued. This same situation as to fares and transfers prevails also in some places where the bus is used to furnish transportation to sparsely settled districts where traffic demands are not great enough to justify extensions to the railway lines.

Officials of electric railways operating buses seem in general to be well pleased with the results accomplished by such operation. While buses are in many cases not directly profitable to the company, they nevertheless furnish a necessary service at less cost than could be done in any other way. The nature of the territory through which these routes are operated is usually such that no immediate profit can be expected from any transportation service. The railways have, however, not only acquired much public good will by the inauguration of bus service in the sparsely settled districts but to a great extent have also protected their own interests by forestalling possible competition.

AUXILIARY OR FEEDER SERVICE CAN BEST BE PROVIDED BY THE BUS

A few railway companies have done very well and are making a direct profit from the operation of motor buses. This is in most cases the result of comparatively high fares for short hauls. The consensus of opinion expressed by those having experience is that the bus cannot replace the electric railway for ordinary city service. Nearly all railway operators find it an unsatisfactory vehicle for mass transportation, but say that in auxiliary or feeder service it has a distinct and important place.

A point brought out by the remarks of some railway officials concerning the bus is to the effect that the bus should more properly be referred to as a "coach." It is thought that the word "bus" inadequately describes the attractive and commodious vehicles now widely used. This practice is being followed by the Pennsylvania-Ohio Electric Company, which operates its buses under the name of the Pennsylvania-Ohio Coach Lines, and always refers to them as coaches. Some other companies do likewise.

Indications are that bus operations by electric railways will increase greatly during the coming year. As already mentioned, thirty companies have definitely stated that they are contemplating the inauguration of bus service. The companies which are now operating buses are planning the purchase of much new equipment in 1924. In general an addition of about 50 per cent of the present number of buses will be made to the equipment of the railways operating them. One large company which spent $200,000 on buses in 1923 intends to expend an additional $100,000 during the coming year. Two other companies operating more than thirty buses now plan to increase the number 100 per cent next year.

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The figures in the accompanying table were compiled from the answers received by the ELECTRIC RAILWAY JOURNAL to a questionnaire sent to all the electric railways throughout the country, and from other data in the JOURNAL files. The experiences of various companies are given in the following paragraphs:

NEW ENGLAND STATES

The Connecticut Company, New Haven, operates forty-seven buses on various lines in city districts otherwise unserved, in rural districts where no other means of transportation is available, and also in rural districts where short routing gives facilities superior to the rail line. In the city the rates are the same as on the railway, but in the outlying territories bus fares are higher. In the opinion of the company the bus fills a very necessary place as an adjunct to existing rail lines, and also meets a public desire for a better service over some routes at a higher rate.

The Eastern Massachusetts Street Railway, Boston, operates thirty-one buses on various routes throughout its territory. The company says: "In substantially every instance our buses are running on lines formerly served by our electric cars. In most cases the buses were put into service some time after the cars had been stopped on account of poor condition of track and poor earnings. On only two routes were the buses put in at the same time that the cars were stopped. Most of our operation is in small towns or between small towns, and in all cases in very light riding territory.

"The rate of fare on our buses is approximately the same as on street cars in similar territory on our property. We do not generally use transfers on this system, but in some special cases they are issued between cars and buses. The rates on the buses vary in different places over a wide range, but 2½ cents a mile is about typical of the rate on the suburban lines. We have no real interurban runs.

"Our buses have operated quite satisfactorily and in some divisions have demonstrated that they can be operated at a reasonable cost. Our principal difficulty is poor earnings on the lines where they are operated. The operation of buses has been a satisfactory way out of the problems presented by the necessity otherwise of completely rebuilding a line where riding is light. Buses have been very easily able to take care of the volume of business offered on the lines where we are oprating them. We have had no bus experience with particularly heavy traffic."

The Boston Elevated Railway has had buses in service since the early part of 1922, and the plans of development call for buses as a regular part of its service. In all cases these buses are used in the suburban districts, in several instances to supply service on routes formerly operated by trolley. The change in these cases was usually made for economic reasons, it being thought that the bus service would result in less loss than that by trolley car. There is no competitive jitney service in the Boston Elevated territory.

So far as fares are concerned, the buses form an integral part of the system and give and accept transfers from trolley cars under conditions where transfers would have been given and honored if the route was operated by trolley cars. Bus operators on the Boston Elevated system are classed with the operators of the trolley cars and receive the same wages, including the regular bonus for one-man operation, as all buses are one-man operated.

The Springfield Street Railway, Springfield, Mass., operates four buses in feeder service. Bus receipts are less than the actual operating costs plus depreciation, interest on investment, etc. The operation is primarily for the purpose of protecting the railway investment.

The United Electric Railways, Providence, R. I., operates twenty-eight buses in intercity express service and also in routine local passenger service. On the basis of earnings bus operation is paying well on certain routes throughout all months of the year. Certain other routes, on account of local conditions, have such variable traffic that operating deficits occur periodically. Unquestionably, the bus operation supplies a service demanded at a lesser loss than would be incurred through railway operation. Moreover, the company feels that bus operation protects the railway investment and discourages independent jitney operation over new routes.

The greatest advantage apparent in bus operation is the relatively low capital investment required to render a service adequate to meet small traffic demands. In the opinion of the company the greatest limitation of the bus lies in its inability to compare with the electric railway car for extremely heavy passenger demands.

The Twin State Gas & Electric Company, Brattleboro, Vt., has discontinued railway service altogether and now provides the public with transportation entirely by means of buses. These buses operate on a thirty-minute headway, an improvement over the previous street car schedule.

EASTERN STATES

The Capital Traction Company, Washington, D. C., owns and operates eight buses. Three bus lines are operated as extensions to the existing street railway system. One line replaces the trolley service formerly furnished by another small company, and one bus is operated in place of an owl car. The rates of fare on street railways and buses in the District of Columbia are the same and transfers are issued at the rate of 2 cents each except where buses have replaced existing trolley service. In these instances all transfers are free.

Bus operation by this company has so far been expensive. Since operations began the average revenue per bus mile has been 8.22 cents, while the average expense was 20.73 cents. The latter figure represents only what is entered on the books as bus expense and does not include overhead. The company believes, however, that the buses are well worth their cost as they furnish service which the public demands and which would cost much more to furnish by means of extensions to the electric car lines.

The Capital Traction Company has had no experience in the handling of heavy traffic by buses but is firmly of the opinion that the bus cannot compete with the electric railway for mass transportation.

The United Railways & Electric Company, Baltimore, one of the pioneers in bus operation, now runs thirty-six buses under the name of the Baltimore Transit Company. These buses are operated in city service, as an alternative to the street cars in two instances, and on two more routes as feeder service. On the feeder routes the fare is the same as on the railway, but on the alternative city routes the bus fare is 10 cents. In the first case transfers are exchanged and in the second they are not.

The company expresses its opinion of bus operation

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as follows: "We believe that buses have a field for operation as a supplement to the street railway system, either as an alternative service, as feeder service, or as pioneer service, so called. We feel that the operation of buses in Baltimore has been justified and that moreover they have helped us to maintain our position as the corporation supplying transportation to all sections of the community.

"Our experience as to the advantages and limitations of the bus is in general similar to that of other companies. It is not a vehicle adapted to handling mass transportation, but has advantages for furnishing superior service on the basis of a seat for each passenger, thus in effect being a kind of limited service as this word is understood in connection with railroad service."

The Public Service Railway, Newark, operates two bus lines in the city of Camden and one feeder line in sparsely settled territory. On one of the former, a crosstown route, the bus has supplanted the railway service altogether. This is a short line crossing several street car lines and connecting with the ferry. The same fare is charged as on the railway, 5 cents, and no transfers are issued. On another route the buses have partly supplemented the railway service and serve also to some extent as an extension to the line. The feeder bus route connects a small town about a mile from the railway with an interurban car line. Results of these operations are considered to have been entirely satisfactory.

The New York State Railways operates buses in Rochester and in Utica. In the former city they are operated in a section not otherwise served and connect with one of the railway lines. The fare is divided into three zones, the rate within the city zone being 7 cents with transfer, 3 cents between the city line and the end of the first zone and 15 cents to the end of the route with transfer privilege. A reduced rate ticket is also in effect. In Utica the fare on the buses is 7 cents. According to the company, the operation of buses seems to be working out very satisfactorily.

The Altoona & Logan Valley Electric Railway, Altoona, Pa., operates seven buses under the name of the Logan Valley Bus Company. There is a fare differential in favor of the railway of 3 cents, the bus fare being 10 cents and the railway fare 7 cents. Free transfers are issued from the bus to the railway, but a charge of the additional 3 cents is made for a transfer from the railway to the bus. This service has been in operation only a few months, and although business is gradually picking up it is still more in the nature of an accommodation to the territory served than a source of profit to the railway. However, the company believes that the bus is a good feeder to the trolley from points where service is required but where traffic is not sufficiently heavy to warrant the building of a railway line.

The Conestoga Traction Company, Lancaster, Pa., operates buses under the name of the Conestoga Transportation Company, at the same fare as the railway. No transfers are issued, however, and a separate fare is collected by each company. The railway says: "Bus operation seems satisfactory to the public and avoids the expenditure of a larger sum of money by the street car company to construct a car line through undeveloped territory. The bus operation thus far has been conducted at a slight loss, which we feel is about offset by the increase in passengers riding on the electric railway lines."

The Citizens Traction Company, Oil City, Pa., operates two bus lines, one being a city line and the other an interurban line. On the city line the railway fare is 8 cents and the bus fare 10 cents, and transfers are issued. In interurban service the railway fare is approximately 2½ cents a mile, whereas the bus fare is 4 cents a mile. The company thinks that bus operation is not satisfactory on an earnings basis. It does, however, provide service demanded at a lower cost than the railway could do in an outlying district. Bus service is also important in protecting the railway investment. The experience of this company leads to the belief that the bus is not suited for mass transportation and is advantageous only where the traffic is light.

The Philadelphia Rapid Transit Company operates fifteen buses under the name of the Philadelphia Rural Transit Company. It is expected that five additional buses will soon be placed in service. This operation is auxiliary to the street railway service, although a 10-cent fare is charged instead of 7 cents. The length of time this route has been operated is so short that no definite conclusions have yet been reached by the company concerning the merits of bus operation.

The West Chester Street Railway has, through its subsidiary, the Peoples Transportation Corporation, acquired control of all the motor bus routes in southern Chester County, connecting points in this district with the cities of Chester, Pa., and Wilmington, Del., and a co-ordinated plan of railway and motor bus transportation for the whole district is now being worked out.

Another railway which formerly operated from West Grove to Kennett Square, a distance of 7½ miles, and thence 14 miles southward to the outskirts of Wilmington, ceased operation in April, 1923. Most of the traffic had been on the Kennett-West Grove division, the earnings of which practically carried the whole property. This portion of the line has now been taken over by the West Chester Street Railway. The remainder of the old road has been sold and the tracks taken up, the district being served by buses of the West Chester Company.

The York Railways, York, Pa., operates three buses under the name of the York Transit Company. One bus line is a feeder to an 8-mile interurban line. The other operates in territory not served by the railway. The line operating as a feeder has been decidedly unprofitable, even though additional travel on the railway is considered. Unless traffic increases so that the bus line will be self-supporting, in the near future application will be made for its discontinuance. The second line has not been in operation sufficiently long for the company to be able to pass judgment upon its success. This railway says:

"We cannot find any physical advantages of the bus over the electric car, but bus lines when tried and found unprofitable do not, of course, entail the enormous loss which would occur in the construction and operation of cars on tracks. The bus has its advantages under certain conditions, and in many instances can no doubt be used profitably as a feeder to the existing railway lines."

The Monongahela Railway & Power Company, Fairmont, W. Va., recently purchased the Marietta Bus Company, which will be continued under the name of the Pioneer Transport Company. It is planned to furnish service in connection with the street railway operation in the city of Marietta. Under the present

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Summary of Bus Operation by Electric Railway Companies

Name of Railway	Name of Bus Subsidiary	Number of Buses	Date Operation Began	Kind of Service	Rate of Fare: Bus	Rate of Fare: Railway	Transfer to Railway
CONNECTICUT							
Danbury & Bethel St. Ry., Danbury		5	Aug. 1921	2&3	10	10	Free
Connecticut Co., New Haven		47	July 1921	2-3-4-5	10	10	Free
Groton & Stonington St. Ry., Norwich		5	Nov. 1922	2-3-5	05	05	None
Hartford & Springfield St. Ry., Warehouse Point		2	Dec. 1923	2	10	10	....
MASSACHUSETTS							
Eastern Mass. St. Ry., Boston		31	Jan. 1922	2-3-4-5	10	10	Free
Boston Elevated Ry		31	Feb. 1922	2-3-4	05	10	None
Connecticut Valley St. Ry., Greenfield		1	Nov. 1922	5	10	10	None
Northern Mass. St. Ry., Greenfield		1	Aug. 1922	2	05	10	None
Holyoke St. Ry		3	July 1921	3	06	06	None
Union St. Ry., New Bedford		3	Dec. 1923	4	05	05	....
Plymouth & Brockton St. Ry., Plymouth		2	Feb. 1923	2	07	07	Free
Springfield St. Ry		4	Feb. 1923	2	07	07	Free
RHODE ISLAND							
United Elec. Rys., Providence		28	July 1922	3-4-5	06	06	Free
VERMONT							
Twin State Gas & Elec. Co., Brattleboro		3	Aug. 1923	6	10	Discontinued	
DISTRICT OF COLUMBIA							
Capital Traction Co., Washington		8	Feb. 1923	2	08	08	02
Washington Ry. & Elec. Co		17	May 1922	2-3-4	08	08	Free
Washington-Virginia Ry		4	Jan. 1922	2	05	05	Free
MARYLAND							
United Rys. & Elec. Co., Baltimore	Baltimore Transit Co	36	 1915	2&3	10	07	Free
Potomac Edison Co., Cumberland		2	Jan. 1924	3	10	07	....
Potomac Public Service Co., Frederick		15	 1923	5	10	08	....
NEW JERSEY							
Millville Traction Co		1	....	2	..	..	....
Morris County Traction Co., Morristown	Dover Bus Co	1	July 1923	2	05	07	02
Public Service Ry., Newark	Public Service Transp. Co	27	July 1922	2&4	05	05	None
Trenton & Mercer County Traction Corp	Central Transp. Co	5	Sept. 1923	3	08	08	01
NEW YORK							
International Ry., Buffalo	International Bus Corp	3	Sept. 1923	2	07	07	Free
Jamestown St. Ry		11	Mar. 1922	3	08	08	Free
Orange County Traction Co., Newburgh	Newburgh Pub. Service Corp	32	Mar. 1922	6	07	Discontinued	
Niagara Gorge R. R., Niagara Falls	Niagara Gray Bus Line	10	 1921	..	..	..	....
N. Y. State Rys. (Rochester Lines)		3	Nov. 1923	2	07	07	Free
N. Y. State Rys. (Utica Lines)	Utica Ry. Co-ordinated Bus Line	4	Oct. 1923	2	07	07	Free
PENNSYLVANIA							
Altoona & Logan Valley Elec. Ry	Logan Valley Bus Co	7	July 1923	2	10	07	Free
Schuylkill Ry., Girardville	Schuylkill Transp. Co	6	July 1922	3	10	..	....
Johnstown Traction Co	Traction Bus Co	3	Dec. 1922	2	..	..	....
Conestoga Traction Co., Lancaster	Conestoga Transp. Co	2	April 1923	2	06	06	None
Lewistown & Reedsville Elec. Ry	Lewistown Transp. Co	2	Jan. 1924	2	06	06	Free
Beaver Valley Traction Co., New Brighton		2	June 1923	2	10	05	Free
Citizens Traction Co., Oil City	Citizens Transit Co	4	July 1921	2&5	4c. mi. 10	2.5c. mi. 08	Free
Philadelphia Rapid Transit Co	Philadelphia Rural Transit Co	20	Sept. 1923	2	10	07	03
Pittsburgh, Harmony, Butler & New Castle Ry., Harmony		3	April 1923	5	..	..	....
Jefferson Traction Co., Punxsutawney		3	....	..	..	..	....
West Chester St. Ry	Peoples Transportation Co	14	 1923	5	..	..	....
York Rys	York Transit Co	3	Aug. 1923	2&5	10	07	Free
WEST VIRGINIA							
Wheeling Public Service Co		4	....	..	..	..	....
Monongahela Power & Ry., Fairmont	Pioneer Transport Co	8	Jan. 1924	2&5	07	07	None
Princeton Power Co		1	 1923	2	..	..	....
ILLINOIS							
Centralia Traction Co		1	....	..	..	..	....
Chicago & West Towns Ry., Oak Park		2	Jan. 1923	2	10	10	Free
East St. Louis Ry		4	Mar. 1923	4	08	08	Free
Chicago, North Shore & Milwaukee R. R., Highwood		27	Aug. 1922	2&5	Ticket 3.6c mi. 4c. mi.	3c. mi. 3.3c. mi.	....
Chicago & Joliet Elec. Ry., Joliet	Chicago & Joliet Transp. Co	2	April 1923	5	15	..	None
Rockford City Traction Co		6	April 1922	2	10	10	Free
Tri-City Ry., Rock Island		2	Nov. 1923	2	10	10	Free
INDIANA							
Gary St. Ry		7	May 1922	3	10	10	Free
Gary & Valparaiso Ry., Gary		1	Dec. 1922	5	..	..	....
Chicago, South Bend & Northern Ind. Ry., South Bend		3	Sept. 1923	3	08	05	Free
IOWA							
Des Moines City Ry		6	 1923	2	..	..	....
Dubuque Elec. Co		3	June 1914	2	10	08	None
Waterloo, Cedar Falls & Northern Ry., Waterloo	Cedar Valley Road	6	Jan. 1923	5	15	..	Free
KENTUCKY							
Louisville Ry	Kentucky Carriers, Inc	12	June 1923	1&3	10	..	....
MICHIGAN							
City of Detroit (Dept. St. Rys.)		5*	Nov. 1923	2	06	06	None
Grand Rapids Ry		6	April 1923	2	10	10	Free
Houghton County Traction Co., Houghton	Houghton City Bus Co	3	....	5	..	..	....
Michigan United Rys., Jackson		11	Mar. 1922	2&3	08	..	Free
Muskegon Traction & Lighting Co		1	Nov. 1923	4	10	10	Free
Saginaw-Bay City Ry	Saginaw Transit Co	25	Nov. 1923	3	..	..	....
MINNESOTA							
Mankato Elec. Traction Co		2	Sept. 1923	5	07	05	....
Twin City Rapid Transit Co., Minneapolis		1	Dec. 1921	2	06	06	Free
MISSOURI							
Springfield Traction Co		13	Aug. 1921	3	05	07	02
OHIO							
Northern Ohio Traction & Light Co., Akron	Northern Transit Co	17	Mar. 1922	2&5	05	05	Free
City of Ashtabula (Div. St. Rys.)		1	....	..	..	..	....
Steubenville, E. Liverpool & Beaver Valley Trac. Co., E. Liverpool	Valley Motor Transp. Co	2	Aug. 1923	..	10	..	None

*Operated under agreement with Detroit Motorbus Company.

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Summary of Bus Operation by Electric Railway Companies—(Continued)

Name of Railway	Name of Bus Subsidiary	Number of Buses	Date Operation Began	Kind of Service	Rate of Fare: Bus	Rate of Fare: Railway	Transfer to Railway
OHIO—(Continued)							
Hocking-Sunday Creek Trac. Co., Nelsonville		1	 1922	..	05	03	....
Columbus, Newark & Zanesville Elec. Ry., Columbus	C. & Z. Transp. Co.	13	Jan. 1923	2&5	9 @ 50	9 @ 50	....
Springfield St. Ry.		1	Nov. 1923	2	07	07	Free
Indiana, Columbus & Eastern Trac. Co., Cincinnati	Dayton & Columbus Transp. Co.	15	Feb. 1923	2&5	3c. mi.	..	....
Community Traction Co., Toledo		4	.....	..	..	..	....
Penn.-Ohio Elec. Co., Youngstown	Akron-Youngstown Bus Co.	..	.....	..	3c. mi.	..	....
	P-O Coach Lines Co.	26	Aug. 1922	2&5	10	10	Free
Youngstown Municipal Ry.		31	Sept. 1922	2	08	08	01
Youngstown & Suburban Ry.	Youngstown & Suburban Transp. Co.	4	April 1923	5	2.4c. mi.	2.8c. mi.	None
WISCONSIN							
Wisconsin Public Service Corp., Green Bay	Riverview Motorbus Co.	3	1922	5	10	07	Free
Wisconsin Gas & Electric Co., Kenosha		6	.....	2	07	07	Free
Milwaukee Elec Ry. & Lt.	Wisconsin Motor Bus Lines	100	Aug. 1919	1-2-5	10 07	07	None Free
Eastern Wisconsin Elec. Co., Oshkosh		8	Aug. 1922	5	3.5c. mi.	08	....
Wisconsin Valley Elec. Co., Wausau	Valley Transit Co.	..	.....	..	..	..	....
	Merrill Bus	4	Nov. 1921	6	10	Discontinued	
ALABAMA							
Birmingham Ry., Lt. & Power Co.		4	Oct. 1923	2	07	07	Free
ARKANSAS							
Arkansas Central Power Co., Little Rock		1	Nov. 1923	2	..	..	....
Intercity Terminal Ry., No. Little Rock		12	 1922	3	06	..	....
MISSISSIPPI							
Vicksburg Light & Traction Co.		2	Oct. 1923	2	07	07	Free
SOUTH CAROLINA							
South Carolina Gas & Elec. Co., Spartanburg		4	Sept. 1923	6	05	Discontinued	
CALIFORNIA							
Bakersfield & Kern Elec. Ry., Bakersfield		5	May 1915	2	05	05	Free
Los Angeles Ry.	Los Angeles Motor Bus Co.	100	Oct. 1923	1-2-3-4	10	05	Free
Pacific Elec. Ry., Los Angeles	Pacific Elec. Land Co.	102	 1917	2&5	06 3c. mi.	06 2.75c. mi.	Free ....
San Francisco-Oakland Terminal Rys., Oakland		4	May 1921	2	06	06	Free
Pacific Gas & Elec. Co., Sacramento		4	 1922	2	..	..	....
San Diego Elec. Ry.		3	Nov. 1922	2	05	05	Free
Municipal Ry. of San Francisco		8	Feb. 1918	2	05	05	Free
Peninsular Ry., San Jose		3	Sept. 1922	2	10	06	....
Santa Barbara & Suburban Ry.		6	Jan. 1917	2	08	08	Free
Stockton Elec. R.R.		3	 1915	2	..	..	....
KANSAS							
Kansas Elec. Power Co., Lawrence		2	Aug. 1923	3	08	08	Free
Salina St. Ry.		1	 1920	..	10	..	....
NEW MEXICO							
City Electric Co., Albuquerque		1	Dec. 1921	3	07	07	Free
OKLAHOMA							
Tulsa St. Ry.		23	July 1922	3	07	07	Free
Okmulgee Traction Co.		3	 1920	3	10	..	Free
SOUTH DAKOTA							
Sioux Falls Traction System		5	May 1923	2	10	06	Free
TEXAS							
Eastern Texas Traction Co., Beaumont		1	Dec. 1923	2	10	..	....
Northern Texas Traction Co., Fort Worth	Fort Worth Auto Bus Co.	8	May 1917	2	07	07	Free
San Antonio Public Service Co.		10	July 1923	3	06	06	Free
UTAH							
Utah Light & Traction Co., Salt Lake City		2	Oct. 1923	4	10	..	....
WASHINGTON							
Puget Sound International Ry. & Power Co., Everett		17	Dec. 1922	5	..	..	....
Pacific Northwest Traction Co., Seattle	Thompson-Smith Transp. Co.	13	July 1921	5	3c. mi.	..	....
Seattle Municipal Street Ry.		10	Nov. 1919	2	10	10	Free
Seattle & Rainier Valley Ry., Seattle		2	.....	2	05	10	None
Pacific Traction Co., Tacoma		..	July 1923	5	..	..	....
Tacoma Ry. & Power Co.		2	Feb. 1923	2	10	..	Free
CANADA							
British Columbia Elec. Ry., Vancouver		2	April 1923	2	6 @ 35	6 @ 35	Free
Toronto Transportation Commission		15	Sept. 1921	2	07	07	Free
Winnipeg Elec. Ry.		11	May 1918	2	07	07	Free
Montreal Tramways		2	Nov. 1921	2	07	07	Free
Nova Scotia Tramways & Power Co., Halifax		2	.....	..	..	..	....
PANAMA							
Panama Elec. Co., Panama		2	.....	..	..	..	....

CLASSIFICATION OF SERVICE
1—Boulevard; 2— Rail line extension; 3— New route to city center; 4—Crosstown Auxiliary; 5—Interurban; 6—Complete substitution

plan these buses will parallel street railway lines for part of the route over which they are operated, but will be so scheduled that they come in between the regular street cars.

In addition to bus operation in Marietta the company has purchased buses to be operated between the city of Morgantown, W. Va., and the terminus of the railway line at Rivesville, which is about 5 miles north of the city of Fairmont. It is planned to sell through transportation from Fairmont to Morgantown, transferring passengers at Rivesville from the cars to the buses or vice versa.

CENTRAL STATES

The East St. Louis Railway operates four buses in crosstown service where no transportation facilities previously existed. The same rates are charged on the railway and on the buses and free transfers are issued. In every way the buses are on the same basis as the street cars. Bus operation has been as satisfactory as

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was expected. It is a losing proposition, but the company is losing less money on the buses than if new tracks were built. Track could not be built at the present time except at excessive cost, and buses furnish a service which is helpful from the point of view of public relations.

This company finds no appreciable advantage in the bus, and the main reason for operating it is that the service can be rendered at a less cost. Over part of the route where the buses operate there is practically no pavement and this hampers operation to a considerable extent. Buses can be used only where pavement is good and it is impractical for the company to maintain the paving for buses where it is used also by all other automobile traffic.

The Chicago North Shore & Milwaukee Railroad operates twenty-seven buses in feeder and special service. The company states: "As a protection to our railway investment and as a feeder to our railway lines, we consider the motor coach operation satisfactory. We have also, to a limited extent, used the motor coach for an extension to our street railway service, thus supplying a demand for service at a very small investment and approximately no loss from operation even during the first few months of the development period."

The Chicago & Joliet Electric Railway, Joliet, Ill., operates bus service between Stateville, the site of the new Illinois State Penitentiary, and the city of Lockport, where connection is made with the interurban service for points between Joliet and Chicago. The fare is 15 cents and no transfers are issued between cars and buses. The company gives its opinion as follows:

"Our experience with the operation of the bus, notwithstanding the high rates of fare we charge, has not been financially satisfactory so far. This service was inaugurated to protect our territory, and since there is no intermediate traffic between the two terminals we have to rely upon the revenue from carrying state employees to and from the prison, together with the few visitors to convicts on the Honor Farm adjacent.

"Up to the present time about one-half of the convicts have been transferred from the old to the new penitentiary, but owing to the fact that the administration building is not yet completed, visitors are not allowed. It is expected that all prisoners will be in the new prison by June 1, next year, and the penitentiary will then be open to the public certain hours of the day. We believe that when this occurs our traffic on this bus line will warrant a reduction in fares and make the operation profitable."

The Chicago & West Towns Railway, Oak Park, Ill., operates buses in feeder service. The same rate of fare, 10 cents, is charged on both railway and bus with free transfers. Up to the present time this service has been operated at a loss.

The Tri-City Railway, Davenport, Iowa, operates one bus in Moline, Ill. This line gives city service only with transfer to and from the connecting railway line. It has not been in operation for a sufficient length of time to enable any conclusions to be reached concerning its success.

The Rockford City Traction Company, Rockford, Ill., operates six buses in city service. The same rates of fare are charged on the bus lines and on the railway with free transfers from buses to cars, and vice versa. In the opinion of the company, "It is very difficult to say much about the satisfactoriness and worth of bus operation. Our bus operation shows a net loss of about $2,500 per month. The operation costs are low, but the gross earnings are poor. As to the physical advantages and limitations of the bus, we have been able to handle all passengers who have offered themselves for transportation on our buses."

The Dubuque Electric Company, Dubuque, Iowa, was one of the pioneers in the bus business, having commenced this operation in June, 1914. Ten cents is charged on the bus, as against only 8 cents on the railway. No transfer privilege from bus to railway or vice versa is in effect. This company has found bus operation more satisfactory as a railway feeder or as a transportation medium on lines where travel is limited than as a substitute for ordinary street car operation. The use of the bus in sparsely settled territory is advantageous, since street car operation requires a large original investment and subsequent expenditures for repairs. Bus operation is satisfactory, if limited to routes without steep grades.

The Louisville Railway, Louisville, Ky., is operating buses on two routes under the name of Kentucky Carriers, Inc. One route is from the center of Louisville into the southern part of the town, where jitney competition in the past has been most active. The other runs through the southeastern section of the city. Neither route traverses the streets over which the cars of the Louisville Railway are operated.

At the present time the bus service is not earning more than 60 per cent of its operating cost. Very little improvement has been shown in earnings in spite of changes in operating schedules, and the company has recently announced that the present bus service will probably be abandoned unless the public supports it better. The fact that the idea of service by bus is somewhat new in Louisville and that the public has not become attracted to it is regarded as being partly responsible for the lack of patronage.

The City of Detroit, Department of Street Railways, has bus operation over a short route connecting with one of the railway lines. This service is not operated directly by the city, but by the Detroit Motor Bus Company on a mileage basis under the supervision of the railway. The rate of fare on this line and on the railway is the same, but no transfers are issued. The service has not been a paying proposition, but has been furnished because this particular locality was otherwise without transportation service.

The Grand Rapids Railway, Grand Rapids, Mich., operates six buses in city service. When these buses started operation the route was from the center of the town to an outlying district. The service was later discontinued and operation was begun as a feeder line connecting with the main line and issuing free transfers. The rate of fare on the railway and on the buses is the same. The experience of the company is that bus operation results in no financial gain. It is believed that the advantage of the bus is limited to the outlying districts where the cost of rails and overhead construction would be greater than the traffic warrants. Moreover, the bus cannot handle peak loads because of its limited capacity, and if sufficient bus equipment were provided it would congest the thoroughfares. The bus is believed to be satisfactory for feeder service.

The Springfield Traction Company, Springfield, Mo., operates thirteen buses in city service. The fare of the railway is 7 cents, while the bus fare is only 5 cents. Free transfers are issued from the street car

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to the bus, but a 2-cent charge is made for transfer from bus to railway. The company considers that this service has been satisfactory in protecting railway investments. In a general way, it is thought that bus service is apt to be a success on smooth, well-paved roads, but is not likely to be successful over a rough pavement.

The Columbus, Newark & Zanesville Electric Railway operates twenty-eight buses in interurban service, connecting Dayton, Springfield, Newark, Zanesville, Urbana and Bellefontaine. The company says: "In order to get the proper background and to understand our motives in going into the bus business, it is necessary to speak in some detail of bus competition with which we have had to contend. Our first competition appeared some two and one-half years ago, giving hourly service with seven-passenger cars between Zanesville and Columbus. This was an association of individuals, each driver owning and operating his own bus and contributing a portion of his receipts to a general fund wherewith to pay for timetables, terminal facilities, advertising, etc. By the early part of 1923 parallel competition covered in some degree all of our interurban lines.

"As a means of combating this competition, we decided to go into the bus business on our own account. In making this decision we were influenced by the evident intention of the Ohio State Assembly to provide a bus law which would place all bus operation under the jurisdiction of the public utility commission, and it was the desire to get in under the wire which induced us to go into the bus business when we did. In this way, when the time came to pass around certificates of necessity, we would be in a position to claim some.

"Thus far we have succeeded in driving only one competing bus line out of business, namely, the line which at one time operated from Springfield through Urbana and Bellefontaine to Lakeview. We believe, however, that we have kept down the earnings of all other competitors to a point where they are not making enough money adequately to meet all charges. We know that several of our competitors are on a very unstable basis financially and have hopes that when their state and federal fees for 1924 come due they may be forced either to curtail or suspend operation.

"To the extent of having protected our railway investments by securing certificates of necessity, which enable us to compete with rival business, our service has been a success. Financially, it has been operated at a loss, and we can see no hope under present conditions and with the present type of buses whereby we can expect to make anything out of bus operation."

The Pennsylvania-Ohio Electric Company operates twenty-one buses as interurban coaches and five in city operation in New Castle. The buses in New Castle are operated at the same fare as the street railways, with free transfer between the two. This operation supplies a service for which there is popular demand at less expense than would be the case with the street railway.

Of the two divisions of the interurban bus operation one is for the purpose of perfecting railway investment and the other is in the hope of profit. The experience of this company with the bus has in general been satisfactory, although it is felt that there are still some mechanical problems to be solved.

The Youngstown Municipal Railway, Youngstown, Ohio, operates thirty-one buses in city service, accommodating sections of the city not previously served by street railway lines. The rate of fare is the same on the railway and on the bus and free transfers are issued. The company says:

"Buses have a very particular field of operation, and in that field, which in our case is serving sections of the city not already served by railway cars, the buses have proved very satisfactory. It was impossible for this company to raise sufficient money to install street car lines in the rapidly growing sections of the city to which the buses operate. Jitneys were carrying people to and from these districts and, in addition, were carrying people to and from points along our car line. It was therefore necessary for us to take care of these outlying sections of the city if we were to have any success against the jitney competition.

"Buses also have a decided advantage in trying out new territory, in that if the service given is not appreciated buses can easily be transferred to some other sections of the city without loss on account of track and overhead being in place. To sum up, the buses were put in service to protect our existing railway investment. Although buses are advantageous in developing new territory, they have decided limitations in so far as handling mass transportation is concerned. One study made on this property in connection with the handling of industrial loads developed that it would require three buses for every street car during the peak period, which of course would be prohibitive."

The Youngstown & Suburban Railway operates four buses in interurban service. These are unusually commodious vehicles with individual wicker chairs, and the fare charged is 2.4 cents a mile with a minimum of 15 cents. Experience with buses to date has not been satisfactory, due to the high maintenance cost. The company believes that buses are as yet far from mechanically perfect, and these buses are being written off the books on a basis of a life of 200,000 miles.

The Milwaukee Electric Railway & Light Company operates 100 buses in interurban service and in de luxe city service under the name of the Wisconsin Motor Bus Lines. In addition, a number of bus lines are operated as feeders to the railway system. On feeder lines the same fare is charged as on the railway, with free transfers, while on the de luxe line the bus fare is 10 cents with no transfer privilege.

Bus service is being operated to supply a public demand for this type of transportation, to protect the railway investment and to avoid the necessity of expensive railway construction until such time as it is found that the traffic justifies it. The company reports:

"Our experience has indicated that while the motor bus is desirable from the point of view of flexibility, it has a number of limitations, such as higher cost of maintenance and operation, more rapid depreciation and inability to handle overloads as well as electric railway equipment."

The Wisconsin Valley Electric Company, Wausau, Wis., acquired the Merrill Railway in the fall of 1915. This property included 1¾ miles of electric street railway which had been losing money ever since it was put in operation in 1889. The cars were in a deplorable condition, as was also the overhead system. The tracks had been rebuilt a few years previous to the time of the purchase, but were very poorly constructed and rehabilitation would have required an expenditure of approximately $40,000. In a city the size of Merrill, which has a population between 8,000 and 9,000, it was

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thought that it would be impossible to earn even operating expenses. The company therefore decided to replace the electric railway service 100 per cent with bus service.

Three buses were purchased and put in operation in November, 1921, two buses being required to give fifteen-minute service over the same route as the electric cars had been formerly operated. Later this line was extended, so that instead of the 1¾ miles originally operated there are now 2½ miles. An additional bus was purchased in July, 1922, and placed in interurban service, as was also one of the original buses. There was not patronage enough, however, to keep these interurban lines in operation, and when the highways became bad in the fall they were abandoned. Operation is now confined exclusively to the city of Merrill.

Financially, the bus operation has not been a profitable venture, but the company has lost less money than would have been the case if electric cars had been continued. The service at least carries itself, which is better than the railway used to do, and at the same time the public is receiving better transportation. The latter factor is advantageous from the point of view of public relations.

SOUTHERN STATES

The Birmingham Railway, Light & Power Company, Birmingham, Ala., operates a shuttle bus line in accordance with an agreement with the city to furnish service on a route previously operated by jitneys. Buses were selected as the lesser evil with respect to losses.

The Vicksburg Light & Traction Company, Vicksburg, Miss., inaugurated bus service in order to avoid an investment of $40,000 for street paving. Track was removed and buses purchased. This company finds the revenue per mile on the buses to be much greater than with the street cars. Furthermore, the maintenance of track and overhead construction has been eliminated.

The South Carolina Gas & Electric Company began operation of motor buses in September of this year instead of electric street railway cars in the city of Spartanburg. It has found the buses to be a very satisfactory substitute for the electric cars. The expenses, however, are somewhat greater than the income for several reasons. First, the fare is only 5 cents, and second, there are not enough buses to accommodate the traffic and to provide adequate schedules. The company is of the opinion that the motor bus can be substituted successfully for the electric street car in cities the size of Spartanburg, provided that the rate of fare be fixed at 8 cents or 10 cents in the city or per zone for suburban transportation.

WESTERN STATES

The Bakersfield & Kern Electric Railway, Fresno, Cal., has operated buses since May, 1915, in connection with the regular railway service, but has found them to be unsatisfactory.

The Pacific Electric Railway and the *Los Angeles Railway* co-operate in furnishing bus service in the Los Angeles district under the name of the Los Angeles Motorbus Company. There are now three routes in operation covering a total of 27 miles. A crosstown bus line extends from Hollywood, on the north, across the western portion of the city of Los Angeles to Slauson Avenue on the south, a distance of 11 miles. Another bus line operates between Hollywood and the business district of Los Angeles, a distance of 10 miles. From the northern part of Hollywood to the center of Los Angeles a third route covering a distance of 6 miles has been established. These three lines require a total of approximately seventy buses.

The local fare in the Hollywood district is 6 cents, while the through bus fare over these routes is 10 cents, carrying with it the privilege of transferring to the street car lines of the Pacific Railway and the Los Angeles Railway.

One railway line in the city of Pasadena bus service has been substituted for trolley service. This was done because an expenditure of $350,000 would have been necessary to rebuild the tracks if the car line were to be continued. Railway service was discontinued temporarily and bus service installed. Indications are that bus service will remain permanently because travel on this route is not very heavy. Forty-five buses are being operated by the railway in Pasadena. Together with shops and garage facilities this involves a total bus investment in the city of about $500,000.

In addition to the bus service in the city of Pasadena and in Los Angeles the Pacific Electric Railway operates feeders or auxiliary bus lines as part of its railway system in the cities of Santa Ana, Alhambra, Beverly Hills, Glendale, San Bernardino and Redlands. About fifty buses are required for this service.

In a great many instances the bus lines are being operated at a slight loss when operating expenses, interest, depreciation and taxes are considered. However, the loss is not looked upon as a serious matter for the reason that the bus service has been installed instead of extending railway lines to take care of the growing traffic demands of districts not otherwise served.

The San Francisco-Oakland Terminal Railways operates four buses as feeders to street railway lines. The company considers the operation unsatisfactory so far as the earnings are concerned, the service having been established merely to develop outlying territory. For this purpose it costs less per bus-mile than similar service by the railway would cost per car-mile.

The San Diego Electric Railway, San Diego, Cal., is at present operating three coaches as feeder service in new suburban territory. The company says that motor coach operation has been unsatisfactory so far as earnings are concerned. It is considered desirable as supplementary or feeder service in order to avoid making large investments in sparsely settled territories, or to replace the street car service in unprofitable territories. "Supplying service demanded at less cost" is believed by this company to be the real truth concerning the motor coach operation by electric railways. The coach is considered "not suitable for mass transportation from the standpoint of safety, comfort, cost of operation, reliability nor ability to handle rush-hour crowds."

The Municipal Railway of San Francisco first commenced the operation of buses with rented equipment in 1917, its own equipment not being in use until February, 1918. Bus service has been only fairly satisfactory, but has obviated the necessity of having to build expensive lines in order to take care of sparsely settled communities within the city limits. At present with eight buses the loss on their operation is approximately $100 a day. The actual operating cost per mile for buses almost equals that of the street cars. The advantage, however, lies in the fact that there are much smaller interest and depreciation charges to be met.

The Santa Barbara & Suburban Railway operates six buses in city service. This is done to supplement car service, because the investment required renders it

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impossible to build car lines into newly developed territory. The fare charged on the bus, which is 8 cents, the same as the railway, is too low for bus operation, in the opinion of the company, and the service is rendered as a protection to the railway investment and to eliminate competition. The railway believes that the bus has some advantages, such as being able to take on and discharge passengers at the curb and to render more speedy service. On account of the tremendous investment required to handle mass transportation, buses can never supplant railway service.

The Kansas Electric Power Company, Emporia, Kan., last summer purchased two buses which were placed in operation in August as a trial installation to determine whether or not such service would be more satisfactory to the public and to the company than the existing street railway operation. The company says: "We have been unable so far to show any advantages in bus operation over street car operation so far as the cost of service is concerned, and there has been very little difference in the amount of revenue obtained. The depreciation on the bus will be about twice that of the street car and the cost of each unit would be approximately the same. There would undoubtedly be some saving due to track and paving maintenance. This would probably be just about offset by the higher bus maintenance and depreciation."

The City Electric Company of Albuquerque, N. M., operates one bus on a route extending outward from the center of the town but not competing with the railway. Experience has been satisfactory so far but the bus is more costly to operate than is a small street car.

The Sioux Falls Traction System, Sioux Falls, S. D., operates five buses in city service. The company says: "We find the bus has an important field to fill in city transportation, serving sections where it is impracticable to make the heavy investment required for the construction of an electric railway line. Actual operating costs per vehicle are higher for the bus than for the street car, but considering all the component parts of the electric railway system, such as track, overhead wiring and paving, the bus has considerable advantage.

"As an element of protection from destructive competition on the part of fly-by-night jitney operators it appeals to us that it is necessary for street railways to co-ordinate the transportation facilities of a community under one management. Because the street railways from their experience in the transportation field are qualified to serve the public, if buses are necessary to furnish properly the required transportation in addition to that furnished by the existing street railway lines, then it is up to the street railway to supply this means transportation if it is to function properly within the community it serves.

"There are certain advantages in the operation of motor buses over street cars, especially on single-track lines. A disabled car, a derailment, or a broken trolley wire sometimes ties up the entire street railway system for the time being. Fire, paving operations, traffic blockades cause similar effects. Delays at passing switches are inevitable and tend to slow up the service. Motor buses have none of these drawbacks, operating as they do each as a separate unit. But their capacity is limited, they are not so commodious and hence passengers load and unload more slowly. When they are full they are so full that they lack the ability of the street car always to take on one additional passenger.

"We feel that the truck manufacturers, the body builders, etc., are doing an injustice to the type of equipment now coming into extensive use when they refer to it as a 'bus.' When one refers to a 'bus' the first impression is of an old, narrow, side-seated rattly affair, such as used to meet all railroad trains. The beautiful, comfortable, modern equipment now being put into service is entitled to a more dignified name and we invariably call ours 'coaches,' and are endeavoring to educate our public to do likewise."

The Eastern Texas Traction Company, Beaumont, Tex., operates one bus as a feeder to its interurban railway line. The bus runs from Nederland, a small town on the interurban, to Port Neches, about 4 miles distant, in which is located a large asphalt plant. The line was instituted to give a much needed service to the people of the communities concerned, and there was no expectation of profit on the investment. On the contrary it was expected to operate at a loss until the district develops further. Operation has not been of long enough duration to permit any definite conclusions.

The Northern Texas Traction Company, Fort Worth, Tex., operates eight buses in city service. The greater part of this operation is an extension to one of the city lines to serve a pleasure resort. For several months buses have been serving a territory to which a street railway line is now being built. The company says: "The experience we have had with bus operation has been satisfactory for the purposes for which we use it. Our bus operation has all been without profit and a considerable loss has been experienced a great part of the time. We feel, however, that a loss of this nature is justified in some cases, in order to keep all transportation under control of the street railway system.

"While our experience with bus operation is somewhat limited, it is our opinion that the bus has no physical advantages over the street car and that the limitations of the bus are far greater than those of the street car in handling mass transportation. We firmly believe that the bus has its field in transportation and that street railways should develop this field."

The San Antonio Public Service Company, San Antonio, Tex., operates ten buses, mostly in shuttle service. They were placed in operation to replace an old street car shuttle which was abandoned to avoid extensive paving charges, to take care of territory not easily accessible to the railway and threatened with jitneys, to give service to territory not served by the railway and furnishing the backbone of the jitney patronage in South San Antonio, to give temporary service while a railway line was being reconstructed, and to replace a suburban trolley line which was very unprofitable and badly in need of reconstruction. These operations were generally successful in that expenses were met and losses reduced, although no large profits have been made.

The Utah Light & Transit Company, Salt Lake City, operates a crosstown bus line connecting with its railway lines. This service was inaugurated in order to forestall jitney operation by an independent company which desired to operate directly into the business center of Salt Lake City in competition with the railway, and has achieved the desired object.

The Street Railway Division of the City of Seattle, Wash., has been operating ten buses as feeders to its railway lines for more than four years. The fare is 10 cents, with three tokens for 25 cents, as on the cars, and free transfers between the two services. The bus operation is said by the department to be very satisfactory.

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Back Over the Year with a Skip and a Jump

By G. J. MacMurray
News Editor ELECTRIC RAILWAY JOURNAL

Before the Cinematograph Projects the 1924 Picture of the Electric Railways 'Tis Well to Recall a Few of the High Points of the News of 1923. After It's All Over You Can See a Lot of Humor in It—After It's All Over

THE executioner was about to push the button that would release the current which would send to his death the man in the chair before him. "Is there anything you would like to say?" asked the warden.

"Yes," said the convict, "I should like to give up my seat to the man standing on your right."

The man standing on the right was the executioner. The magnanimity of the convict is very much like that felt by the writer when the task was assigned to him of writing this review. He felt like giving up his editorial seat to his tormentor or to some other member of the staff.

NO OCCASION FOR PESSIMISM

Perhaps you feel somewhat the same way about the electric railway business as President Loree did about the steam railroading when he said: "Railroading has ceased to be a business—it is a calamity." The occasion doesn't exist now for such pessimism. It has passed. You have lived through it. You have Mr. Emmons' word for it. And you have Mr. Welsh's word for it. If I am to be assigned by some pessimist to the Ananias Club, I should at least be permitted to pick my company. If figures mean anything, then there is cheer in the report of the census of the industry showing that the number of passengers increased 12 per cent in the five years from 1917 to 1922. Earlier in the year the association statistics for representative roads showed that the operating ratio was down to 72.6 per cent.

But think of men in other lines. They have their troubles, too. Just at present the cotton mills of New England are shut down because of the rage for King Tut printed cloth. As the head of the mill said: "If ever I hear that they are about to dig up another of those old Egyptians you can be sure I will see to it that they find him wrapped up in the product of a New England gingham mill." This was a case for real dejection, but this man didn't go home and eat his wife's Mineralava. Why should you?

King Tut jokes are pretty old now, but this one is particularly pertinent. It illustrates a point Mr. Wickwire made in his speech at the C. E. R. A. meeting that railway men are selling a service, not a product. You don't have to think back to the time of King Tut unless you happen to have the King Tut slant on things. Your styles don't change much, except the turnstile. It seems to me as a slim man that the impression you make on your passengers depends a great deal upon whether you use plush, rattan or slat seat. The car-mile, the car-hour and all the other units have, it appears, received more attention than they deserve. You may, perhaps, consider all this somewhat trivial, but if you are like the man that the publishers told about in their house ad in the JOURNAL for Dec. 1, who in his opening sentence said that the JOURNAL was great stuff—and in addition that he read it—then you have noticed that the Chicago Elevated Railways have gone to the plush seat.

In this connection you will recall that a few years ago a man said that he took a street car for the same reason that he did an ambulance—because he was helpless. On the other hand the steam roads were not much better off in the matter of public opinion. The public is moved to emotion by little things, personal things. You will probably recall that in speaking about the steam railroads Mr. Dooley said: "Whenever I feel the desire to fly through space I throw four dollars out if th' window, put a cinder in to me eye, an' go to bed on a shelf in th' closet."

Of course, the stigma of the remark about the public be damned has passed down through the years, but even that remark was greatly exaggerated as the former president of the Associated Press has made plain. These are all reactions the causes of which are steadily being corrected. Aside from the discussion of the sale of transportation, this has been the big topic during the year. Hardly a company throughout the country but has done something to bring its service more forcefully to the attention of the public. It really is startling the amount of excellent material along this line that is available in the record of the year's activity as published in the JOURNAL on all the various means that have been developed for making the service more attractive. The thesis on which the Coffin award was made, which honor went to an interurban whose president is now the president of the American Electric Railway Association, contains a myriad of suggestions alone on the subjects of public relations and merchandising. As for the copies of the ELECTRIC RAILWAY JOURNAL, they are replete with the records of good public relations work. Of the talks along similar lines one of the best was "Jack-in-the-Pulpit Is Succeeding the Shrinking Violet," made by Labert St. Clair of the American Association.

"MODERNIZE AND MERCHANDISE" THE SLOGAN

Somewhat in line with the talks of the year was the interview headed "Modernize and Merchandise" with Britton I. Budd in the issue for Dec. 22. This interview was unusual in its method of presentation and in its significance. As inspiration for the new year it should be reread and then kept at hand for reference as it offers so many suggestions likely to be found helpful in dealing with the problems of 1924.

As has just been indicated, many

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striking things have been done to sell the service to the public, but one of the most spectacular and successful attempts of the kind made during the year was that by Mr. Morgan of Brooklyn in connection with the introduction of the first of his 200 pay-as-you-pass cars. So far as Mr. Morgan and his men are concerned—

Brooklyn now has a brand new treat—
A car that wins on any street.
It's painted red with yellow trim;
The lines are smart—appearance slim.
It's up to date and very bright
And rides with ease—a real delight;
A modern fare box near the center,
No harsh demand, "Pay as you enter."
Seats fifty-three—sounds odd, no doubt,
But Clint knew what he was about.
He showed the car on Borough Hall loops
And took his patrons through in groups,
And told them of the car so new
And brought its strong points to their view.
This done he started to run four,
The harbinger of tenscore more.
At selling the service 'twas a very good stunt,
And that's where Morgan is up near the front.

Over in Long Island City General Andrews provided sample rides in introducing a new service. And Blinn and Atchley certainly have sold their service to the people of Akron, who are invited to pay 6 cents for their ride—and they are doing it—although the company has been unable to get the city to advance fares to more than 5 cents, regardless of the fact that the ride costs 5.7 cents.

Don't Pray for Too Much

In connection with the merchandising of transportation Daniel L. Turner, consulting engineer New York Transit Commission, in two articles on foreign practice, pointed out that there is much to be learned from the properties abroad, especially in the methods of merchandising transportation. Still, New York holds the palm for carrying passengers. In somewhat the same category was the article "Merchandising Transportation Abroad," by J. Kappeyne. But publicity is not a panacea. Neither is merchandising. Some railway men expect too much of them. They are inclined to be impatient of results. They are like the Jew referred to in the article by Mr. Sanders in the issue for May 12. This article deserves careful rereading. As Mr. Sanders retold this story the Jew was losing money. Business was rotten. He was told to pray to God and to have faith. Some time later he was asked how things were going. They were not going any better. He had been praying for $8,000 profits. When told that he had been asking too much the Jew replied: "Well, how did I know that was too much. Why didn't he make me an offer?"

Too many railway men have, in a sense, been praying for too much and not telling the people what they have to offer. As Bruce Barton said in his speech before the N.E.L.A., in session in New York in June: "Unless there is back of the desire for better public relations a real conviction, a real, genuine feeling that you are in business as a matter of service, not merely as a matter of advertising service—unless there is that, then it is very dangerous, indeed, to attempt to build public relations on any other ground."

You will recall that Mr. Barton on being offered the publicity account of a bank said to the bankers: "Now you go back to your bank and shave off all the side whiskers that there are in your bank and you take all the high hats and put them in a pile and light a match to them, because I am going to advertise to people that you are human, and it may be a shock to have them come in and find you as you are."

Some of the publicity and advertising men in the railway field have been laboring under difficulties similar to those that beset Mr. Barton. Railway men are no less human as a whole than others, but the outward aspect of some of them is forbidding. In other words, there are still a few high hats left in the railway field that might well be burned. As President Bill Strandborg said at the first annual convention of the Public Utility Advertising Association held in Atlantic City last June, for practically seven years the advertising fraternity in the public utility field has been "nothing more nor less than a bunch of maverick steers roaming the range and milling around trying to horn into the regular herd." And now that they have horned in some of them appear to have been gored by the otherwise docile members of the full-blooded herd.

After the conventions in recent years, at which the bus has been discussed, I have always come away with the thought in my mind about the man who asked his wife what the topic was that had been discussed at the meeting she attended.

"Oh," was the reply, "we discussed the antecedents of that brazen woman with the dyed hair that's just moved in opposite the Joneses, and also one of the poets—Shelley, I think."

But at the convention at Atlantic City in October there was a great deal more of the olive branch spirit in evidence with respect to the bus than has been the case in the past. Really there was. As Mr. Storrs said at Atlantic City: "Today we find careful students of the transportation problem in practical agreement that the two agencies must be co-ordinated." That this is not a theory Mr. Pontius, vice-president and general manager of the Pacific Electric Railway, made plain in his paper. H. W. Alden, president of the Society of Automotive Engineers, and Alfred Reeves, general manager of the National Automobile Chamber of Commerce, were more than conciliatory in the remarks which they made. So far as the interest of the general public in the matter is concerned, Mr. Brown's address by radio, made last August, was surely a "far-flung" contribution to a better understanding of the problem. On the economics of the use of the highway for motor transport the special committee of the Chamber of Commerce of the United States discussed the relations between the motor bus and the trolley car. A report by another committee of this same body, it will be recalled, recommended the simplification of the taxation problem of the electric railways by stating definitely that in lieu of the present tax a gross-net tax should be imposed.

Every Story Has Two Sides

Some there are in the railway field still inclined to point an accusing finger at the user of the bus, but their number is fast diminishing. More than 120 railways are now using the bus in one form of service or another. Harsh things have been said about some of them in the past, but the old story of survival holds good of them just as it did of Pat. On being reminded by a friend that if he did not resent a supposed insult he would be called a coward, Pat replied: "And, sure, I'd rather be called a coward today than to have people say the day after tomorrow: 'How natural he looks.'" In two cases at least it appears that the funeral oration would have been said over electric railways if they hadn't gone over to the bus.

So you see every story has two sides. The experts will not agree with me about this. That's what an expert is for. He finds out what you think or what you are doing and then he disagrees with you or your methods. That makes him an expert. Not that I am biased about experts. Indeed,

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no. But in glancing through for a second time a certain report made early in the year in connection with the operation of a municipal railway, the story kept dancing in my head about the sermon preached by the archbishop on the beauties of married life. Two old Irish women coming out of church were heard commenting upon his address.

" 'Tis a fine sermon his reverence would be after giving us," said Bridget.

"It is, indeed," replied Maggie, "and I wish I knew as little about the matter as he does."

In connection with the A. E. R. A. activities, the association was particularly fortunate in having Vice-President Coolidge as one of the speakers at the Midyear Meeting in Washington. Little did we or he expect then that he would so soon have to take up the burdens of the President. He said that without the electrical development of the last twenty years it would not be possible at the present time to carry on the business of the nation as it is being carried on, either for the transmission of intelligence or in the transportation of merchandise and of the people. President Emmons said that it was fitting to pause for a few moments to express appreciation to the federal government for its constructive assistance to the electric railway industry. The late President Harding also had a kindly word for the men in the industry. This he communicated to the meeting in a letter through Secretary of the Interior Fall. Former Vice-President Marshall also spoke at the banquet.

Flowers Could Be Sent to Some Congressmen

It is always a treat to listen to Mr. Marshall. It will be recalled that he wanted the flowers used to decorate the tables at the banquet sent to the District committee at that time trying to re-establish the 5-cent fare on the local lines. Judging by recent news events there are a few other Congressmen to whom flowers might fittingly be sent just now. Remember that Mr. Marshall said he spoke as a straphanger, but that this didn't give him the right to tell the men present how to run their business.

As just indicated, Mr. Marshall, in the particular situation that existed in Washington, wanted to say it to the local commissioners with flowers. In New York a public-spirited citizen, disgusted with the apathy of the local officials to the need for new transportation facilities, coined the phrase: "Say it with shovels." He meant, of course, that the shovels should be applied to the building of new lines, but certain politicians apparently got the idea that the shovels might be used to inter them, so a more conciliatory attitude has been in evidence on their part recently. In New York 160,000 people are being added to the population of the city every year, but no new trunk line subways have been authorized since 1913. If the Transit Commission had its way, however, it would spend $218,000,000 for seven new lines. In what some consider an excess of zeal Borough President Miller of Manhattan wants to tear down the Sixth Avenue Elevated. The Board of Estimate has approved his plan and something may come of it in spite of the revolutionary character of the suggestion, which would put the cost of a substitute subway on the adjacent property owners.

As for the 5-cent fare in New York it is still a myth. The surface cars charge for transfers, and on the rapid transit lines the passenger pays 5 cents and the city pays 1 cent out of taxes. The 5-cent fare hasn't been saved. It has merely been camouflaged.

Chicago's new Mayor, Mr. Dever, wants municipal ownership and operation of the surface and elevated lines. He says that the 1907 settlement ordinance has failed. On his recommendation, however, the Thompson policies have been thrown overboard and the Council on Oct. 27 voted unanimously to repeal the 1921 ordinance forfeiting the franchise of the Chicago Surface Lines. It also voted to discontinue the forfeiture suits and to accept the city's share of the companies' profits since 1919, aggregating more than $8,000,000. As for Chicago's unified transit plan, it has been revived by the report of R. F. Kelker, Jr., consulting engineer to the City Council. He wants the surface, subway and bus lines unified. In short, Mr. Kelker's program calls for $372,823,000 for new work.

Philadelphia also proposes to step ahead. It has been voted there to merge the present transit programs and to carry out so-called Step 1, for which the sum of $42,000,000 is available. Detroit has also been considering rapid transit. Neither the extent of the system there nor the financial plan has been decided upon, but construction costs have been estimated at $3,500,000 a mile for an elevated system and $4,700,000 a mile for subway. The Rapid Transit Commission there recommends a pay-as-you-go plan that spreads the cost by assessment over the property benefited and the city at large, leaving only the equipment, about 32 per cent of the total investment, to be provided by a bond issue. Los Angeles and Cleveland are other cities that want subways.

Within their own organization the electric railways reduced the subject of safety almost to a science. The great menace now lies in the growing use of the automobile. It is perhaps not too much to say that one of the most complete series of articles on safety pertaining to any one industry published anywhere was contributed by C. W. Price to the JOURNAL. There were ten of these articles — concise chapters in a complete treatise designed to tell an electric railway man definitely how to organize a community for safety. Last year the material on safety was packed largely into one special issue. The matter of writing about safety is a continuous process. The work will never be done. It is too much to expect of human nature that there will not always be a few fools who will become angels at a crossing.

No Legislation 100 per Cent Perfect

Rulings and legislation are all right in their way, but they not infrequently go astray. Take the legislation in both Oakland and Dayton against the one-man car. Laws against the operation of these cars were passed in both cities, but no attempt was made to enforce them. The passage of these and similar measures recalls the case of a U. S. Senator who had just finished a night's work on a speech. "You have convinced me," said his secretary, "except for one trifling detail. Where do *I* get off?" The Senator touched his nose with his finger and sagely replied: "Well, no legislation is 100 per cent perfect." Certainly the one-man car legislation to which reference has been made is in this same category. In Massachusetts there has been some talk of introducing legislation against the one-man car, but apparently not enough people were interested to warrant going ahead with the referendum measure. As far as the rank and file of the men are concerned the Amalgamated Association realizes the need for the one-man car. The only concern of that body over the matter is that the cars shall be fully equipped with safety devices, a need that railway executives realize. On the matter of the differential on wages, that, according to the Amal-

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gamated, should be a matter of individual negotiation. If one delves behind the scenes at Dayton and Oakland, where the one-man car has been under fire, he quickly realizes that political ambition is fired by the peculiar opportunities which these situations have afforded.

As far as municipal operation is concerned the most notable references in the JOURNAL were to the four years of municipal operation in Seattle, the digest of the Detroit report, and the meeting of the League for Municipal Ownership in Toronto. Up to August last Seattle had experienced a little more than four years of municipal ownership, and during that time three Mayors successively occupied the chief executive's chair. Twice rates were raised, only to be lowered and again increased. At times employees have had to wait for their pay. Jitneys have been ruled off the streets. As Mayor Brown said: "I gave the people a 5-cent fare, but if they would rather ride in automobiles than patronize their street cars, I can't help it." At last accounts a net profit was being shown at Seattle, but on a 10-cent cash fare with tickets at three for 25 cents.

DETROIT TAKING NO CHANCES

The Research Bureau at Detroit, a non-partisan body, reported in July, in anticipation of the complete report, that the revenue of the Municipal Railway for eleven and one-half months was in excess of all charges for operation and maintenance, except depreciation and interest and sinking fund requirements. The report for Detroit for the fiscal year ended June 30, 1923, showed a net income of $938,467, but the recent decision of the arbitration board fixing the terms of the entrance of the private lines to the city over the municipal tracks is expected to cut the profit of more than $900,000 in half. High traffic density was a major factor contributing to Detroit's success, in which low taxes and interest rates and the assistance of other city departments also helped to make a favorable showing. Detroit is taking no chances. The wage award, announced during the summer, increased the platform cost $700,000 a year. The decision to increase wages was met promptly by an advance in fares from 5 cents with 1 cent for a transfer to 6 cents, with 1 cent additional for a transfer, but with tickets at nine for 50 cents.

Of the valuation cases one of the most important was the decision of the Pennsylvania Commission with respect to the Philadelphia Rapid Transit fixing the value of that property at upward of $200,000,000. In the case of Toronto the arbitration board there awarded the Toronto Railway $11,180,000. As for abstract discussions of the problem of valuation, it might be well to reread the report of the A. E. R. A. committee on valuation run in this paper Nov. 3.

In all work being done it is necessary to pause at times and take a check on oneself. It was with this in mind that the editors published in the JOURNAL for Jan. 6 last year a list of economy and betterment measures against which operators could check their performances. The idea behind the chart proved so popular that the chart was reprinted in the issue for July 7 with a caption about the desirability of the individual checking off against the chart. It is hoped that this advice has been followed, but if it hasn't it would be well to act on the suggestion now.

One of the most extensive rehabilitation programs to be carried out by a company of moderate size was the one by the San Diego Electric Railway. That company, with its program well along toward conclusion, will spend $2,000,000 for extensions and improvements.

As proof that the industry has not passed entirely out of the entrepreneur stage, a new interurban railway was opened during the year. This was the Dallas-Terrell line in Texas. It was placed in service on Jan. 14 and is 30 miles long.

The railway in Des Moines, operating on the basis of no unfair competition from the jitney, is coming into its own. The stabilizing fund has been built up to a point where it has just recently been possible to announce a cut in fare from 8 cents to 7 cents. As for Saginaw, combined railway and bus service under one management was established here on Nov. 1 after the railway lines had been shut down for more than two years. During the very first month of the combined operation the lines were operated at a profit. In New Jersey the 5-cent local fare is not working out as satisfactorily as was anticipated by the Board of Public Utility Commissioners, which urged its adoption. But the full complement of bus competition is still in effect, except that the railway has recently taken over most of the buses in Camden. One thing is certain. The railway cannot be put in a satisfactory financial position until this unfair competitive situation is ended.

Consider the million or more maintenance kinks that have been published during the year in the JOURNAL. I read them all and understand only one. This was a description of the very simple means devised by the Brooklyn-Manhattan Transit Corporation to tell its trainmen how to regulate the heat in cars. You will recall that signs numbered 0, 1, 2, 3 and 4 are painted for posting at terminals and elsewhere. It is intended that these numbers shall indicate to trainmen the notch on the heater switch to which the current shall be turned. The sign illustrated in the JOURNAL reads 0. Speaking as a humble Thoid Avenue Brooklynite and without the approval of the editors, I think they must have forgotten to paint any of the other numbers. As I rode home the other day, my mind gamboled along like this:

It's winter now;
That all will agree.
But they don't know it yet
On the B.-M. T.

On April 1 the weekly pass was withdrawn from sale at Youngstown, Ohio. This was done on the recommendation of the Street Railway Commission, the railway there operating under a service-at-cost arrangement. Youngstown was blamed for having a 9-cent cash fare when with the pass in effect the actual revenue per passenger was less than 7 cents. Abuse of the pass is also ascribed as one of the reasons for its withdrawal at Youngstown. But this is about the only town where it has been withdrawn, and it is going into use in more cities right along. Fort Wayne, Terre Haute, San Diego, Santa Barbara, Chicago (on the "L") and other cities appear to be well satisfied with the pass.

NOTHING IS PERFECT, NOT EVEN THIS STORY

If this account has seemed to trail off toward the end, remember the advice of the editor to the contributor of his thrillers to condense somewhat when nearing the finish. In consequence, so the story goes, the writer concluded his next contribution as follows: "The villain took a Scotch whiskey, his hat, his departure, no notice of his pursuers, a revolver out of his hip pocket, and lastly his life." Also please remember that an editor must combine the attributes of St. George and St. Vitus. Also that:

Whoever thinks a faultless piece to see,
Thinks what ne'er was, nor is, nor e'er shall be.

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Electric Railway Costs Approaching Stabilized Conditions

Trend Figures Indicate that Period of Rapid Fluctuations of Labor and Material Prices Is About Over—Wholesale Prices of Commodities and Street Railway Operating Materials Costs Recede Slightly During 1923, While Construction Costs and Street Railway Wages Have Small Advance

INDICATIONS are that the country is once more entering a period when conditions will be fairly stable. This is a deduction that may be made by a look back at economic history. There has been a steady though gradual rise in all figures for labor and material costs from the time the country was settled. This gradual progression has been disturbed to a greater or lesser extent by every war. Costs have risen abnormally, sometimes reaching a peak about the end of the war, and sometimes a few years later, afterward falling again so as to bring them back to something like the old conditions, but always on a basis higher than if the war had not occurred.

A similar readjustment has taken place since the last war and still is in progress. Following the peak in 1920, there was a sharp recession. This was checked about the beginning of 1922, and a new rise began. This spent itself very largely during that year, and in 1923 the changes were relatively slight.

That conditions are getting back toward stability is shown by the tabulation and chart reproduced herewith. This is a compilation by Prof. Albert S. Richey showing the five principal index figures for the electric railway industry over a period of ten years. These were published in the Annual Statistical Number of this paper for Jan. 6, 1923, and have been revised and brought up to date. The methods used for obtaining these index figures were fully described in last year's article.

Trend Shown by the Chart

In the chart and table the various index figures have been adjusted to a standard base, 100 representing average values during the year 1913. That is the last year during which conditions for this country, or for the world, were fairly stable. The fluctuations since then are therefore shown in proportion to a steady condition which had existed for a number of years.

The chart is plotted on a logarithmic scale so that the relative or per cent change in an index number, from any period to any other, is shown directly by the slope of the line regardless of the distance from the base. This would not be true with the ordinary arithmetic scale of ordinates.

Wholesale prices, as shown by the United States Bureau of Labor statistics, have fluctuated over a fairly narrow range during the year. The peak of the post-war inflation occurred in this item in May, 1920, when a figure of 247 was reached. From then there was an extremely rapid fall in prices to January, 1922, when the index figure of 138 appeared. Following that there was a gradual rise until March, 1923, with 159 as the index. Since then there has been a slight fall, with minor fluctuations, the November index being 152, and the tendency downward.

Construction costs, as given by the *Engineering News-Record* index, were maximum in June, 1920, at 273.8, from which they fell to 162 in March, 1922. A sharp rise ensued, followed by a more gradual increase the greater part of 1923, a maximum index of 222.1 being reached last July. Since then there has been a slight recession, a figure of 217.3 being reached in December.

Street railway operating materials have followed a course nearly identical with that of construction costs, although the range of fluctuations has been somewhat less. The peak reached was 247 in September, 1920, and from that point there was a recession to 156, which occurred for several months in the latter part of 1921 and the early part of 1922. A sharp rise followed to 189 in August, 1922, since when there has been a gradual fall. Although there have been slight increases in 1923 for a few months, the figures are at the present time almost back to the lowest since the war, the November index being 158.

The trend of wages in the industry has been somewhat less reassuring. On account of the methods of collective bargaining almost universally prevailing on electric railway properties, there is a slight lag behind the commodity prices. The maximum was reached in September, 1920, with an index of 232, which continued for the remainder of the year. From that time it dropped very slowly during 1921 and 1922, the recent minimum of 207 being reached in January of last year and continuing for four months. The December index of 218 is the highest since July, 1921.

The last index of the series, that of street railway fares, does not follow the same trend as the others. While prices and wages were advancing, fares remained practically the same as in 1913. This continued until the middle of 1918, nearly five years later. A gradual rise ensued, reaching a maximum of 149.6 in the middle of 1921. A slight recession has taken place since then, a minimum of 142.1 occurring last May. Minor fluctuations ensuing have brought the latest index up to 142.4. Fares thus appear to be practically stationary at this level. Such increases as occur are about offset by other reductions.

Future Course of Index Numbers

The fluctuations of the past ten years do not give a good basis on which to predict future costs, but going back again to the earlier economic history, one is able to find a precedent for what may be the trend of the next few years. The nearest approach to present conditions is the period immediately following the Civil War. Then there was a rise all through the war, with a peak about the time of the cessation of hostilities. Following this there was a sharp drop which began a series of quite rapid fluctuations, whose general trend

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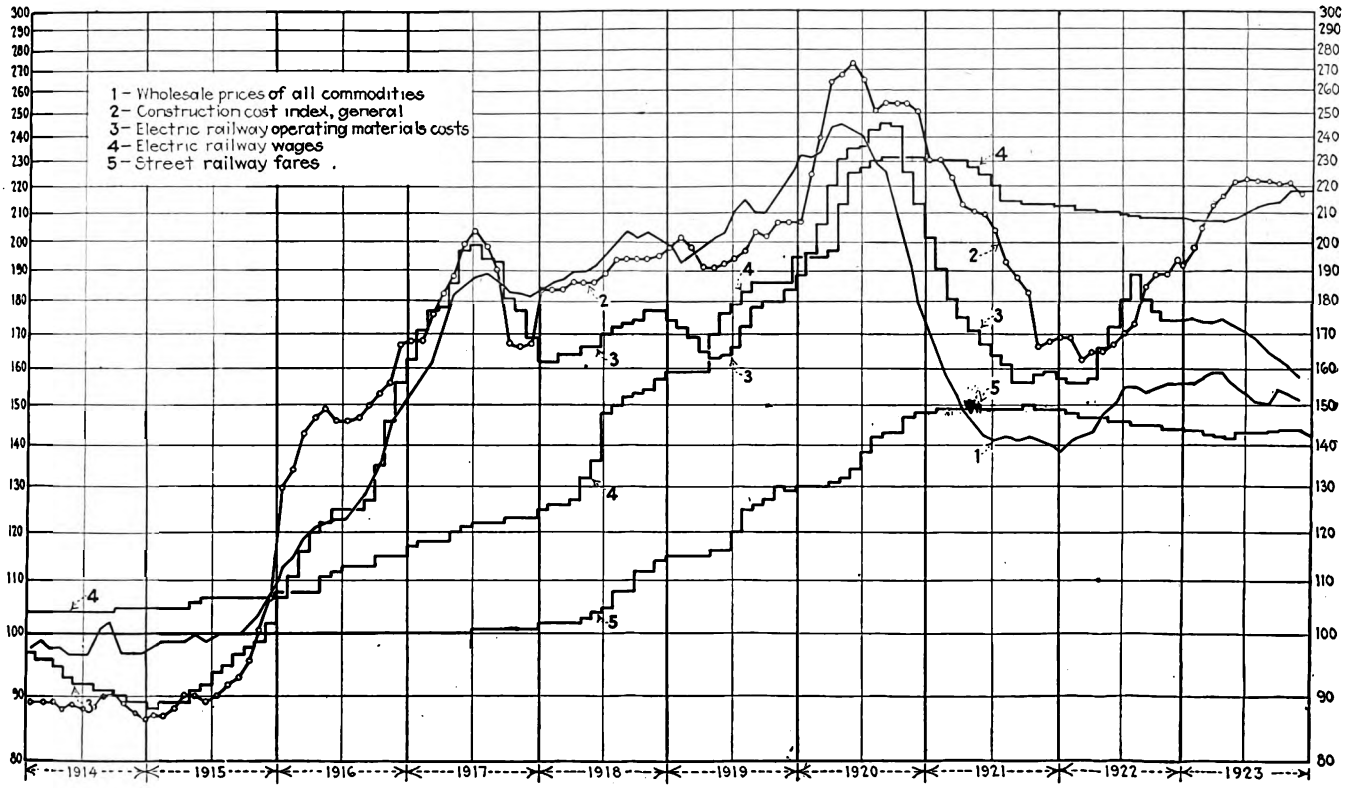

Trend of Prices, Wages and Fares, Based on Figures Assembled and Compiled by Albert S. Richey

1914	Wholesale Prices, All Commodities (U. S. Bur. Lab. Stat.)	Construction Costs (*Eng. News-Rec.*)	Elec. Ry. Operating Materials Costs (Richey)	Elec. Railway Wages (Richey)	Street Railway Fares (Richey)
January	98	89.2	97	104	100
February	99	89.2	96	104	100
March	98	89.0	96	104	100
April	98	88.0	95	104	100
May	97	88.6	93	104	100
June	97	87.9	92	104	100
July	97	88.1	92	104	100
August	101	90.1	91	104	100
September	102	90.4	91	104	100.1
October	97	88.5	90	105	100.1
November	97	87.3	89	105	100.1
December	97	86.5	89	105	100.1
1915					
January	98	87.1	88	105	100.1
February	99	87.4	89	105	100.1
March	99	87.7	89	105	100.1
April	99	90.2	89	105	100.1
May	100	90.2	91	106	100.1
June	99	89.0	92	107	100.1
July	100	90.5	94	107	100.1
August	100	91.8	95	107	100.1
September	100	93.0	97	107	100.1
October	102	96.2	98	107	100.1
November	104	101.1	99	107	100.1
December	108	107.1	102	107	100.1
1916					
January	113	130.5	107	108	100.1
February	115	134.5	111	108	100.1
March	119	143.0	116	108	100.1
April	121	147.3	120	108	100.1
May	122	148.9	122	111	100.1
June	123	146.5	125	112	100.1
July	123	145.8	125	113	100.1
August	126	146.6	125	113	100.1
September	130	149.6	127	113	100.1
October	136	152.9	135	115	100.1
November	146	155.7	146	115	100.1
December	149	167.2	156	115	100.1
1917					
January	153	167.8	163	117	100.1
February	157	167.8	171	118	100.1
March	162	175.7	177	118	100.1
April	173	183.4	178	118	100.2
May	183	187.6	186	120	100.2
June	185	199.3	197	121	100.2
July	188	204.1	199	122	100.6
August	189	198.4	194	122	100.6
September	187	190.3	193	122	100.6
October	183	167.1	181	123	101.1
November	183	166.5	175	123	101.1
December	182	167.1	169	123	101.2
1918					
January	184	184.5	162	125	101.7
February	186	184.5	162	126	101.7
March	187	184.5	164	126	101.9
April	190	186.0	164	127	102.2
May	190	186.0	166	132	102.8
June	191	186.3	166	136	104.5
July	196	188.7	170	148	105.1
August	200	193.9	172	150	107.5
September	204	193.9	173	152	108.2
October	202	193.9	174	153	112.0
November	203	193.6	177	154	112.3
December	202	194.8	177	157	114.4

1919	Wholesale Prices, All Commodities (U. S. Bur. Lab. Stat.)	Construction Costs (*Eng. News-Rec.*)	Elec. Ry. Operating Materials Costs (Richey)	Elec. Railway Wages (Richey)	Street Railway Fares (Richey)
January	199	198.1	174	159	115.0
February	193	201.5	172	159	115.0
March	196	198.1	169	159	115.1
April	199	191.3	165	159	114.6
May	202	191.3	163	170	115.6
June	203	191.9	164	176	116.5
July	212	193.7	166	179	119.6
August	216	196.7	172	183	125.1
September	210	202.9	178	186	126.2
October	211	202.3	180	186	126.9
November	217	206.9	180	186	129.9
December	223	206.9	184	186	129.0
1920					
January	233	206.6	189	195	129.9
February	232	225.1	196	195	129.9
March	234	240.9	207	195	130.2
April	245	265.2	221	197	131.1
May	247	268.9	232	213	131.9
June	243	273.8	236	226	134.0
July	241	265.7	237	228	138.0
August	231	252.0	243	231	141.5
September	226	255.2	247	232	142.6
October	211	255.2	245	232	143.3
November	196	255.3	227	232	147.0
December	179	251.6	213	232	147.5
1921					
January	170	230.9	202	231	148.2
February	160	230.7	191	231	148.6
March	155	224.3	181	231	148.9
April	148	213.1	175	231	149.1
May	145	210.8	171	228	149.6
June	142	209.8	167	225	148 9
July	141	203.8	164	221	149.0
August	142	193.1	161	215	148.7
September	141	188.3	156	215	148.9
October	142	182.6	156	214	149.6
November	141	166.3	158	214	148.9
December	140	167.8	159	214	148.6
1922					
January	138	168.7	157	213	148.6
February	141	168.7	156	213	147.8
March	142	162.0	156	212	147.4
April	143	164.7	157	212	147.4
May	148	164.6	166	211	147.4
June	150	166.6	172	211	145.5
July	155	169.7	181	210	145.5
August	155	173.4	189	208	144.9
September	153	185.0	181	208	144.8
October	154	188.6	177	208	144.6
November	156	188.6	174	208	144.1
December	156	192.6	174	208	143.7
1923					
January	156	191.7	175	207	143.4
February	157	197.4	174	207	143.4
March	159	205.3	174	207	142.4
April	159	213.5	175	207	142.3
May	156	216.7	173	208	142.1
June	153	220.7	171	210	142.9
July	151	222.1	169	212	142.9
August	150	221.5	165	214	142.9
September	154	221.5	163	215	143.4
October	153	220.3	161	218	143.5
November	152	220.9	158	218	143.5
December	...	217.3	...	218	142.4

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was downward. The limits of these fluctuations grew less and less, until in 1873 a panic minimum was reached. Following this there was a gradual increase in prices, which continued with minor fluctuations until 1913. Somewhat similar reactions have taken place after all wars, not only in the United States but abroad.

The present trend figures follow a similar course. Due to conditions which were quite different from those existing at the close of the Civil War, the peak was not reached for nearly two years later. Since then the downward trend, with the reversing fluctuations, has been quite like the cost variations following the earlier war.

A similar series of fluctuations may be expected to continue. However, steady prices should follow more rapidly the last war than the Civil War. More intensive industrial methods, quicker means of communication, faster transportation, and shorter time required for turnover of stocks, all point to stabilization of the important commodities in a much shorter period than after the earlier upheaval. Hence, it seems probable that by the close of this year the industry will be in a position where estimates can be made with assurance that they can be met with little more than the usual allowances for contingencies.

It would seem likely that there will be a slight recession in materials prices, lasting probably the greater part of 1924, or even into next year. Wages and fares, being slower to follow the general trend, may not show similar changes, and in any event the fluctuations from the 1923 values are not likely to be so great as those of materials prices.

The Year in Heavy Traction

Outstanding Events Are Decisions to Electrify Virginian Railway and Toledo & Ironton—Other Projects Under Consideration—Numerous Electrifications Under Way in Foreign Countries

IN THE heavy traction field the year just past has been relatively quiet in the United States. Many projects are known to be under consideration, but definite announcements have been withheld except for a few. It is certain, however, that improved credit conditions of the railroads would impel them to start important projects in a number of localities. This is likely to come if Congress does not enact radical legislation hampering the railroads.

The outstanding event of the year was the announcement that the Virginian Railway had contracted to electrify 213 miles of track between Roanoke, Va., and Mullens, W. Va. This road, while one of the newest of American railroads, has been noted for its rapid development of traffic and the increase in tonnage of trainloads handled. It is now moving 7,000,000 tons of coal annually, but this could be increased if the road had greater capacity. While it is using some of the most powerful Mallet steam locomotives in the world and is handling trainloads of 5,500 tons, this is not considered sufficient, and electric locomotives developing 20,000 hp., as compared with 7,000 hp. of the Mallets, will be substituted to haul 9,000-ton trains up the grades. Furthermore, these electric locomotives will have a working speed at these loads of 14 m.p.h., against 7 m.p.h. for steam. It will also be practicable to increase the trainloads to 12,000 tons if necessary.

The selection of the single-phase 11,000-volt system for this road is perhaps natural, since the Norfolk & Western, which is directly across the river, has been using this type of power supply for some ten years with success in similar service. Although competitors, the similarity of the traffic handled and of the system and equipment will make it possible to use the trackage jointly if necessary, or even to interchange motive power. This will be a material factor in assuring reliability of service, should occasion arise.

Another event of more than passing importance in the heavy traction field was the decision of Henry Ford to electrify the Toledo & Ironton Railroad. At present this is a smaller project, but it is more than likely to be the first step in the complete electrification of the entire 500 miles of the Detroit, Toledo & Ironton Railroad. It is planned to haul heavy trainloads on this road. Although complete details of the installation have not been given out, the system, like the Virginian, will be single phase, though the contact line potential will be 22,000 volts instead of 11,000. It was felt that this will permit of greater concentration of power with comparatively small currents to collect, and low line losses.

In the last days of the year a statement was given out by the Baltimore & Ohio Railroad that it will proceed to electrify its lines in the Borough of Richmond, New York City, which comprises Staten Island. These lines, which are entirely separated from the remainder of the railway's system, are used as a freight terminal by the company. Certain of them form what formerly was the Staten Island Rapid Transit Company, giving a local passenger service to the greater portion of the island. Since there is a strong probability that these lines ultimately will be connected with the rapid transit systems of New York City by means of a tunnel under the Narrows, it is quite likely that there will then be through routing of trains. For this reason the company intends to make its system interchangeable with that of the New York subway and elevated roads, which is 600 volts with third-rail contact line.

In addition to these major projects, work has gone ahead on other roads. The Illinois Central electrification of its Chicago terminal, which was announced in 1922, has gone forward. This system will comprise some 418 miles of track, on which the suburban service only will be operated with multiple-unit trains on 1,500 volts d.c. equipment. The Norfolk & Western Railroad has added to its motive power four electric locomotives of a type similar to those of the original order. The New York, New Haven & Hartford Railroad placed in service during the year twelve additional 180-ton locomotives of the a.c.-d.c. type, which are practically identical with the five placed in service in 1919.

During the year a successful demonstration was made of a new type of overhead construction with a double contact line suitable for the heaviest loads and speeds now in use on any railroad.

In the foreign field more apparent progress has been made than in the United States. The Mexican Railway electrification is progressing and, barring difficulties due to the recent rebellion, should be in operation before the close of 1924. The Chilean State Railways began electric operations during the year. This is an important electrification, comprising 144 route-miles and using thirty-nine electric locomotives. The Paulista Railway in Brazil has started operation on a considerable portion of its system and has placed orders for 35 additional miles, bringing the total up to 63 miles, between Jundiahy and Tatú.

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In Europe developments are also going forward steadily. An ambitious program of extensions of the suburban line electrifications in the suburbs of London is progressing with considerable rapidity. These are being equipped with the 600-volt third-rail system, except for a portion of the London, Brighton & South Coast line, of the Southern Railway, which uses single phase.

The French railroads are making an elaborate series of competitive trials of locomotives constructed by various American and European builders. The roads being electrified are the Paris-Lyons-Mediterranean, the Midi and the Paris-Orleans, all using 1,500 volts d.c.

The Spanish Northern Railway has begun operations with the 3,000-volt d.c. system during the year. A portion of the locomotives were built in this country and the remainder in Europe. The Moroccan Railways will electrify 75 miles, while the Java State Railways is electrifying lines on the island of Java. The Japanese Government Railways also has obtained additional locomotives. All this equipment is being built in America.

Outlook for Railway Financing Better

Investment Bankers Not Yet Enthusiastic, but Are Cognizant of General Improvement—They Urge Railways to Keep Their Case Before the Public—Equipment Trusts Take Well, but Wide Choice Had by Investor in Present Market Militates Against Railway Issues at Low Costs

BANKERS react both favorably and unfavorably on the outlook for financing electric railway securities during the coming year. On the whole, however, their general attitude toward the electric railways appears to be distinctly more favorable than it has been in the past. Time heals many wounds. The electric railways were deeply wounded as regards their credit. In consequence the recovery is correspondingly slow. The reasons are not far to seek for the almost complete destruction of the credit of the electric railways. It would be trite to repeat any of them were it not for the fact that such repetition carries with it a suggestion of corrective measures.

Representatives of banking houses of original issue who were interviewed on the subject of electric railway financing do know that the railway situation as a whole is much better than it has been, but they have very little interest in the situation as such. They are not interested because, as one banker said, no statement of the industry as a whole can be applied to a particular property. The concern of the banker is with the individual property which is seeking the loan. It may seem elementary to say this, but it is perhaps just as well to remind the industry of this fact. Another thing, there appears to be no general set of requirements which it can be said must be met before bankers are willing to consider a proposition for new financing. The previous earnings record of a road, the condition of its physical property, the type of management, the local political situation, the public relations situation, the labor question, etc., are all matters that are carefully weighed in the balance by the banker, but the stress that is laid on these considerations is not equal. Thus the representative of one house put the considerations that would weigh with him in this order: (1) Satisfactory record of earnings, (2) favorable franchise situation, (3) record of good management. This, by the way, represents the opinion of the head of a house that has perhaps done more purely street railway financing in the last few years than any other.

Somewhat in contrast with this was the opinion expressed by the representative of another house. With him, too, the record of earnings was a primary consideration, but next to this he put the ability of the management to maintain friendly public relations and good relations with its employees. A management might be better than another so far as its conduct of the physical operations of the property is concerned, but if a trace showed of inability to maintain public relations on a favorable basis, then that outweighs a good record of operating efficiency. In a situation of this kind the thought is that the future is uncertain.

Still another banking representative said that in addition to satisfactory elementary factors such as a consistent record of earnings, a reputation of good management, a favorable labor situation, a satisfactory state of public relations, he would require that the road be protected by a state law which would prevent competition in the business through buses, trucks and jitneys. He would also require an agreed valuation of the property based on a ten-year average of prices for the period, say, 1913 to 1923, in order to establish what seems to be a fair valuation on which a federal court would allow, after depreciation, a return adequate to attract the money required to run the business. All this is presaged, of course, on there being a state public service commission with power broad enough to afford it a real measure of authority. No particular road was mentioned, but the names of a number occur at once that fill this bill of particulars.

More Educational Work Needed

The banker wants to see the electric railway business put in sound position as quickly as possible. Several of those interviewed expressed the view that the men in the industry should lose no opportunity to broaden the viewpoint of public officials. Of even greater importance is the need to broaden the knowledge which the public itself has of the situation. To this end it has been recommended that the heads of the railways take the situation into their own hands and come out into the open as often as possible. Another banker said that the only way to get the electric railway story across is to continue, even to a greater extent than heretofore, the excellent work which the American Electric Railway Association, the ELECTRIC RAILWAY JOURNAL and others are doing along educational lines. This second statement, perhaps unconsciously, embraces the thought of the other man. In other words, it is education, more education and still more education of the public that is needed. Men in the industry seeking to state their case to the public have been rebuffed in

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FIVE-YEAR RECORD OF NEW ELECTRIC RAILWAY FINANCING INVOLVING BOND OR NOTE ISSUES OF MORE THAN $500,000

	City Railway	Interurban	City and Suburban
1919	$22,800,000	$6,050,000	$7,550,000
1920	2,250,000	2,340,000	4,200,000
1921	11,740,000	1,900,000	7,250,000
1922	865,000	750,000	27,138,000
1923*	14,562,000†	.....	6,305,000

*Eleven and one-half months. †Does not include $1,115,000 of Electric Railway Equipment Securities Corporation 6 per cent equipment trust gold certificates.

DETAILS OF NEW BOND AND NOTE FINANCING IN AMOUNTS OF MORE THAN $500,000 DURING 1923

Issue	Sale Price	Maturity	Yield	Amount
JANUARY				
Philadelphia Rapid Transit 5½ per cent equipment trusts	.....	serially 1924—33	5.20 to 5.50	$4,750,000
Wilmington & Chester collateral trust 6s	92½	1933	7.06	2,305,000
MARCH				
Chicago, North Shore & Milwaukee secured sinking fund 6½ gold notes	par	1926	6.50	1,000,000
APRIL				
Interborough Rapid Transit 6 per cent equipment trusts	par	serially 1924—28	6.00	1,400,000
JUNE				
Boston Elevated 6 per cent gold bonds	98	1933	6.25	3,000,000
SEPTEMBER				
United Railways, St. Louis, three-year 6 per cent certificates of indebtedness	99	1926	6.38	4,200,000
DECEMBER				
Philadelphia Rapid Transit two-year 6 per cent secured gold notes	99½	1925	6.40	3,500,000
San Diego Electric Railway 6 per cent equipment trust certificates	96 to par	serially 1925—34	6.00 to 6.50	712,000
Total				$20,867,000

the past. They will be rebuffed in the future. But the thought was expressed that if they keep everlastingly at it they will finally secure a measure of recognition somewhat in keeping with the extent of their effort.

In this connection attention was directed to the annual report of the committee on public service securities of the Investment Bankers' Association of America, submitted on Oct. 29, which said: "The problem of the electric street railways today are those largely incidental to more economical operation and the prevention of unfair competition." As the committee saw it, much progress had been made in the solution of both problems.

So much for the effort that the railway man must make. As for the actual prospects for financing, the fact confronts the railways that the return on the dollar invested in the electric railway business is not so good as in other kinds of business. This is generally well known, but it is important to repeat it because it conveys the idea of the lag that must exist between the terms for securities of the railways and other investments entering into competition for funds under present market conditions. Is the extent of choice with respect to the securities offered the investor often fully realized outside of banking circles? It seems doubtful. The measure of that choice is strikingly indicated, however, by the compilation made available to the JOURNAL by one of the bankers interviewed. In the three years previous to the war the following amounts at par of new issues of securities were offered in the United States:

1911	2,411,213,565
1912	2,286,480,292
1913	2,604,987,654

In New York alone there were offered for the three years since the war the following amounts, at par value:

1920	$4,010,048,184
1921	4,234,013,085
1922	5,926,854,134

The figures are not yet available for 1923, but in the first eight months of the year recently ended $3,392,225,795, par value, of securities were offered, or at a rate that indicates a total of more than $4,500,000,000 for the year.

It is obvious, then, as several bankers said, that in view of the wide range of good investments now available and the large demand for money, the electric railways will have to offer securities at a higher than average yield in order to attract money. The increases in fares that have been secured have made it possible to bring back the physical condition of many of the properties to a high standard. With this done, the surplus in the next few years may be available for additions to rolling stock to keep up with traffic demands, or for other additions to plant.

In this connection there were some very optimistic expressions of opinion. Several bankers thought that the financing of rolling stock might be expected to increase materially in the future. There are a number of companies that could successfully go out into the open market for rolling stock by issues of equipment trust certificates. Some financing of this kind was done the last year, but it was not large in bulk. The principal offerings are listed in an accompanying tabulation, except for the issue of $344,000 of the Memphis Street Railway.

These issues, inquiry revealed, were favorably received and are well regarded by both bankers and investors. In commenting on them one banker made the suggestion that the electric railways arrange to offer equipment trust certificates for sale in the communities in which the rolling stock will be used. So far this has apparently not been done. This is, indeed, an unselfish proposal, for the banker would be deprived of possible business if this course were followed. The suggestion emphasizes again, however, the thought previously expressed that after all the banker wants to see the business put in a sound position as quickly as possible.

In the discussion on the outlook for the sale of equipment trust certificates, one banker lamented the lack of standardization in electric railway rolling stock. He thought that the negotiation of loans of this kind would be greatly expedited if the situation approximated more nearly the condition that exists in the steam railroad field. Steam equipment is interchangeable, and it is largely this factor that has made the steam railroad equipment trust popular with investors. It accounts for the fact that bonds secured by car trust certificates sell at a very low yield. According to this man too many personal idiosyncrasies are permitted to creep into the design of electric railway cars. As a result such cars are not as a rule interchangeable with other systems. He realizes, of course, that the problem of car design with the electric railways presents problems for solution that do not exist in the steam railroad field. But despite this he thought the industry could with great profit turn its attention to a more thoughtful consideration of the desirability of trying to evolve standard designs.

That there is a real opportunity in the purchase of new cars was indicated by Britton I. Budd in his recent

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interview in the JOURNAL. He said that he knew of some interurbans that could well afford to replace the great battleships of cars they are operating. He cited a case where equipment of that kind could be replaced with modern equipment and the entire cost of the new equipment saved in operating expenses in five years. Many similar opportunities are known to exist.

Incidentally, in another discussion the possibility was referred to of the railways making loans on a particular improvement, especially where such improvement involved the development of real estate. Thus a new carhouse or shop or terminal might be financed by a distinct loan if the buildings were located where there was a real chance of appreciation in land value.

As for the outlook for financing of the interurbans, here again there was wide divergence of opinion. Practically all who were induced to express their thoughts gave vent to the feeling that the development of freight and express business was one thing the interurbans as a whole could carry on much more intensively. In this connection there was a great deal of praise for the accomplishments on the Chicago, North Shore & Milwaukee Railroad. In fact, it was somewhat surprising to find how extensive was the knowledge which bankers everywhere had of these accomplishments on the Chicago-Milwaukee line. None sought to detract in any measure from the success of this road, but several of those interviewed expressed the thought that there were perhaps certain factors in this particular operation which helped greatly toward the success that has been achieved. Agreement was general, however, that many of the methods that have turned that road into a successful property might well be adopted elsewhere. The personality of the management counted a great deal in this particular case. That was agreed, but it is by no means the secret of the success there attained. It was rather the intelligent application of effort to the problem of merchandising.

The representatives of a banking house which recommends an interurban issue of long maturity selling at a premium and yielding more than 7 per cent said that the motor bus and the motor truck are not a real menace to the interurban. As this man saw it, the fact is being generally borne in upon the people that they are really paying dearly, if indirectly, for the use of the roads by the trucks and the buses, and that gradually the situation will come to equalize itself. So far as the particular road about which he was talking was concerned, he could see nothing ahead that should militate against its continued progress as a dividend earner.

After all, bankers do not sell securities for the moment. They have a distinct obligation to their patrons extending sometimes many years into the future, as fixed by the length of the obligation which they recommend. This is another truism that there would seem to be little need to repeat, but the fact was mentioned by the bankers time and again, and the suggestion was even made that the thought be repeated in this article. As one of the officials interviewed expressed it in stressing these points, bankers do not have the power to turn thumbs down on any particular class of security. It is the investing public which does that for them, popular opinion to the contrary notwithstanding.

As is generally well known and as the bankers pointed out the net return on the dollar invested in the electric railway business is not as satisfactory, never has been and perhaps never will be as is the money put into the hydro-electric or the electric light and power business.

PRINCIPAL ELECTRIC RAILWAY MATURITIES IN 1924 BASED ON DOW, JONES & COMPANY'S COMPILATION

Corporation	Rate	Amount
JANUARY		
Iowa & Illinois Railway 1st	5	$1,063,000
Eastern Massachusetts Street Railway ref.	6	300,000
January total		$1,363,000
FEBRUARY		
Detroit, Ypsilanti & Ann Arbor Railway 1st cons.	6	330,000
Philadelphia Rapid Transit Company equip. trust G	5½	237,500
February total		$567,500
MARCH		
Boston Elevated Railway deb.	6	1,500,000
Interborough Rapid Transit equip. trust	6	280,000
March total		$1,780,000
APRIL		
New England Investment & Security Co. secured notes	5	13,115,000
Market Street Railway coll. notes	6	4,278,000
Denver City Tramway prior mortgage	6	2,000,000
Denver Tramway Power extension	6	788,000
April total		20,181,000
MAY		
Michigan Railroad 1st	6	4,250,000
North Hudson County Railway imp.	5	1,291,000
Hestonville, Mantua & Fairmount Passenger Railway	5	1,050,500
May total		$6,591,500
JUNE		
Grand Rapids Railway 1st	6	$2,500,000
June total		$2,500,000
JULY		
South Side Elevated 1st	4½	8,000,000
Chicago Elevated Railways deb.	6	7,000,000
Broadway Surface 1st	5	1,500,000
July total		$16,500,000
AUGUST		
West End Street Railway deb.	7	1,581,000
Philadelphia Rapid Transit equip. trust G	5½	237,500
August total		$1,818,500
SEPTEMBER		
Market Street Railway cons.	5	9,560,100
Minnesota & St. Paul Suburban Railway 1st	5	500,000
Hoosac Valley Street Railway ref.	4	400,000
September total		$10,460,100
OCTOBER		
St. Louis Transit imp.	5	9,790,000
Milford, Attleboro & Woonsocket Street Railway	5	300,000
October total		$10,090,000
DECEMBER		
Detroit Railway 1st	5	1,200,000
December total		$1,200,000
Railway notes and bonds maturing in:		
January		$1,363,000
February		567,500
March		1,780,000
April		20,181,000
May		6,591,500
June		2,500,000
July		16,500,000
August		1,818,500
September		10,460,100
October		10,090,000
November		
December		1,200,000
Grand total		$73,051,600

The difficulty of breaking down the nickel as the measure of payment for a car ride and the question of the future of the railway raised by the much-heralded advent of the bus have acted to deter investors from putting money into the railway business. But these uncertainties are rapidly disappearing, for experience is showing that the cost of the ride must be paid for and that the bus cannot replace the railways in any important service. When the public generally comes to realize these changes the securities of the electric railways will increase in popular favor.

After all, the electric railways are merely striving for the same objective as the electric light and power industry—service to the public. All the electric railways ask is an adequate return on the honest investment value in the business. And that they have in the

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past often been denied. In their case, in other words, service has not always brought its proper reward. But there is absolutely no question that the public relations work and the better attitude of railway managements are bearing fruit, and that the cumulative effect of these will result in the railways being able to do their financing on more advantageous terms.

Statistics Showing Extent of the Industry

Number of Operating Companies, Miles of Track, Number of Cars and Buses Comprised in Electric Railway Field in 1922

AS IN previous years, the ELECTRIC RAILWAY JOURNAL has compiled statistics of the miles of track and quantities of rolling stock of the electric railway companies of the United States to compare with a similar table which was published on page 50 of the JOURNAL for Jan. 6, 1923. This information was obtained from the August, 1923, "Electric Railway Directory" of the McGraw-Hill Company and is indicative of the conditions as they existed about July 1. As with last year's table, the mileage of electrified steam railroads has been included.

This year, as previously, considerable difficulty was experienced in compiling the table, because, with companies owning both electric and steam equipment, the figures as reported did not always indicate definitely the equipment primarily used for electric operation and that for steam operation. In such case where it was believed that the equipment was primarily for steam service, it was omitted from the table. This course was followed, for instance, with the 2,405 trail freight and express cars reported by the Fort Dodge, Des Moines & Southern Railroad, the 319 motor coal cars reported by the East St. Louis & Suburban Railway, and the 495 coal cars reported by the St. Louis & Belleville Electric Railway. As the purpose of the table was primarily to show the number of cars engaged in street and interurban and electrified steam railroad service, the 300 "other cars" reported by the Chicago Tunnel Company were also omitted. At the same time the compilation includes the 1,129 trail freight cars of the Pacific Electric Railway and the 910 freight cars of the Illinois Traction System, as these roads are primarily electric railway systems that cover a large territory. The method described is the same as that followed last year.

Estimates had to be made in some cases, particularly where lessor and lessee companies were concerned, in regard to track and to some extent in regard to rolling stock, so as to avoid duplication, where the figures as reported in the directory were not very clear in this regard. For this reason, too great reliance should not be placed upon slight differences in this table and in the corresponding table published last year as indicating corresponding differences in the exact status of the industry. The compilation is claimed to be approximate only, but it is believed to be as close to the facts as can reasonably be obtained under private direction, as distinguished from government direction. In a number of cases where a smaller number of cars was reported, the cause is believed to be that with the purchase of new cars, a large number of old and obsolete cars was scrapped. As the scrapped cars had practically been retired the net result was an increase in serviceable cars, though the statistics showed a smaller total number of cars.

STATISTICS OF CARS AND TRACK OPERATED BY ELECTRIC RAILWAYS IN THE UNITED STATES IN JULY, 1923

	No. of Cos. Operating	Miles of Single Track	Passenger Motor Cars	Cars, Trail	Electric Locomotives	Freight Motor	Cars, Trail	Service Cars	Other Cars	All Cars
New England States										
Connecticut	9	1,600.89	1,639	66	108	65	9	323	1	2,211
Maine	14	527.87	426	10	5	33	92	94	34	694
Mass.	28	2,710.53	5,223	280	13	63	8	896	74	6,557
N. Hamp.	11	243.53	307		2	4	2	43	10	368
Rhode Isl.	4	400.12	1,259	26	3	31	33	168		1,520
Vermont	7	98.50	108	4	7	10	3	13	1	146
1923 total	73	5,581.44	8,962	386	138	206	147	1,537	120	11,496
1922 total	74	5,691.12	8,901	402	137	216	156	1,473	147	11,432
Eastern States										
Delaware	1	139.73	191	72		3		30		296
D. of Col.	6	379.25	1,028	92	6	5	29	106		1,266
Maryland	10	702.34	2,083	61	13	7	41	12	54	2,271
New Jersey	23	1,464.77	3,035	109	2	22	6	370	7	3,551
Pennsylv'a.	104	4,625.37	7,555	542	9	164	156	997	170	9,593
Virginia	13	447.27	858	64	3	16	32	59	5	1,037
W. Virginia	15	611.29	442	9	15	25	27	38	35	591
New York	89	5,427.84	16,882	2,143	131	117	94	1,750	487	21,604
1923 total	261	13,797.86	32,074	3,092	179	359	385	3,362	758	40,209
1922 total	263	13,857.60	32,721	3,199	176	336	308	3,303	839	40,882
Central States										
Illinois	61	3,587.32	5,831	879	64	213	1,955	679	58	9,679
Indiana	28	2,429.99	1,808	265	12	58	513	147	134	2,937
Iowa	23	975.23	789	85	41	17	393	140	76	1,541
Kentucky	7	491.82	774	62		15	10	145	8	1,014
Michigan	23	1,827.50	2,867	300	22	127	189	232	272	4,009
Minnesota	13	781.51	1,252	8	7	46		98	20	1,431
Missouri	22	1,146.34	2,551	255	6	20	29	337	42	3,240
Ohio	62	3,998.42	4,269	570	38	241	348	483	439	6,388
Wisconsin	16	768.26	1,035	116	8	12	29	306	19	1,525
1923 total	255	16,006.39	21,176	2,540	198	749	3,466	2,567	1,068	31,764
1922 total	254	15,844.59	20,956	2,508	179	588	3,672	2,478	1,260	31,641
Southern States										
Alabama	12	361.79	434	130	3	5	81	60	17	730
Arkansas	8	126.32	228	19		1	6	17	3	274
Florida	7	200.41	368	11		12	6	25		422
Georgia	11	497.61	690	49	1	7	12	18	40	817
Louisiana	8	314.75	732	47		6		81	2	868
Mississippi	7	94.08	108	21		1	4	2	3	139
N. Carolina	9	363.94	307	23	18	6	161	31	8	554
S. Carolina	4	148.18	178	21				5	14	218
Tennessee	10	444.58	694	70	2	5	2	58	18	849
1923 total	76	2,551.66	3,739	391	24	43	272	297	105	4,871
1922 total	78	2,516.83	3,560	374	25	55	302	324	96	4,736
Western States										
Arizona	3	43.79	49					3		52
California	37	3,363.54	3,842	483	82	178	2,276	540	116	7,517
Colorado	12	453.75	400	146	10	19	223	57	6	861
Idaho	3	100.20	33		3	3	25	2		66
Kansas	13	508.34	376	39	3	22	128	32	11	611
Montana	7	844.50	115	25	90		2	14		246
Nebraska	5	241.75	596	10	4	4		73		687
Nevada	1	7.50	5							5
New Mex.	2	10.95	16							16
N. Dakota	4	25.79	48	22				9		79
Oklahoma	13	361.99	298	16	8	38	203	22	2	587
Oregon	10	765.31	729	78	22	2	397	184	31	1,443
S. Dakota	2	19.75	27			2	2	3		34
Texas	22	1,037.05	1,364	103	1	25	13	139	1	1,646
Utah	5	504.83	216	45	21	10	244	17	213	766
Washington	14	1,034.89	1,171	46	31	52	659	112		2,071
Wyoming	2	22.00	13	1				1	4	19
1923 total	155	9,345.93	9,298	1,014	275	355	4,172	1,208	384	16,706
1922 total	158	9,239.73	9,304	1,141	255	180	3,465	1,183	453	15,981
1923 Total U.S.	821	47,283.28	75,249	7,423	814	1,712	8,442	8,971	2,435	105,046
1922 Total U.S.	827	47,149.87	75,442	7,624	772	1,375	7,903	8,761	2,795	104,672

The compilation showed that the electric railway companies of the country own 112 cable cars and seven storage battery cars. Since these were not sufficiently numerous to warrant a separate column, the cable cars (all of which are in the states of Washington or California) have been included under passenger trail cars, and the storage battery cars under motor passenger cars. Steam locomotives, trackless trolleys and inclined plane cars owned by electric railways are not included in the table. A column of buses owned was published last year, but it has been omitted this year, as a table of buses owned by electric railway companies will be found elsewhere in this issue.

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Receiverships Lowest in Thirteen Years

Twelve Companies Failed During 1923—Mileage of Track Involved and Capitalization Lowest on Record—Total Number Emerging from Receivership or Foreclosure Is Thirty-one, Lifting 1,772 Miles and $305,265,000 Face Value of Securities Involved—Net Receiverships Reduced from Eighty-five to Sixty-three Companies

THE general improvement of conditions in the electric railway industry is reflected by the marked reduction in the number of properties remaining in receivership at the close of the year ending Dec. 31, 1923. The failures during the year were less in number than in any year since 1910 and the track mileage and amount of capital involved is the lowest since this paper began publishing the record, in 1909. Comparing the figures for 1923 in Table I with previous years the marked improvement in the situation is evident.

The improving condition of the industry is perhaps even better shown by the large number of foreclosure sales during the year, preparatory to reorganization. The total number of sales, and the figures involved, show a material increase over several years previous. Practically all the roads involved in such sales are out of receiverships, have been reorganized and are now able to meet their obligations as they come due.

Details of the new receiverships for the year just completed are given in Table III. No city systems of any great importance went into the hands of receivers in 1923. The largest company in point of capital involved that went into receivership during the year was the Washington-Virginia Railway, which operates 40 miles of interurban lines running out from Washington, D. C., into Virginia. In point of track mileage the Morris County Traction Company, operating 69 miles of interurban lines in northern New Jersey, was the largest.

But five companies were so unfortunate as to abandon operation permanently during the year, as compared with nine in 1922. The track involved was 65.04 miles, as compared with 213.02 the year before. It is impossible to make an exact comparison of the securities involved, on account of the impossibility of segregating the railway property in one case and incomplete information in others, but the totals of stock and bonds involved is materially below that for the previous year. The largest railway to cease operations was the Jersey Central Traction Company, which operated 40 miles of interurban lines in the section of New Jersey between Perth Amboy and the seacoast. The road never was a financial success, depending principally on summer business which was lost with the advent of private automobile competition and finally a bus line.

Table V gives a record in detail of the status of each company that was in receivership at the beginning of 1923, or that went into receivership or was foreclosed during the year. The outstanding feature of this table is the large proportion of roads emerging from receiverships during the year, as compared with those added.

In the New England district the Atlantic Shore Railway and its subsidiaries were sold at foreclosure sale, being reorganized as the York Utilities Company. No companies went into receivership in this territory during the year, so that the total of receiverships was

TABLE I—RECORD OF ELECTRIC RAILWAY RECEIVERSHIPS

Year	Number of Companies	Miles of Single Track Involved	Outstanding Securities—Stock	Outstanding Securities—Bonds
1909	22	558.00	$29,962,200	$22,325,000
1910	11	696.61	12,629,400	75,490,735
1911	19	518.90	29,533,450	38,973,293
1912	26	373.58	20,410,700	11,133,800
1913	18	342.84	31,006,900	47,272,200
1914	10	362.39	35,562,550	19,050,460
1915	27	1,152.10	40,298,050	39,372,375
1916	15	359.26	14,476,600	10,849,200
1917	21	1,177.32	33,918,725	33,778,400
1918	29	2,017.61	92,130,388	163,257,102
1919	48	3,781.12	321,259,354	312,915,104
1920	19	1,065.31	28,758,455	72,283,575
1921	19	986.42	32,909,525	36,177,800
1922	14	695.43	18,140,150	20,304,400
1923	12	333.63	8,332,100	14,707,066

TABLE II—RECORD OF ELECTRIC RAILWAY FORECLOSURE SALES

Year	Number of Companies	Miles of Track Involved	Outstanding Securities—Stock	Outstanding Securities—Bonds	Receiver's Certificates
1909	21	488.00	$22,265,700	$21,174,000	(a)
1910	22	724.36	19,106,613	26,374,075	(a)
1911	25	660.72	91,354,800	115,092,750	(a)
1912	18	267.18	14,197,300	10,685,250	(a)
1913	17	302.28	15,243,700	19,094,500	(a)
1914	11	181.26	26,239,700	44,094,241	(a)
1915	19	308.31	30,508,817	16,759,997	(a)
1916	19	430.14	13,895,400	22,702,300	(a)
1917	26	745.19	27,281,900	27,313,045	(a)
1918	23	524.22	37,740,325	20,149,384	(a)
1919	29	2,675.48	89,893,400	79,836,738	$42,300
1920	13	259.90	7,782,400	11,227,328	52,000
1921	13	777.97	33,642,255	30,863,526	5,000
1922	13	322.88	7,491,500	12,640,600	114,683
1923	15	927.45	118,077,959	110,638,250	12,265,000

TABLE III—ELECTRIC RAILWAY RECEIVERSHIPS—1923

	Miles of Single Track Involved	Outstanding Securities Stocks	Outstanding Securities Bonds	Receiver's Certificates
Denver & Intermountain R.R., Denver, Col.	22.28	1,000,000	500,000	.....
Washington-Virginia Ry., Washington, D. C.	40.00	2,378,300	5,614,000	None
DeKalb-Sycamore & Interurban Traction Co., DeKalb, Ill.	6.50	(a)	(a)	.....
Galesburg & Kewanee Electric Railway Co., Kewanee, Ill.	14.00	310,800	400,000	None
Henderson Traction Co., Henderson, Ky.	8.00	85,000	150,000	None
Owensboro City R.R., Owensboro, Ky.	12.50	75,000	400,000	None
Morris County Traction Co., Morristown, N. J.	68.98	300,000	4,193,066	None
New York & Queens County Ry. Co., New York City	43.65	3,235,000	1,500,000	None
New York & Long Island Trac. Co., Hempstead, N. Y.	50.76	1,000,000	1,000,000	None
Dayton, Springfield & Xenia Southern Ry. Co., Dayton, Ohio	27.97	500,000	500,000	.....
The Hocking-Sunday Creek Traction Co., Nelsonville, Ohio	14.99	223,000	*300,000	None
Norwalk & Shelby R.R., Norwalk, Ohio	24.00	125,000	150,000	None
Total for 1923—12 companies.	333.63	8,332,100	14,707,066	.....

* In addition to bonds, interest amounting to $183,688 is unpaid.
(a) Data not available.

TABLE IV—ABANDONMENTS—ENTIRE—1923

(Includes only companies whose entire traction property has been dismantled or permanently abandoned and not likely to resume operation.)

	Miles	Stock	Bonds
Douglas Traction & Light Co., Douglas, Ariz.	10.00	$773,180	$195,000
*Nevada County Traction Co., Grass Valley, Cal.	5.00	(a)	(a)
Fort Scott & Nevada Light, Heat, Water & Power Co., Nevada, Mo.	5.00	(a)	(a)
Jersey Central Traction Co., Keyport, N. J.	39.54	1,131,400	800,000
*Twin State Gas & Electric Co., Brattleboro, Vt.	5.50	(b)	(b)
Total for 1923 (five companies)	65.04	$1,904,580	$995,000

* Now operating bus line. (a) Data not available. (b) Railway value not given separately.

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Table V—Electric Railway Receiverships as of Dec. 31, 1923, and Foreclosure Sales During Year

Name of Company	Year of Receivership or Foreclosure	Miles of Single Track Involved	Outstanding Securities: Capital Stock	Outstanding Securities: Funded Debt	Outstanding Securities: Receivers' Certificates
New England District					
CONNECTICUT					
Danbury & Bethel St. Ry., Danbury	1917	13.00	$320,000	$588,500	$100,000
Hartford & Springfield St. Ry., Warehouse Point	1918	48.00	785,000	961,000	None
Shore Line Electric Ry., New London (1)	1919	28.22	1,000,000	2,725,000	None
MAINE					
Atlantic Shore Ry., Kennebunk (2)	1915	49.93	1,000,000	1,746,250	None
MASSACHUSETTS					
Concord, Maynard & Hudson St. Ry., Greenfield (2)	1921	18.15	235,000	230,000	None
Connecticut Valley St. Ry., Greenfield	1921	47.05	620,000	580,000	10,000
Northern Massachusetts St. Ry., Greenfield (3)	1921	44.09	500,000	500,000	40,000
NEW HAMPSHIRE					
Portsmouth, Dover & York St. Ry., Portsmouth (2, 4)	1917	41.46	(4)	707,000	30,000
VERMONT					
Barre & Montpelier Trac. & Pwr. Co., Montpelier	1920	9.75	120,000	100,000	None
Springfield El. Ry. (34)	1918	9.00	100,800	100,000	None
Summary					
Total Jan. 1, 1923	11 cos.	360.63	4,880,800	8,308,750	130,000
Net changes and corrections (35)	*1 co.*	*51.98*	*200,000*	*71,000*	50,000
Receiverships and foreclosures in 1923	....	.....	.....	.....	.....
Less properties sold or reorganized	*4 cos.*	*118.54*	*1,335,800*	*2,783,250*	*30,000*
Net receiverships, Dec. 31, 1923	6 cos.	199.11	3,345,000	5,454,500	150,000
North of the Ohio and East of the Mississippi					
ILLINOIS					
Alton, Granite & St. Louis Trac. Co., Alton	1920	62.00	3,189,000	3,000,000	None
Aurora, Elgin & Chicago R.R., Aurora (6)	1919	66.00	6,200,000	3,636,000	None
Chicago, Aurora & DeKalb R.R., Aurora (7)	1916	30.20	950,000	427,500	None
Chicago & Interurban Traction Co., Chicago (6)	1922	50.00	1,000,000	1,350,000	None
Chicago & Oak Park Elev. R.R., Chicago	1911	22.66	100,000	5,992,500	2,210,000
DeKalb-Sycamore & Interurban Trac. Co., DeKalb	1923	.....	.....	.....	.....
Galesburg & Kewanee El. Ry., Kewanee (8)	1923	14.00	310,800	400,000	None
Peoria Railway Terminal Co. (30)	1922	11.40	1,000,000	2,444,000	None
INDIANA					
Beech Grove Traction Co.	1917	3.90	150,000	100,000	None
Ft. Wayne, Van Wert & Lima Traction Co., Ft. Wayne	1921	61.63	1,000,000	1,470,000	None
Winona Interurban Ry., Warsaw	1916	70.00	750,000	2,343,700	None
MICHIGAN					
Houghton County Trac. Co., Houghton	1921	32.15	957,200	660,000	None
Michigan United Rys., Jackson (6, 28)	1922	257.46	7,000,000	12,355,800	None
Saginaw-Bay City Ry., Saginaw (9)	1921	64.22	2,600,000	2,063,000	None
NEW JERSEY					
North Jersey Rapid Transit Co., Hohokus	1912	18.00	800,000	800,000	None
Morris County Trac. Co., Morristown	1923	68.98	300,000	4,193,066	Noue
NEW YORK					
Binghamton Ry.	1918	50.25	978,995	2,396,707	None
Buffalo & Lackawanna Trac. Co., Buffalo	1918	8.80	55,000	1,000,000	50,000
New York & Long Island Traction Co., Hempstead	1923	50.76	1,000,000	1,000,000	None
Hornell Traction Co.	1917	10.90	117,900	150,000	7,000
Brooklyn Rapid Transit Co., New York (29)	1918	Holding Co.	74,422,959	68,114,700	12,000,000
Brooklyn Heights R.R.	1919	5.12	200,000	250,000	None
Brooklyn Queens Co. & Suburban R.R. (12)	1919	65.52	2,000,000	6,624,000	None
Coney Island & Brooklyn R.R.	1919	46.15	2,983,900	6,232,000	None
Nassau El. R.R.	1919	136.10	105,925	13,571,928	70,000
New York Consolidated Ry. (10)	1918	252.88	683,184	22,936,000	None
New York Municipal Ry. Corp. (10)	1918	85.73	.....	2,207,000	None
Manhattan & Queens Trac. Corp., Long Island City (6)	1917	21.20	20,000	(11) 2,090,000	None
New York & Queens Co. Ry., Jackson Heights	1923	43.65	3,235,000	1,500,000	None
New York Rys.	1919	91.05	17,495,060	58,773,027	None
Richmond Lt. & R.R., New York (12)	1920	32.05	(13) 2,871,750	2,200,000	None
Second Avenue R.R., New York	1908	30.02	1,862,000	5,720,000	3,140,000
Staten Island Midland Ry., New York	1920	28.68	1,000,000	1,000,000	3,000
Steinway Ry., Long Island City	1922	31.11	None	1,500,000	None
Ogdensburg St. Ry.	1922	7.74	150,000	150,000	None
Orange County Trac. Co., Newburgh	1923	20.82	325,000	780,000	None
Penn Yan & Lake Shore Ry., Penn Yan	1918	8.50	94,000	100,000	2,500
Westchester St. R.R., White Plains	1920	21.66	700,000	168,000	22,400
OHIO					
Cincinnati & Dayton Traction Co., Hamilton (30)	1920	91.07	(24) 1,250,000	(24) 4,500,000	.....
Cincinnati, Lawrenceburg & Aurora El. St. R.R., Cincinnati	1913	31.89	808,900	750,000	None
Cleveland, Alliance & Mahoning Valley R.R., Ravenna (6)	1920	46.00	1,100,000	1,100,000	8,000

reduced from eleven to six. The lines remaining in receivership at the end of the year are all interurbans with small mileage.

The second district, comprising the territory north of the Ohio River and east of the Mississippi, includes a great proportion of the electric railway mileage of the country. In this group the principal change was the completion of the reorganization of the former Brooklyn Rapid Transit properties. The Brooklyn-Manhattan Transit Corporation has taken over the functions of the holding company, and under it have been organized subsidiaries to operate the rapid transit and surface lines. A few of the subsidiaries still remain in receivership. In this reorganization a total of 540 miles of track, with $77,200,000 in stocks, $113,450,000 in

NOTES FOR TABLE V

1—23.95 miles of track transferred to the Groton & Stonington Traction Co. as of Jan. 1, 1923.
2—Sold at foreclosure sale during 1923.
3—To be sold at receiver's sale.
4—Included in that of Atlantic Shore Railway.
5—All service suspended in 1922.
6—As included in last year's report. No new information received.
7—Sold for junk during 1923.
8—Sold at receiver's sale and operation of road discontinued.
9—Sold at foreclosure sale and reorganized as Saginaw Transit Co.
10—Reorganized as part of New York Rapid Transit Co.
11—No bonds issued. Cost of construction carried by temporary notes.
12—Receiver discharged during 1923.
13—Figures cover portion of securities only.
14—Represented as having had right of way but no track built.
15—In addition to bonds, interest amounting to $183,688 is unpaid.
16—Successor to Ohio Elec. Ry. Co.
17—Sold during 1922.
18—Sold and reorganized as Bangor & Portland Transit Co.
19—Reorganized as New Jersey Interurban Co.
20—Figures for total property. Railway value cannot be separated.
21—Notes, bank loans and $85,050 car trust certificates included.
22—Sold at foreclosure sale and operation of railway discontinued.
23—Sold at foreclosure sale. Now owned and operated by Scotts Run Ry.
24—Information not received from company. Supplied by *Commercial and Financial Chronicle.*
25—No par value. Nominal value of stock given.
26—Road purchased from bondholders' protective committee and now being reorganized.
27—Preferred stock; also 3,000 shares no par value common.
28—Sold at foreclosure sale and reorganized as Michigan Elec. Ry. Co.
29—Sold at foreclosure sale and reorganized as Brooklyn-Manhattan Transit Corp.
30—Omitted from 1922 tabulation.
31—Information not received. Supplied by Moody's Analyses.
32—Sold at auction and reorganized.
33—Sold at receivers' sale and reorganized as Interurban Trac. Co.
34—Sold at receivers' sale to Springfield Terminal Railway Co.
35—Net changes in individual returns and additions and subtractions for companies included or omitted in error last year.

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bonds, and $12,070,000 of receiver's certificates, have been involved. With the corporate changes ensuing these companies are now on a firm financial basis and should make a far better showing than in the past.

The Richmond Light & Railroad Company, operating lines on Staten Island, also had the receivership terminated during the year. This property involves some 32 miles of track and $5,000,000 of securities. Material assistance came from the agreement whereby the company was allowed to charge an 8-cent fare, even though within the limits of New York City.

Included in the totals at the beginning of the year were items of $50,403,634 for stock and $63,808,000 for bonds of the Interborough Consolidated Corporation. This company was dissolved late in 1922, but owing to technicalities in the approval of the plan the totals were shown in the table at the end of the year. Since the dissolution took place entirely in the earlier year these figures have been removed as a correction, rather than as a termination of the receivership in 1923.

Outside of New York the principal receiverships terminated during the year are those of the Michigan United Railways and the Saginaw-Bay City property. The bonds of the former company were scaled down within the limit of the company's earning power, and the reorganization has put it in a healthy condition. The vicissitudes of the Saginaw property are familiar to all who have followed the course of events in that city. Forced to shut down in 1921 through lack of earning power occasioned by vicious jitney competition, the company remained inactive for two full years until the city took steps to remove the unjust competition and have service restored. A reorganization has been effected, and the road is now getting on its feet.

The Chicago, Aurora & De Kalb Railroad, which for twenty years operated 20 miles of interurban line in northern Illinois, suspended operations on Feb. 1 and was sold for junk, bringing $90,000.

During the year a master's

Table V—Electric Railway Receiverships as of Dec. 31, 1923, and Foreclosure Sales During Year—(Concluded)

Name of Company	Year of Receivership or Foreclosure	Miles of Single Track Involved	Outstanding Securities: Capital Stock	Outstanding Securities: Funded Debt	Receivers' Certificates
Cleveland, Southwestern & Columbus Ry., Cleveland	1922	185.00	6,648,000	4,454,000	185,000
Dayton, Covington & Piqua Trac. Co., West Milton (6)	1922	38.00	1,150,000	550,000	None
Dayton, Springfield & Xenia So. Ry., Dayton	1923	27.97	(24) 500,000	(24) 500,000	.....
Gallipolis & Northern Trac. Co., Gallipolis (17)	1922	5.00	20,000	48,000	None
The Hocking-Sunday Creek Trac. Co., Nelsonville	1923	14.99	223,000	(15) 300,000	None
Lima-Toledo R.R., Lima (16)	1921	82.90	11,000,000	7,254,000	None
Indiana, Columbus & Eastern Trac. Co., Springfield	1921	207.43	4,025,000	7,900,000	200,000
Ohio River El. Ry. & Power Co., Pomeroy (6)	1919	12.70	300,000	315,000	None
Maumee Valley Ry. & Lt. Co., Toledo (17)	1921	23.21	1,000,000	800,000	None
Norwalk & Shelby R.R., Norwalk	1923	24.00	125,000	150,000	None
Toledo & Western R.R., Sylvania (2)	1921	89.00	2,000,000	2,000,000	None
PENNSYLVANIA					
Bangor & Portland Trac. Co., Bangor (18)	1922	8.70	130,000	130,000	None
Buffalo & Lake Erie Trac. Co., Erie	1915	168.00	7,500,000	7,066,000	760,000
Ephrata & Lebanon St. Ry., Lebanon	1921	24.00	189,000	250,000	None
Montgomery Transit Co., Norristown (2)	1923	14.01	(31) 280,000	(31) 160,000	.....
Northampton, Easton & Washington Trac. Co., Easton (19)	1919	17.80	1,250,000	739,000	15,000
North Branch Transit Co., Bloomsburg	1915	30.00	500,000	532,500	75,000
Pittsburgh Railways	1918	595.88	21,726,750	51,541,633	None
Slate Belt Transit Co., Pen Argyl (3)	1922	18.00	360,000	400,000	21,000
Sunbury & Susquehanna Ry., Sunbury (6)	1913	9.20	600,000	640,000	None
Summary					
Total Jan. 1, 1923	53 cos.	3,367.73	245,795,107	377,833,148	18,679,400
Net changes and corrections (35)	*2 cos.*	*118.87*	*53,161,484*	*54,437,153*	68,500
Receiverships and foreclosures in 1923	10 cos.	285.68	6,298,800	8,983,066	.....
Less properties sold or reorganized	*17 cos.*	*1,116.70*	*95,949,618*	*135,556,928*	*12,085,000*
Net receiverships Dec. 31, 1923	44 cos.	2,417.84	102,982,805	196,822,133	6,662,900
South of the Ohio and East of the Mississippi					
ALABAMA					
Birmingham Ry., Lt. & Pwr. Co.	1919	154.08	4,232,800	8,737,872	117,388
Birmingham-Tidewater Ry., Birmingham	1919	32.55	325,000	1,500,000	None
Montgomery Lt. & Trac. Co. (12)	1919	38.00	(20) 2,000,000	(20) 1,430,000	(20) 250,000
DISTRICT OF COLUMBIA					
Washington-Virginia Ry.	1923	40.00	2,378,300	5,614,000	None
FLORIDA					
Jacksonville Traction Co. (6)	1919	64.00	1,500,000	(21) 4,122,050	62,500
Pensacola Electric Co.	1920	24.49	(20) 1,100,000	(20) 1,751,135	None
KENTUCKY					
Henderson Traction Co. (2)	1923	8.00	85,000	150,000	None
Owensboro City R. R.	1923	12.50	75,000	400,000	None
TENNESSEE					
Memphis Street Ry. (12)	1919	129.11	5,000,000	8,730,000	None
WEST VIRGINIA					
Morgantown & Wheeling Ry., Morgantown (23)	1916	27.00	345,000	500,000	214,000
Summary					
Total Jan. 1, 1923	7 cos.	472.43	14,502,800	26,124,547	983,521
Net changes and corrections	....	*3.20*	.....	*646,510*	*339,633*
Receiverships and foreclosures in 1923	3 cos.	60.50	2,538,300	6,164,000	.....
Less properties sold or reorganized	4 cos.	*202.11*	*7,430,000*	*10,810,000*	*464,000*
Net receiverships Dec. 31, 1923	6 cos.	327.62	9,611,100	22,125,057	179,888
West of the Mississippi					
ARKANSAS					
West Helena Consolidated Co., Helena (33)	1921	5.50	469,975	None	None
CALIFORNIA					
San Francisco-Oakland Terminal Rys., Oakland (2)	1923	262.00	28,175,000	20,704,000	None
COLORADO					
Denver Tramway Co., Denver	1920	226.14	6,156,300	17,458,160	None
The Denver & Intermountain R.R., Denver	1923	22.28	(24) 1,000,000	(24) 500,000	.....
KANSAS					
Manhattan City & Interurban Ry., Manhattan (26)	1922	16.00	612,150	90,000	None
Southwestern Interurban Ry., Winfield (2)	1919	20.00	(27) 100.000	None	None
MINNESOTA					
St. Paul Southern El. Ry., Hastings	1918	17.54	658,225	425,400	None
MISSOURI					
Kansas City, Lawrence & Topeka R.R., Kansas City	1919	12.00	250,000	400,000	None
Kansas City Rys.	1920	314.88	(25) 100,000	30,032,336	None
Missouri Elec. R.R., St. Louis	1919	18.91	1,000,000	700,000	None
United Rys. of St. Louis	1919	460.93	41,296,000	50,690,000	4,200,000

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Table V—Electric Railway Receiverships as of Dec. 31, 1923, and Foreclosure Sales During Year—(Concluded)

Name of Company	Year of Receivership or Foreclosure	Miles of Single Track Involved	Outstanding Securities—Capital Stock	Funded Debt	Receiver's Certificates
TEXAS					
Austin St. Ry.	1921	22.67	810,000	786,000	None
Bryan & College Interurban Ry., Bryan (*6, 32*)	1920	27.20	300,000	300,000	None
Summary					
Total Jan. 1, 1923	14 cos.	1,349.99	81,439,350	140,348,521	5,480,000
Net changes and corrections (*35*)	*3 cos.*	*208.22*	*29,677,100*	*39,466,625*	*1,280,000*
Receiverships and foreclosures in 1923	2 cos.	287.44	20,657,000	28,675,000	
Less properties sold or reorganized	*6 cos.*	*356.53*	*21,949,125*	*29,351,000*	
Net receiverships Dec. 31, 1923	7 cos.	1,072.68	50,470,125	100,205,896	4,200,000
Recapitulaton					
Total Jan. 1, 1923	85 cos.	5,550.78	346,618,057	552,614,966	25,272,921
Net changes and corrections (*35*)	*6 cos.*	*382.27*	*83,038,584*	*93,328,268*	*1,701,133*
Receiverships and foreclosures in 1923	15 cos.	633.62	29,494,100	43,822,066	
Less properties sold or reorganized	*31 cos.*	*1,793.88*	*126,664,543*	*178,501,178*	*12,578,000*
Net receiverships Dec. 31, 1923	63 cos.	4,008.25	166,409,030	324,607,586	11,192,788

sale was held at which the Toledo & Western Railroad was sold to the Doherty interests. The refinancing which has been accomplished will enable the road to operate and meet its obligations.

In the group south of the Ohio and east of the Mississippi River three companies terminated receiverships and two new receiverships began. There also was one foreclosure sale, that of the Henderson (Ky.) Traction Company, which was sold without a receivership. Of the companies in this group where the receiverships were lifted the most important was the Memphis, Tenn., property. After being in receivership for four years the property was turned back to the stockholders without a reorganization and operation continued under the same management as before.

West of the Mississippi six receiverships were ter-

Table VI—Abandonments—Partial—1923

(Includes all pieces of track sidings, yards, etc., permanently abandoned—Companies arranged alphabetically by states.)

	Miles City	Miles Interurban
Birmingham-Tidewater Ry., Birmingham, Ala.	0.06	
Pacific Electric Co., Los Angeles, Cal.	3.74	8.88
Birmingham Ry., Lt. & Pwr. Co., Birmingham, Ala.	0.21	
Petaluma & Santa Rosa R.R., Petaluma, Cal.		0.03
San Diego Electric Ry., San Diego, Cal.	1.88	
Boulder Street Ry., Boulder, Col.	0.34	
The Denver & Intermountain R.R., Denver, Col.		0.64
The Denver Tramway Co., Denver, Col.	0.88	0.46
The Trinidad Elec. Transmission Ry. & Gas Co., Trinidad, Col.	3.50	
The Connecticut Co., New Haven, Conn.		0.26
New York, New Haven & Hartford R.R. Co., New Haven, Conn.		1.08
Shore Line Elec. Ry., Norwich, Conn.		25.45
Washington Ry. & Elec. Co., Washington, D. C.	2.56	1.44
Jacksonville Traction Co., Jacksonville, Fla.	0.34	
Municipal Ry. of St. Petersburg, Fla	0.34	
Columbus Electric & Pwr. Co., Columbus, Ga.	0.72	
Macon Ry. & Light Co., Macon, Ga.		1.00
Chicago & Interurban Trac. Co., Chicago, Ill.	0.42	
Chicago, Milwaukee & St. Paul Ry., Seattle, Wash.	0.30	
Chicago Railways., Chicago, Ill.	0.01	
Rockford & Interurban Ry., Rockford, Ill.		2.42
Tri-City Ry. of Ill., Rock Island, Ill.	4.90	
Illinois Power Co., Springfield, Ill.	1.05	
Indiana Service Corp., Fort Wayne, Ind.		4.09
Tri-City Ry. Co. of Iowa, Davenport, Iowa	1.13	
Des Moines City Ry., Des Moines, Iowa	0.20	
Dubuque Electric Co., Dubuque, Iowa	1.00	
Waterloo, Cedar Falls & Northern Ry., Waterloo, Iowa		0.11
Kentucky Traction & Term. Co., Lexington, Ky.	0.68	
Louisville & Interurban R. R., Louisville, Ky.		0.17
Louisville Railway, Louisville, Ky.	4.14	
New Orleans Public Service, Inc., New Orleans, La.	3.15	
Portland Railroad, Portland, Me.		0.27
United Rys. & Electric Co., Baltimore, Md.	0.50	
Eastern Mass. Street Ry., Boston, Mass.	2.21	6.61
Boston Elevated Ry., Boston, Mass.	6.64	
Northampton St. Ry., Northampton, Mass.		0.09
New Bedford & Onset St. Ry., New Bedford, Mass.		1.00
Union St. Ry., New Bedford, Mass.		0.05
Berkshire St. Ry., Pittsfield, Mass.		6.26
Springfield St. Ry., Springfield, Mass.	0.99	
Department of St. Railways, Detroit, Mich.	2.87	
Detroit United Ry., Highland Park, Mich.		0.48
Grand Rapids Ry., Grand Rapids, Mich.	0.37	
Jackson Pub. Service Co., Jackson, Miss.	0.50	
Vicksburg Lt. & Traction Co., Vicksburg, Miss.	1.50	
The Helena Light & Ry. Co., Helena, Mont.	2.02	
Dover, Somerworth & Rochester St. Ry., Dover, N. H.	0.30	
Pennsylvania-New Jersey Ry., Trenton, N. J.		25.00
Auburn & Syracuse Electric R.R., Auburn, N. Y.	0.25	
Brooklyn City R.R., Brooklyn, N. Y.	1.50	
Southern New York Power & Ry. Corp., Oneonta, N. Y.	2.47	
New York State Rys., Rochester, N. Y.	1.04	
New York State Rys., Syracuse, N. Y.	0.04	
Syracuse & Eastern R.R., Syracuse, N. Y.	0.45	
New York State Rys., Utica, N. Y.	0.39	
Tidewater Power Co., Wilmington, N. C.	1.00	
Cincinnati, Lawrenceburg & Aurora El. St. R.R., Cincinnati, Ohio	0.90	
The Cincinnati Traction Co., Cincinnati, Ohio	1.16	
The Cleveland Ry., Cleveland, Ohio	0.30	
The Dayton & Western Trac. Co., Dayton, Ohio	1.20	
The Indiana, Columbus & Eastern Trac. Co., Springfield, Ohio	4.05	10.30
Community Traction Co., Toledo, Ohio	1.39	
Cleveland, Painesville & Eastern R.R., Willoughby, Ohio.	4.50	5.00
Shawnee-Tecumseh Traction Co., Shawnee, Okla.	1.91	
Oklahoma Union Ry., Tulsa, Okla.		0.12
Portland Ry., Lt. & Pwr. Co., Portland, Ore.	0.33	0.06
Southern Pacific Co. (Portland Div.), Portland, Ore.		0.44
Panama Electric Co., Panama, Panama	1.27	
North Branch Transit Co., Bloomsburg, Pa.	0.34	
Buffalo & Lake Erie Trac. Co., Erie, Pa.	3.50	
Conestoga Traction Co., Lancaster, Pa.		0.07
Allegheny Valley Street Ry., New Kensington, Pa.		2.55
Citizens Traction Co., Oil City, Pa.	0.90	
Philadelphia Rapid Transit Co., Philadelphia, Pa.	1.65	
Pittsburgh Rys., Pittsburgh, Pa.	1.56	0.03
Reading Transit & Lt. Co., Reading, Pa.	0.41	
York Rys., York, Pa.	0.50	
Manila Electric Co., Manila, P. I.	0.95	
Charleston Consolidated Ry. & Ltg. Co., Charleston, S. C.	2.44	
Dallas Ry., Dallas, Tejas	1.54	
Texas Electric Ry., McKinney, Tex.	1.03	
El Paso Electric Ry., El Paso, Tex.	0.33	
Marshall Traction Co., Marshall, Tex.	0.11	
San Antonio Public Service Co., San Antonio, Tex.	0.27	
Wichita Falls Traction Co., Wichita Falls, Tex.	0.40	
Rutland Ry., Lt. & Pwr. Co., Rutland, Vt.		1.40
Virginia Ry. & Power Co., Richmond, Va.	0.80	
Puget Sound International Ry. & Pwr. Co., Everett, Wash.	9.00	
Pacific Northwest Trac. Co., Seattle, Wash.		1.43
Seattle Municipal Street Ry., Seattle, Wash.	1.50	
Spokane United Rys., Spokane, Wash.	11.79	
Yakima Valley Transportation Co., Yakima, Wash.	0.59	
Charleston Interurban R. R., Charleston, W. Va.	0.34	
West Virginia Utilities Co., Wheeling, W. Va.	3.50	
City Ry., Wheeling, W. Va.	5.00	
Wisconsin Traction, Lt., Heat & Pwr. Co., Appleton, Wis.		0.04
Wisconsin Public Service Corp., Green Bay, Wis.	0.07	
Milwaukee El. Ry. & Lt. Co., Milwaukee, Wis.	0.80	0.18
Sheridan Ry., Sheridan, Wyo.	2.00	
CANADA		
British Columbia El. Ry. Co., Ltd., Vancouver, B. C.	0.88	
Suburban Rapid Transit Co., Winnipeg, Man.	0.39	
New Brunswick Power Co., St. Johns, N. B.	0.39	
Hamilton & Dundas St. Ry., Hamilton, Ont.		4.84
Sarnia St. Ry., Sarnia, Ont.	0.25	
Montreal Tramways Co., Montreal, Que.	0.99	
Regina Municipal Ry., Regina, Sask.	0.58	
	128.40	112.25

TABLE VII—SUSPENSIONS OF SERVICE—1923

(Includes miles of track on which companies have ceased to operate, but which have not been permanently abandoned or ripped up.)

	Miles
Tucson Rapid Transit Co., Tucson, Ariz.	1.00
Monterey & Pacific Grove Ry. Co., Monterey, Cal.	4.50
The Trinidad Electric Transmission Ry. & Gas Co., Trinidad, Col.	15.50
Shore Line Electric Ry., Norwich, Conn.	13.63
Galesburg & Kewanee Electric Ry., Kewanee, Ill.	14.00
Illinois Power Co., Springfield, Ill.	0.16
Eastern Mass. St. Ry., Boston, Mass.	5.04
Massachusetts Northeastern St. Ry., Haverhill, Mass.	6.22
Lakewood & Coast Electric Co., Lakewood, N. J.	1.00
Public Service Ry., Newark, N. J.	5.00
Orange County Traction Co., Newburgh, N. Y.	20.82
Cleveland Southwestern & Columbus Ry., Cleveland, Ohio	22.50
Columbus Newark & Zanesville El. Ry., Springfield, Ohio	4.80
Indiana Columbus & Eastern Traction Co., Springfield, Ohio	10.45
Youngstown Municipal Ry. Co., Youngstown, Ohio	2.00
Highland Grove Traction Co., McKeesport, Pa.	3.00
Citizens Traction Co., Oil City, Pa.	34.70
Philadelphia Rapid Transit Co., Philadelphia, Pa.	2.86
Northumberland County Ry., Sunbury, Pa.	1.00
United Electric Rys., Providence, R. I.	1.07
South Carolina Lt., Pwr. & Rys. Co., Spartanburg, S. C.	10.00
Rutland Ry., Lt. & Pwr. Co., Rutland, Vt.	27.10
Hamilton & Dundas Electric Ry., Hamilton, Ont.	5.57
Total for 1923 (eighteen companies)	211.92

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minated during the year. These were all small properties, the largest being the Bryan & College Interurban Railway, Bryan, Tex.

In this district, however, there was included as in receivership at the beginning of the year the New Orleans property, due to a technicality regarding the discharge of the receiver. The reorganization which formed the New Orleans Public Service, Inc., was completed and in effect during the latter part of 1922. Accordingly the figures from this property have been deducted under the heading "net changes and corrections" rather than show the road as being in receivership during last year. The property involved consists of 222 miles of track, with outstanding securities consisting of $30,198,850 in stock, $38,361,200 in bonds and $1,180,000 in receiver's certificates.

The number of roads that have terminated receiverships or have been reorganized for the year is not nearly so impressive as are the total amounts of capital and tracks involved. The thirty-one companies that have been returned to their owners total 1,794 miles of track. The securities oustanding for these thirty-one companies before the termination of the receiverships or foreclosures amounted to the imposing total of $305,265,171. The total of new receiverships or foreclosures to offset this is only $23,039,166, or less than 8 per cent as much, which shows how rapidly the industry is recovering from its financial difficulties, and what drastic steps are being taken to place it on a sound financial basis.

Of the roads remaining in the hands of the courts at the close of 1923, comparatively few are of major importance. In the east the New York Railways is the largest of such properties. While it has a relatively small track mileage, the capitalization is large, due to the expensive construction on Manhattan Island.

Another large property still in receivership is the Pittsburgh Railways. Steps are well under way to complete a reorganization, but it was found impossible to complete them before the end of the year. In the South the Birmingham Railway, Light & Power Company still remains in receivership. Progress is being made, and back claims are being paid off, so that it is only a matter of time until its affairs are straightened out.

West of the Mississippi three large properties remain in the list, those in St. Louis, Kansas City and Denver. Much progress is reported in straightening out the affairs in these cities. It appears probable that one or more of the properties will be out of receivership before the close of this year.

The San Francisco-Oakland Terminal Railways was sold at foreclosure during the year, and now is undergoing a reorganization, the announced plan of which will reduce greatly the outstanding securities. The road has not, however, gone through a receivership and the plan has the approval of the State Railroad Commission.

More Cars Ordered During 1923 Than Any Year Since 1913

Passenger Cars Arranged for Either One-Man or Two-Man Operation Constitute Nearly 50 per Cent of the Total of New Cars for City Service—The Number of Single-Truck Safety Cars Ordered Fell Off 60 per Cent, While Orders for One-Man Double-Truck Cars Decreased Slightly from Last Year

THE statistics for new electric rolling stock given in the following tables show in a very striking manner that the electric railway industry is getting ahead and is able to do considerable buying. A large increase in buying of cars began last year and 1923 has exceeded 1922. The total of 4,029 new cars and locomotives ordered during 1923 exceeds the high level of 1916, which was 3,942 cars. The purchases of cars this year indicate a promising future for increased earnings, better service and more passengers.

In considering the various types of cars ordered, the outstanding feature is that 1,114 cars of the one-man two-man type were purchased. Of these 1,076 were for city service and 38 for interurban operation. The total of this type for city service is nearly 50 per cent of all the passenger cars ordered for that service. The one-man single-truck cars with 28-ft. body, which are quite universally known as safety cars, are still being bought, but the number decreased materially. There were 312 of this type purchased during 1923, as compared with 772 for 1922 and 565 for 1921. There were also 239 one-man cars bought with bodies longer than 28 ft. Of these latter 184 had double trucks and 55 were single-truck cars. Of the one-man double-truck cars 56 were purchased for interurban service.

A comparison of these figures with similar ones for passenger cars ordered during the year 1922 shows some interesting facts. The total number of double-truck one-man and one-man two-man cars ordered for city service in 1922 was 627. This is 25.6 per cent of the total number of city passenger cars purchased during that year. A similar comparison of the single-truck one-man cars ordered during 1922 shows a total of 845, or 34.5 per cent of the total city passenger cars purchased. Now, considering the numbers of these types purchased during 1923, we see that while the number of single-truck one-man cars has decreased from 34.5 per cent of the total to 12.2 per cent, the number of double-truck one-man and one-man two-man cars has increased from 25.6 per cent to 41.2 per cent in 1923. There has thus been a decided tendency toward the use of double-truck cars for one-man operation.

The one-man two-man type of car made its first appearance last year and 480 were ordered. The increased popularity of this type is shown by the fact that 1,114 were ordered during 1923. These cars range in length from 38 ft. to 47 ft. 8 in., with a weighted average of about 45 ft. The double-truck one-man cars range in length from 39 ft. 1 in. to 49 ft. 2 in.

A new feature of the tabulation of car data this year

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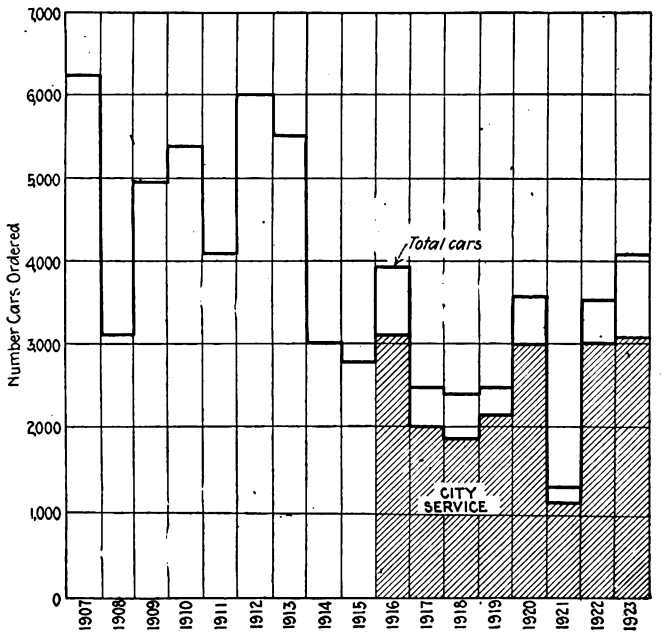

New Cars and Locomotives Ordered by Years. The Division Into City and Interurban Cars Is Not Made Prior to 1916

TABLE I—NEW ROLLING STOCK ORDERED SINCE 1907

Year	Passenger Cars—City	Passenger Cars—Interurban	Freight and Miscellaneous Cars	Electric Locomotives	Total
1907	3,483	1,327	1,406	(a)	6,216
1908	2,208	727	176	(a)	3,111
1909	2,537	1,245	1,175	(a)	4,957
1910	3,571	990	820	(a)	5,381
1911	2,884	626	505	(a)	4,015
1912	4,531	783	687	(a)	6,001
1913	3,820	547	1,147	(a)	5,514
1914	2,147	384	479	(a)	3,010
1915	2,072	336	374	(a)	2,782
1916	3,046	374	491	31	3,942
1917	1,998	185	223	49	2,455
1918	1,842	255	278	44	2,419
1919	2,129	128	172	18	2,447
1920	2,889	227	465	17	3,598
1921	1,059	129	81	7	1,276
1922	2,912	187	405	34	3,538
1923	2,915	427	595	92	4,029

(a) Included in "Freight and Miscellaneous Cars."

TABLE II—SPECIAL COMPARISON OF NEW ROLLING STOCK ORDERS BY YEARS

	1923	1922	1921	1920	1919	1918	1917	1916
Number of railways reporting new cars	167	145	94	172	160	140	182	250
City Service								
Number of one-man cars (28 ft. body S.T.)	312	772	565	1,699	1,383	644	280	187
Number of one-man cars other than 28 ft. body	183	227	....	....	....	....	....	....
Number of one-man, two-man cars	1,076	471	....	....	....	....	....	....
Number of two-man passenger motor cars*	1,097	1,290	383	847	635	1,068	1,316	2,731
Number of passenger trailers	247	150	111	343	111	130	402	128
Service cars	121	103	47	104	31	(a)	(a)	(a)
Total cars city service	3,036	3,015	1,106	2,993	2,160	1,842	1,998	3,046
Interurban Service								
Number of one-man cars	56	40	....	....	....	....	....	....
Number of one-man, two-man cars	38	9	....	....	....	....	....	....
Number of two-man motor cars*	330	122	103	195	96	200	158	303
Number of passenger trailers	3	16	26	32	32	55	27	71
Number of freight, express and miscellaneous cars	474	302	34	361	141	(a)	(a)	(a)
Total cars interurban service	901	489	163	588	269	255	185	374
Total number of cars	3,937	3,538	1,269	3,581	2,429	2,375	2,406	3,911
Number of electric locomotives	92	34	7	17	18	44	49	31

* Includes motor and trail cars for subway, elevated and train service.
(a) Not available.

is that the number of motors per car is included. Aside from the 520 cars ordered by the Philadelphia Rapid Transit Company, nearly all the double-truck cars are equipped with four motors.

There were sixteen electric railways that ordered fifty or more cars. Of these the Philadelphia Rapid Transit Company ordered 385 one-man two-man, 135 two-man and fifty-six miscellaneous cars; the Brooklyn City railroad ordered 200 one-man two-man cars, the city of Detroit and the Cleveland Railways each ordered 100 two-man motor cars and fifty trailers, the Boston Elevated Railway ordered 145 one-man two-man cars, the Long Island Railroad ordered 140 motor cars for train service, the Toronto Transportation Commission ordered sixty two-man motor cars and sixty-five trailers and the New Orleans Public Service Corporation ordered 112 two-man passenger cars and six dump cars. Aside from these there were two other companies that ordered 100 cars each, one ordered seventy-five cars, another seventy cars and four others fifty cars each.

This year's figures contain six orders for rapid tran-

Table III—Details of Rolling Stock Ordered During 1923

New England District

Name of Railway	No.	Class	City or Interurban	Motor or Trailer	Single or Double Truck	One or Two Man	Length Over All Ft. In.	Seating Capacity	Total Wt. Light Tons	No. Motors	No. Cars Junked During Year
Connecticut											
The Connecticut Co.	50	Passenger	City	Motor	Double	Either	44— 0	47	16.00	4	102
The Shore Line Electric Ry.											5
New Haven & Shore Line Ry.	5	Passenger	Interurban	Motor	Double	Either	40— 3	46	16.50	4	....
New York, New Haven and Hartford R.R.	2	Trans.	Interurban	....	Double	....	49— 0	....	33.00	....	....
Maine											
Somerset Traction Co.	1	Passenger	City	Motor	Single	One	29— 0	34	....	2	1 I M
Androscoggin & Kennebec Ry.	5	Passenger	City	Motor	Double	Two	40— 3	46	14.50	4	....
Cumberland County Power & Light Co.	6	Passenger	City	Motor	Double	Either	40— 3	46	16.50	4	....
Massachusetts											
Worcester Cons. St. Ry.	1	Freight	City	Motor	Double	....	45— 0	....	22.50	4	....
	10	Passenger	City	Motor	Double	Either	44— 0	44	22.00	4	1 CM
	1	Dump	City	Motor	Double	....	40— 6	....	26.00	4	....
	145	Passenger	City	Motor	Double	Either	45— 0	48	15.70	4	165
Boston Elevated Ry.	1	Flat	City	Motor	Double	....	....	....	....	4	....
	1	Flat	City	Trailer	Double	....	....	....	....	....	....
	1	Work Car	City	Motor	Double	....	....	....	....	4	....
	1	Flat	City	Trailer	Single	....	....	....	....	....	....
Milford & Uxbridge St. Ry.	6	Passenger	Interurban	Motor	Double	Either	40— 3	44	16.00	4	....
Springfield Street Ry.	10	Passenger	City	Motor	Double	Two	48— 4	48	21.10	4	47 CM
Berkshire St. Ry.	....	....	....	....	....	....	....	....	....	....	26 CM
Union St. Ry.	6	Passenger	City	Motor	Double	Two	44— 0	44	15.00	4	9 CM
Eastern Massachusetts St. Ry.	50	Passenger	City	Motor	Double	Either	41— 3½	41	16.15	4	....
Nashua St. Ry.	1	Passenger	City	Motor	Single	One	28— 0½	33	8.00	2	....
	1	Plow	City	Motor	Single	....	....	....	....	2	....
Massachusetts Northeastern St. Ry.	5	Passenger	City	Motor	Double	Either	41— 4½	42	16.50	4	....
New Hampshire											
Keene Electric Ry.	1	Passenger	City	Motor	Single	One	28— 0½	33	8.00	2	....
Total for New England District	310										

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Table III—Details of Rolling Stock Ordered During 1923—(Continued)

North of the Ohio and East of the Mississippi River

Name of Company	No.	Class	City or Interurban	Motor or Trailer	Single or Double Truck	One or Two Man	Length Over All Ft. In.	Seating Capacity	Total Wt. Light Tons	No. Motors	No. Cars Junked During Year
District of Columbia											
Washington Ry. & Electric Co.	30	Passenger	City	Motor	Double	Two	42— 3	44	18.80	2	30 C M
Illinois											
Aura, Elgin & Chicago Ry. Co. Fox River Div.	40	Passenger	City	Motor	Single	One	28— 0	32	9.00	2	
	7	Passenger	Interurban	Motor	Double	Either	38— 0	52	18.00	4	
Chicago Surface Lines	23	Passenger	City	Motor	Double	Two	48—11	54	23.00	4	
	7	Passenger	City	Trailer	Double	.....	47— 6	62	13.00	.....	
Central Illinois Traction Co.	2	Passenger	Interurban	Motor	Double	One	46— 0	44	14.00	4	
Chicago & Joliet Electric Ry.	10	Passenger	City	Motor	Double	One	43— 7	45	15.00	2	
Rockford & Interurban Ry.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 I T
Chicago and West Towns Ry.	4	Passenger	City	Motor	Double	Two	47— 0	44	20.00	4	
	10	Passenger	City	Motor	Double	Two	46— 0	44	17.50	4	
Chicago Elevated R.R.	5	Passenger	City	Motor	Double	Train	48— 0	52	.....	2	4 El. M
Chicago, North Shore & Milwaukee R.R.	7	Passenger	Interurban	Motor	Double	Two	55— 3½	54	51.35	4	4 CM
	3	Parlor	Interurban	Trailer	Double	.....	55— 3½	29	40.00	.....	1 Wk. T
	10	Express	Interurban	Motor	Double	.....	50— 0	.....	37.25	4	
	20	Gondola	Interurban	Trailer	Double	.....	45—10	.....	22.65	.....	
	15	Gondola	Interurban	Trailer	Double	.....	45—10	.....	22.35	.....	
	1	Plow	Interurban	Motor	Single	.....	49— 1	.....	15.00	.....	
	1	Service	Interurban	Motor	Double	.....	50— 0	.....	47.50	.....	
	4	Passenger	City	Motor	Double	Two	45— 0	48	16.00	4	1 I M
	4	Passenger	City	Motor	Double	Two	52— 2	61	24.00	4	
East St. Louis & Suburban Ry.	1	Passenger	Interurban	Motor	Double	Two	53— 8	60	25.50	2	
	3	Passenger	Interurban	Motor	Double	Two	53— 8	58	29.94	4	
	1	Dump	Interurban	Motor	Double	.....	40— 6	.....	22.50	4	
	1	Dump	Interurban	Trailer	Double	.....	40— 6	.....	16.00	.....	
Bloomington & Normal Ry. & Lt. Co.	10	Passenger	City	Motor	Single	One	28— 0½	32	8.00	2	
Illinois Traction System	10	Passenger	City	Motor	Single	One	29— 4½	32	8.00	2	
	17	Passenger	Interurban	Motor	Double	One	.....	52	18.00	4	
	10	Passenger	City	Motor	Single	One	.....	34	7.25	2	
Indiana											
Union Trac. Co. of Indiana	5	Box	Interurban	Trailer	Double	.....	.....	.....	19.00	.....	
	5	Flat	Interurban	Trailer	Double	.....	.....	.....	13.50	.....	
Beech Grove Traction Co.	1	Passenger	City	Motor	Single	One	28— 0½	32	8.00	2	
Indiana Service Corporation	15	Passenger	City	Motor	Double	One	40— 0	48	16.00	4	
	10	Passenger	Interurban	Motor	Double	Two	53— 0	51	24 00	4	
	10	Dump	Interurban	Trailer	Double	.....	40— 6	.....	16.00	.....	
Fort Wayne, Van Wert & Lima Trac. Co.	10	Box	Interurban	Trailer	Double	.....	38— 0	.....	17.00	.....	
Indianapolis & Cincinnati Traction Co.	12	Passenger	Interurban	Motor	Double	Two	60— 0	54	36.00	4	
Interstate Public Service Co.	3	Parlor	Interurban	Motor	Double	Two	62— 0	22	.....	.....	
	25	Frt., Box	Interurban	Trailer	Double	.....	41— 9	.....	.....	.....	
	15	Stock	Interurban	Trailer	Double	.....	39— 7	.....	.....	.....	
	4	Ballast	Interurban	Trailer	Double	.....	40— 0	.....	.....	.....	
Terre Haute, Indianapolis & Eastern Traction Co.	10	Frt., Box	Interurban	Trailer	Double	.....	40— 1	.....	.....	.....	19 CE
Chic., South Bend & Northern Indiana Ry.	1	Serv. Car	City	Motor	Single	.....	28—10	.....	9.50	.....	8 CM
	2	Wk. Cars	Both	Motor	Double	.....	36— 6	.....	12.50	.....	
Vincennes Elec. Ry.	1	Passenger	City	Motor	Single	One	28— 0½	32	7.50	2	
Southern Indiana Gas & Elec Co.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 Box
Gary St. Ry.	5	Passenger	City	Motor	Single	One	27— 9	32	.....	2	
Maryland											
United Railways & Elec. Co.	2	Passenger	City	Motor	Double	Two	48— 2¼	52	22.00	4	
The Potomac Public Service Co.	4	Passenger	Interurban	Motor	Double	Two	44— 0	48	20.00	4	2 I M
Michigan											
City of Detroit—Dept. of St. Railways	100	Passenger	City	Motor	Double	Two	48— 5	52	18.50	4	58 CM
	50	Passenger	City	Trailer	Double	.....	48— 0	55	13.00	.....	
	2	Dump	City	Motor	Double	.....	40— 6	.....	22.50	4	
	2	Dump	City	Trailer	Double	.....	40— 6	.....	16.00	.....	
Lake Superior District Power Co.	4	Passenger	City	Motor	Single	One	32— 0	31	7.50	2	3
	5	Passenger	Interurban	Motor	Double	One	40— 0	44	12.00	4	
Grand Rapids Ry.	8	Passenger	City	Motor	Single	One	28— 0½	32	7.50	2	6 Service 5 CM.
New Jersey											
Burlington County Transit Co.	1	Passenger	Interurban	Motor	Double	Two	42— 6	42	19.00	4	
	1	Flat	Interurban	Trailer	Double	.....	.....	.....	.....	.....	
	1	Sweeper	Interurban	Motor	Double	.....	.....	.....	.....	.....	
	1	Work	Interurban	Motor	Single	.....	.....	.....	.....	.....	
Cumberland Traction Co.	5	Passenger	City	Motor	Single	One	28— 0½	33	8.46	2	
	1	Passenger	Interurban	Motor	Double	Either	40— 3	50	14.98	4	
West Jersey & Seashore R.R.	2	Passenger	City	Motor	Double	Two	47— 8	52	19.10	4	
Public Service Ry.	16	Passenger	City	Motor	Double	Two	44— 0	48	.....	4	
New York											
Fonda, Johnstown & Gloversville R.R.	2	Passenger	City	Motor	Double	Either	46— 0	52	18.00	4	
	1	Passenger	Interurban	Motor	Double	Two	52— 9	54	24.00	4	
The Brooklyn City R. R.	200	Passenger	City	Motor	Double	Either	44— 0	53	18.75	4	
New York Rapid Transit Corp.	50	Passenger	City	Trailer	Double	Train	67— 0	80	40.00	.....	
Hudson & Manhattan R.R.	25	Passenger	City	Motor	Double	Train	51— 0	44	37.00	2	
New York Central R.R.	30	Passenger	Interurban	Motor	Double	Train	69— 5	82	64.50	2	
Penn. R.R. System	2	Passenger	Interurban	Motor	Double	Two	47— 8	52	20.35	2	
Niagara Junction Ry.	1	Work car	Interurban	Motor	.....	.....	.....	.....	.....	.....	
Schenectady Ry.	1	Sweeper	City	.....	.....	.....	.....	.....	22.00	.....	1 CM
	1	Plow	Interurban	Motor	Double	.....	40— 0	.....	31.00	.....	
New York State Rys.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	71 CM
Interborough Rapid Transit Co.	100	Passenger	City	Motor	Double	Train	51— 0	46	37.75	2	1 Ex M
Richmond Light & R.R. Co.	1	Plow	City	Motor	Double	.....	.....	.....	.....	4	
Long Island R.R.	140	Passenger	Interurban	Motor	Double	Train	63— 4½	78	57.50	2	65 CM
Geneva, Seneca Falls & Auburn R.R.	1	Passenger	City	Motor	Single	One	28— 0½	33	8.00	2	
Ohio											
City of Ashtabula, Div. of St. Rys.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6 CM
Cincinnati, Georgetown & Portsmouth R. R.	2	Passenger	Interurban	Motor	Double	One	40— 0	47	13.00	4	
Cleveland So. Western & Columbus Ry.	12	Passenger	Interurban	Motor	Double	Two	46— 3	50	17.00	4	4 I M
The Ohio Public Service Co.	3	Passenger	City	Motor	Single	One	28— 0½	33	9.00	2	2 CM
The Columbus, Marion & Bucyrus Ry.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 I T
The Community Traction Co.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 CM
The Cleveland Ry.	100	Passenger	City	Motor	Double	Two	52— 5½	56	22.10	4	
	50	Passenger	City	Trailer	Double	.....	49— 2	60	.....	.....	
	4	Dump	City	Motor	Double	.....	40— 6	.....	22.50	4	
	2	Dump	City	Trailer	Double	.....	40— 6	.....	16.00	.....	
Pennsylvania-Ohio Electric Co.	12	Passenger	City	Motor	Double	One	43—10½	49	18.61	4	
	5	Passenger	City	Motor	Single	One	28— 0½	33	8.15	2	
Springfield & Xenia Ry.	1	Flat	Interurban	Trailer	Double	.....	39— 6	.....	.....	.....	1 Flat
Western Ohio Ry.	1	Passenger	Interurban	Motor	Double	Two	45— 0¾	48	16.22	4	
Northern Ohio Traction & Lt. Co.	12	Freight	Interurban	Trailer	Double	.....	42— 6¾	.....	.....	.....	
Northwestern Ohio Ry. & Pwr. Co.	4	Passenger	Interurban	Motor	Double	Two	47— 4	56	18.21	4	
	1	Plow	Interurban	Trailer	Double	.....	49— 0	.....	20.00	.....	
Indiana Columbus & Eastern Tr. Co.	6	Passenger	Interurban	Motor	Double	Two	54— 8½	58	25.42	4	
Toledo, Bowling Green & Southern Tr. Co.	6	Freight	Interurban	Trailer	Double	.....	42— 6¾	.....	16.88	.....	
Lake Shore Electric Ry.	10	Freight	Interurban	Trailer	Double	.....	55— 0	.....	.....	.....	
Steubenville, East Liverpool & Beaver Valley Tr. Co.	1	Dump	Interurban	Motor	Double	.....	40— 6	.....	22.50	4	
City Ry.	10	Passenger	City	Motor	Double	One	42— 6	51	.....	4	

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Table III—Details of Rolling Stock Ordered During 1923—(Continued)

North of the Ohio and East of the Mississippi River—Continued

Name of Company	No.	Class	City or Interurban	Motor or Trailer	Single or Double Truck	One or Two Man	Length Over All Ft. In.	Seating Capacity	Total Wt. Light Tons	No. Motors	No. Cars Junked During Year
Pennsylvania											
Northampton Transit Co.	8	Passenger	Interurban	Motor	Double	Either	44— 8	48	15.00	4	3 sold
Buffalo & Lake Erie Traction Co.	1	Snowplow	City	Motor	Double		40— 0				10 CM
Schuylkill Ry.	2	Passenger	Interurban	Motor	Double	Two	47— 0	52	24.64	4	3 IM
Harrisburg Rys.											5 open
Indiana County St. Rys.	3	Passenger	Interurban	Motor	Double	Two	45— 6½	56	18.00	4	
The Lewistown & Reedsville Elec. Ry.	4	Passenger	Interurban	Motor	Double	Two	45— 9	48	16.00	4	
The Citizens Traction Co.	6	Passenger	City	Motor	Single	One	28— 0½	33	8.41	2	
Pittsburg Rys.	75	Passenger	City	Motor	Double	Two	45— 0	56	17.00	4	
	4	Dump	City	Motor	Double		40— 6		22.50	4	
Reading Transit & Lt. Co.	6	Passenger	Both	Motor	Double	Either	45— 0	52	17.00	4	8 open, 1 sand
Lackawanna & Wyoming Valley R.R.	4	Passenger	Interurban	Motor	Double	Two	60— 6	72	37.00	2	
Danville Traction & Pwr. Co.	5	Passenger	City	Motor	Double	Either	39— 8	40	16.30	4	
York Rys.	10	Passenger	City	Motor	Single	Two	34—11	38	10.98	2	
	1	Sweeper	Both	Motor	Single		27— 4½		15.80	2	
Scranton Ry.											9 CM
Philadelphia Rapid Transit Co.	385	Passenger	City	Motor	Double	Either	45— 6	52	17.71	2	247 CM
	135	Passenger	City	Motor	Double	Two	45— 6	48	18.81	2	110 CT
	24	Plows	City	Motor	Double		45— 6			4	
	10	Sweepers	City	Motor	Double		44— 4			4	
	8	Dump	City	Motor	Double		35— 6		26.64	4	
	5	Dump	City	Trailer	Double		35— 6		18.26		
	6	Work	City	Motor	Double		44— 6			4	
	1	Crane	City	Motor	Double		44— 6			4	
	1	Crane	Elevated	Motor	Double		44— 6			4	
	1	Line	City	Motor	Double		44— 6			4	
Conestoga Traction Co.	12	Passenger	City	Motor	Single	One	30— 1	30	8.80	2	
	5	Passenger	Interurban	Motor	Double	One	44— 5	48	15.50	4	
Wilkes-Barre Ry.	10	Passenger	City	Motor	Double	Either	45— 0	48	18.75	4	
Eastern Pennsylvania Pwr. & Ry. Co.	2	Passenger	Interurban	Motor	Double	Either	45— 0	48	16.50	4	
Fairchance & Smithfield Traction Co.	1	Passenger	City	Motor	Single	One	28— 0½	33	8.18	2	
Warren & Jamestown St. Ry.	3	Passenger	Interurban	Motor	Double	Two	45— 1¼	48		4	
Altoona & Logan Valley El. Ry.	8	Passenger	Interurban	Motor	Double	Two	50— 8	56	28.75	4	
Beaver Valley Traction Co.	6	Passenger	Interurban	Motor	Double	Either	41— 0	38	15.75	4	
West Penn. Rwys.	2	Passenger	Interurban	Motor	Double	Two	58— 0	70		4	
	2	Passenger	Interurban	Motor	Double	Two	58— 0	62		4	
	17	Passenger	City	Motor	Double	One	42— 2	44		4	
Wisconsin											
Wisconsin Public Service Corp.	6	Passenger	Interurban	Motor	Double	One	43— 9	46	15.00	4	1 CM
	1	Passenger	City	Motor	Single	One	28— 0	32	7.50	2	
Eastern Wisconsin Electric Co.	5	Passenger	Interurban	Motor	Double	One	43— 0	44	17.00	4	1 IM
	4	Passenger	City	Motor	Single	One	27—10	32	9.00	2	
Lake Superior District Pwr. Co.	4	Passenger	City	Motor	Single	One	28— 0½				2 IM
	5	Passenger	Interurban	Motor	Double	Two					
Milwaukee El., Ry. & Lt. Co.	1	Dump	City	Trailer	Double		40— 0		16.00		
Total North of the Ohio and East of the Mississippi River	2,191										

South of the Ohio and East of the Mississippi River

Name of Company	No.	Class	City or Interurban	Motor or Trailer	Single or Double Truck	One or Two Man	Length Overall Ft. In.	Seating Capacity	Total Wt. Light Tons	No. Motors	Cars Junked During Year
Alabama											
Mobile Light & Railroad Co.	2	Flat	Interurban		Double		34— 0		6.50		1 CM
Birmingham Ry., Lt., & Pwr. Co.	20	Passenger	City	Motor	Double	Two	49— 5	62		4	
	2	Dump	City	Motor	Double		40— 6		22.50	4	
	1	Dump	City	Trailer	Double		40— 6		16.00		
Alabama Power Co.	3	Passenger	City	Motor	Single	One	28—0½	32	8.00	2	2 CM
Florida											
Municipal Ry. of St. Petersburg	1	Passenger	Both	Motor	Double	One	40— 0	48	13.75	4	
	3	Passenger	Both	Motor	Single	One	28— 0	32	8.25	2	
	5	Flat	Interurban	Trailer							
	2	Service		Motor	Single						
	2	Work		Motor	Single						
Jacksonville Traction Co.	13	Passenger	City	Motor	Single	One	28— 0	32	7.50	2	24 CM
Tampa Electric Co.	8	Passenger	City	Motor	Single	One	28— 0	32	8.00	2	
Miami Beach Ry.	6	Passenger	City	Motor	Single	One	28— 0	32	8.00	2	
Georgia											
Georgia Ry. & Pwr. Co.	20	Passenger	City	Motor	Double	Two	44— 6	48	19.00	4	20 CM
	1	Ser. Flat	City	Motor	Double		40— 0				
	1	Ser. Flat	City	Trailer	Double		40— 0				
Savannah Electric & Pwr. Co.	8	Passenger	City	Motor	Single	One	28— 0	32	8.00	2	12 CM
Augusta-Aiken Ry. & Electric Corp.	15	Passenger	City	Motor	Single	One	28— 4	32	8.50	2	
	1	Express	Interurban	Motor	Double		45— 0		26.00		
Kentucky											
Louisville Ry.	15	Passenger	City	Motor	Double	Either	44— 0	46	18.45	4	40 CM
	25	Passenger	City	Trailer	Double		41— 5	60	12.25		6 CT
	1	Work	City	Motor	Double		40— 6			4	
	2	Work	City	Trailer	Double		40— 6				
Kentucky Traction & Terminal Co.	27	Passenger	City	Motor	Single	One	26— 2	28	8.00	2	16
	2	Passenger	Interurban	Motor	Double	One	40— 3	45	12.55	4	
North Carolina											
Durham Public Service Co.	4	Passenger	City	Motor	Double	One	39— 1	49	15.00	4	3 CM
Piedmont & Northern Ry.	2	Passenger	City	Motor	Single	One	28— 0½	33	8.55	2	
South Carolina											
Columbia Ry. Gas & Electric Co.	6	Passenger	City	Motor	Single	One	28— 0½	33	8.46	2	
Tennessee											
Jackson Ry. & Lt. Co.	3	Passenger	City	Motor	Single	One	28— 0½	32	8.00	2	
Knoxville Pwr. & Lt. Co.	7	Passenger	City	Motor	Single	One	26— 9	29		2	
	7	Passenger	City	Motor	Double	One	42— 9	52		4	
Virginia											
Radford Water Pwr. Co.	1	Passenger	City	Motor	Single	One	28— 0½	32	8.27	2	
Virginia Ry. & Pwr. Co.	20	Passenger	City	Motor	Single	One	28— 0½	33	8.32	2	
Danville Traction & Pwr. Co.	5	Passenger	City	Motor	Double	Two	39— 8	40	16.00	4	
West Virginia											
Monongahela-West Penn Public Service Co.	2	Passenger	Interurban	Motor	Double	Two	57— 0	72	25.00	4	12
	17	Passenger	City	Motor	Double	One	42— 0	48	14.50	4	
	40	Passenger	Both	Motor	Double	Either	47— 0	48	17.40	4	
Ohio Valley Electric Ry.	1	Dump	Both	Motor	Double		40— 0		22.50	4	
	2	Dump	Both	Trailer	Double		40— 0		16.00		
Tygarts Valley Traction Co.	2	Passenger	City	Motor	Single	One	28— 0½	33	8.80	2	
Sistersville & New Martinsville Tr. Co.	3	Passenger	Interurban	Motor	Double	Either	42— 9	46	16.50	4	
City Ry.											29 CM
Wheeling Public Service Co.											4 CM
Total South of the Ohio and East of the Mississippi River.	308										

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Table III—Details of Rolling Stock Ordered During 1923—(Continued)

West of the Mississippi River

Name of Company	No.	Class	City or Interurban	Motor or Trailer	Single or Double Truck	One or Two Man	Length Over All Ft. In.	Seating Capacity	Total Wt. Light Tons	No. Motors	No. Cars Junked During Year
Arkansas											
Southwestern Gas & Electric Co.	2	Passenger	City	Motor	Single	One	28— 0½	32	8.00	2	2 CM
California											
San Francisco, Napa & Calestoga Ry.	1	Work	Interurban	.....	Double	.....	30— 0	.....	30.00	.....	.....
Pacific Electric Ry.	50	Passenger	Interurban	Motor	Double	Two	57— 4	60	45.00	4	9 CM
	50	Passenger	City	Motor	Double	Two	52— 2	65	29.00	4	57 Frt.
	200	Gondola	Interurban	.....	Double	.....	43— 1½	.....	23.75	.....	9 Service
San Diego Electric Ry.	50	Passenger	Both	Motor	Double	Either	47— 8	54	19.70	4	1 CM
Santa Barbara and Suburban Ry.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 CM
San Francisco-Oakland Terminal Rys.	15	Passenger	Interurban	Motor	Double	Two	57— 7	68	30.00	2	.....
	55	Passenger	City	Motor	Double	Either	44—10	48	20.50	4	.....
Market St. Ry.	30	Passenger	City	Motor	Double	Two	47— 0	50	18.85	4	7 CM
	2	Work	City	Motor	Double	.....	40— 6	.....	27.60	4	.....
Pacific Gas & Electric Co.	5	Passenger	City	Motor	Double	One	41— 6½	44	14.00	2	.....
Glendale & Montrose Ry.	3	Passenger	City	Motor	Double	One	43— 3	46	18.00	4	.....
Colorado											
The Denver & Intermountain R.R. Co.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2 I Gond.
The Denver Tramway Co.	10	Passenger	City	Motor	Double	Two	46— 0	59	21.30	4	19 CM
Grand River Valley Ry.	3	Box	Interurban	.....	.....	.....	.....	.....	.....	.....	.....
Southern Colorado Power Co.	6	Passenger	City	Motor	Single	One	28— 0½	32	8.00	2	4 CT
Western Lt. & Pwr. Co.	1	Passenger	City	Motor	Single	One	28— 0½	32	8.00	2	.....
Iowa											
Des Moines City Railway	10	Passenger	City	Motor	Double	Two	46— 0	52	19.00	4	.....
	2	Dump	City	Motor	Double	—	40— 6	—	22.50	4	.....
Dubuque Electric Co.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6 CT.
Peoples Gas & Electric Co.	4	Passenger	City	Motor	Single	One	28— 0½	32	8.00	2	.....
Burlington Ry. & Lt. Co.	4	Passenger	City	Motor	Single	One	32— 0	30	.....	2	.....
Kansas											
Topeka Ry.	10	Passenger	City	Motor	Single	One	28— 0½	35	8.00	2	.....
Kansas El. Pwr. Co.	5	Passenger	City	Motor	Single	One	28— 0½	32	8.00	2	.....
Louisiana											
Shreveport Rys.	7	Passenger	City	Motor	Single	One	28— 0½	32	7.15	2	.....
New Orleans Public Service Inc.	112	Passenger	City	Motor	Double	Two	47— 8	52	20.00	2	.....
	3	Dump	City	Motor	Double	.....	40— 6	.....	22.50	4	.....
	3	Dump	City	Trailer	Double	.....	40— 6	.....	16.00	.....	.....
Minnesota											
Wisconsin Railway Light & Power Co.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
Missouri											
Jefferson City Bridge & Transit Co.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2 CM
Kansas City, Clay County & St. Joseph Ry.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 Flt. T
The Kansas City Railways	2	Dump	City	Motor	Double	.....	40— 6	.....	22.50	4	.....
	2	Dump	City	Trailer	Double	.....	40— 6	.....	16.00	.....	.....
United Railways Co. of St. Louis	100	Passenger	City	Motor	Double	Two	50— 6⅜	60	19.79	4	9 CM
St. Joseph Ry., Lt., Ht., & Pwr. Co.	12	Passenger	City	Motor	Single	One	28— 0½	35	8.00	2	.....
Montana											
Anaconda Copper Mining Co.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2 CM. 5 CT
North Dakota											
Northern States Power Co.	1	Passenger	City	Motor	Single	One	30— 0	32	9	2	.....
Oklahoma											
Muskogee Electric Tr. Co.	6	Passenger	City	Motor	Single	One	28— 0½	38	8.00	2	6 CM
Oklahoma Ry.	20	Passenger	City	Motor	Single	One	28— 0½	32	8.00	2	.....
	10	Gondola	Interurban	.....	Double	.....	38— 0	.....	.....	.....	.....
Oregon											
Portland Ry. Lt. & Pwr. Co.	80	Flat	Interurban	Trailer	Double	.....	.....	.....	.....	.....	.....
South Dakota											
Sioux Falls Traction System	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4 CM
Texas											
The Abilene Traction Co.	1	Passenger	City	Motor	Single	One	28— 0½	32	8.00	2	.....
Eastern Texas Electric Co.	7	Passenger	City	Motor	Double	One	41— 8	48	.....	4	3 CM
Dallas Ry.	30	Passenger	City	Motor	Double	Either	45— 6	50	17.00	4	.....
Northern Texas Trac. Co.	10	Passenger	City	Motor	Double	One	40— 1	48	14.00	4	29 CM
	1	Passenger	City	Motor	Single	One	28— 0	32	8.00	2	.....
Marshall Traction Co.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 CM
El Paso Electric Ry.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3 CM
San Antonio Public Service Co.	10	Passenger	City	Motor	Double	Two	43— 3	48	14.00	4	15 CM
Galveston Electric Co.	8	Passenger	City	Motor	Single	One	28— 0½	32	8.50	2	.....
Houston Electric Co.	10	Passenger	City	Motor	Double	One	40— 1	44	14.00	4	.....
Utah											
Salt Lake & Utah R.R.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4 Box
Washington											
Spokane United Rys.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5 CM
Puget Sound International Ry. & Pwr. Co.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 CM
	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 Line
Pacific Northwest Traction Co.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1 Dump
Total West of the Mississippi River	953										

Dominion of Canada

New Brunswick											
Morriston Tramways, Elec. & Gas Co., Ltd.	2	Passenger	City	Motor	Double	Two	47— 8½	44	24.00	4	.....
Nova Scotia	2	Passenger	City	Motor	Single	One	28— 0½	32	6.25	2	.....
Cape Breton Elec. Co. Ltd.	1	Flat	City	Trailer	Double	.....	32— 0	.....	9.00	.....	.....
	1	Plow	City	Motor	Single	.....	28— 3	.....	.....	.....	.....
Ontario											
Cornwall St. Ry., Lt. & Pwr. Co.	1	Passenger	City	Motor	.....	One	.....	24	.....	2	1 CM
The London St. Ry. Co.	5	Passenger	City	Motor	Single	One	28— 9	33	9.00	2	4 CM 5 CT
Toronto Transportation Commission	60	Passenger	City	Motor	Double	Two	51—10	57	23.60	4	190 CM
	65	Passenger	City	Trailer	Double	One	49— 2	60	13.40	.....	48 CT
Hydro-Electric Rys.	12	Passenger	City	Motor	Double	Either	46— 2	52	22.00	4	.....
Kitchener & Waterloo St. Ry.	2	Passenger	City	Motor	Single	One	30—10	36	7.75	2	.....
Oshawa Ry.	2	Passenger	City	Motor	Double	Two	47— 8½	44	24.00	4	.....
Ottawa Electric Ry.	1	Tower	City	Motor	Single	.....	29— 0	.....	12.50	2	.....
Quebec	2	Passenger	Interurban	Motor	Double	Two	56— 0	60	30.50	4	.....
Montreal & Southern Counties Ry.	2	Passenger	Interurban	Trailer	Double	.....	56— 0	60	21.50	.....	.....
	1	Passenger	Interurban	Trailer	Double	.....	50— 0	54	27.50	.....	.....
	1	Baggage	Interurban	Motor	Double	.....	50— 0	.....	21.00	4	.....
Quebec Ry., Lt. & Pwr. Co.	10	Passenger	City	Motor	Single	One	30— 9¼	32	8.25	2	12 CM
Three Rivers Traction Co.	1	Sweeper	City	Motor	Single	.....	29— 0	.....	12.50	2	.....
Saskatchewan	1	Passenger	City	Motor	Double	One	40— 0	50	.....	2	.....
Moose Jaw Elec. Ry. Co. Ltd.	1	Plow	City	Motor	.....	.....	.....	.....	.....	.....	.....
	1	Service	City	Motor	.....	.....	.....	.....	.....	.....	.....
	1	Work	City	Motor	.....	.....	.....	.....	.....	.....	.....
Total for Canada	175										

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Table V—Cars Rebuilt During 1923

New England District

Railway	Number	Class	City or Interurban	Motor or Trailer	Single or Double Truck	One or Two Man	Length Over All Ft.	In.	Seating Capacity	Total Weight Light (tons)	Number of Motors
Connecticut											
The Connecticut Co.	5	Sweepers	Both	Motor	Double						
	2	Sand	Both	Motor	Double						
	4	Flat	Both	Trailer	Double						
Waterbury & Milldale Tramway Co.	4	Passenger	City	Motor		One					
Maine											
Cumberland County Pwr. & Lt. Co.	10	Passenger	City	Motor	Double	Either					
Massachusetts											
E. Massachusetts St. Ry.	2	Sweepers	Both	Motor							
Worcester Cons. St. Ry.	6	Sweepers	City	Motor	Double		42	0		25.00	
Springfield Street Ry.	5	Sweepers	City	Motor	Double						
Holyoke Street Ry.	1	Service	City	Motor	Single						
Union Street Ry.	13	Passenger	City	Motor							
Total for New England District	52										

North of the Ohio and East of the Mississippi River

Illinois											
Chicago & Interur. Tr. Co.	1	Freight	Interurban	Trailer							
Chicago & West Towns.	4	Passenger	Interurban	Motor	Double	Two	42	6	48	25.00	4
Chicago Elevated R.R.	2	Flat	City	Trailer							
	1	Fire	City	Trailer	Double						
Ster., Dixon & East. El. Ry.	1	Passenger	City	Motor	Single	One	33	0	34	15.00	2
E. St. Louis & Sub. Ry.	7	Passenger	City	Motor							
Chicago North Shore & Milwaukee R.R.	2	Passenger	City	Motor	Double	One	49	2	50	26.00	4
Chicago & Joliet E. Ry.	4	Passenger	City	Motor	Double	One	44	0	42	19.00	2
Rockford & Inter Ry.	4	Passenger	City	Motor	Double	One	41	4	40	18.00	
	4	Passenger	City	Motor	Double	Either	41	4	40	18.00	2
Illinois Power Co.	7	Passenger	City	Motor	Double	One	41	4	40	17.50	2
Indiana											
Indiana Service Corp.	10	Passenger	City	Motor	Double	One	42	0	48	17.00	4
Gary Street Ry.	5	Passenger	City	Motor							
Terre Haute, Indianapolis & Eastern Tr. Co.	1	Freight	Interurban	Motor							
	2	Stock	Interurban	Motor							
	5	Box	Interurban	Motor							
	2	Stock	Interurban	Trailer							
Chicago, So. Bend & No. Indiana Ry.	18	Passenger	City	Motor	Double	One	41	8	42	16.00	2
	7	Passenger	City	Motor	Double	One	43	6	42	18.00	2
Maryland											
Hagerstown & Fred'ick Ry.	4	Passenger	Interurban	Motor	Double	Two	44	0	48	20.00	4
Michigan											
Grand Rapids Ry.	28	Passenger	City	Motor	Double	One					
New Jersey											
Burlington Co. Trans. Co.	1	Passenger	Interurban	Motor	Double	Two					
Pennsylvania R.R. System	2	Passenger	Interurban	Motor	Double	Train	54	4	72	45.00	
Trenton & Mercer County Tr. Corp.	20	Passenger	City	Motor							
New York											
International Ry.	100	Passenger	City	Motor	Double	One				30.00	
Second Ave. R.R.	10	Passenger	City	Motor	Double	One					2
Olean, Bradford & Sol. Ry.	1	Passenger	City	Motor	Single	One	27	0	20		2
New York State Rys.	70	Passenger	City	Motor	Double	One					
	15	Passenger	City	Motor	Double	Either					
Schenectady Ry.	8	Passenger	City	Motor	Double	One					4
	3	Passenger	Interurban	Motor	Double	Two					4
Black River Traction Co.	1	Passenger	Interurban	Motor	Single	One	32	0	30	9.00	2
New York & Long Island Traction Co.	12	Passenger	Interurban	Motor	Double	Two			44		2
Ohio											
ncinnati Traction Co.	9	Passenger	City	Motor	Double	Two	38	9	35	19.41	4
Columbus, Delaware & Marion El. Co.	1	Passenger	Interurban	Motor	Double	Two					
Ohio Public Service Co.	1	Work	Interurban	Motor	Double		36	0		15.00	4
Columbus, Marion & Bucyrus Ry.	1	Work	Interurban	Motor	Double						
	1	Freight	Interurban	Motor	Double						
Indiana, Columbus & Eastern Tr. Co.	1	Freight	Interurban	Motor	Double		60	0		40.00	4
Community Traction Co.	10	Passenger	City	Motor	Double	Two	39	3	40	17.00	2
Penn.-Ohio Electric Co.	7	Passenger	City	Motor	Double	One					
Youngstown Munic. Ry.	12	Passenger	City	Motor	Double	One					
Peoples Rwy.	10	Passenger	City	Motor	Single	One					
	10	Passenger	City	Motor	Double	One					
N.E. Ohio Ry. & Pwr. Co.	1	Passenger	Interurban	Trailer	Double		46	10		16.00	
Pennsylvania											
North Branch Trans. Co.	6	Passenger	Interurban	Motor		One	27	7	33	9.00	2
New Jersey Interurban Co.	5	Passenger	Interurban	Motor		One					
Buffalo & Lake Erie Tr. Co.	20	Passenger	City	Motor	Double	One	42	0	40		2
Scuylkill Ry.	1	Passenger	Interurban	Motor	Double	Two	43	0	42	23.00	4
Citizens Traction Co.	2	Passenger	Interurban	Motor	Double	Either	43	6	42	20.00	4
Pittsburg Rwys.	9	Work	City	Motor	Single						
Scranton Ry.	8	Passenger	City	Motor	Double	Two			40		4
West Chester Street Ry.	4	Passenger	Interurban	Motor	Double	Two	40	0	40	15.00	4
Phila. Rapid Transit Co.	40	Passenger	City	Motor	Double	One	45	6	51	18.00	2
Altoona & Logan Valley El. Ry.	10	Passenger	Interurban	Motor	Double	One	41	4	44	19.00	2

sit cars. The Long Island Railroad ordered 140 motor cars, the Interborough Rapid Transit Company 100 motor cars, the New York Rapid Transit Corporation fifty trailers, the New York Central Railroad thirty motor cars, the Hudson & Manhattan Railroad twenty-five motor cars and the Chicago Elevated five motor cars.

An exceptionally large number of cars were junked during the year, the number reported being 1,689, divided as follows: 1,085 city motor cars, 184 city trailers, thirteen open cars, fourteen interurban motor cars, two interurban trailers, 67 interurban ex-

TABLE IV—ELECTRIC LOCOMOTIVES ORDERED DURING 1923

Name of Railway	Number	Weight Tons	Length Over All Ft.	In.
New England District				
Boston Elevated Ry.	1	...	.....	
New York, New Haven & Hartford R.R.	12	181	68	6
North of the Ohio and East of the Mississippi River				
Baltimore & Ohio R.R.	2	120	39	6
Chicago, North Shore & Milwaukee Ry.	1	50	37	4
Detroit & Ironton R.R.	2	180	.....	
Interstate Public Service Co.	1	50	35	6
Niagara Junction Ry.	2	43	32	7½
Pennsylvania R.R.	3	200	68	2½
Northwestern Ohio Ry. & Pwr. Co.	1	40	41	0
South of the Ohio and East of the Mississippi River				
Norfolk & Western R.R.	8	200	48	7
Virginian Ry.	36	200	48	7
West of the Mississippi River				
Denver & Intermountain R.R.	4	30	37	0
Glendale & Montrose Ry.	1	50	35	6
Iowa Southern Utilities Co.	1	50	35	6
Northeast Oklahoma R.R.	1	50	35	6
Pacific Electric Ry.	2	43	35	6
	8	65	32	0
Petaluma & Santa Rosa R.R.	1	45	30	6
Portland Ry., Lt. & Pwr. Co.	1	50	37	4
Sacramento Northern R.R.	2	60	37	4
San Francisco, Napa & Calistoga Ry.	1	50	50	0
Oklahoma Union Ry.	1	50	41	0
Total	92			

press and freight cars, one interurban service car, 18 city service cars, and 305 of which no designation was given.

The number of companies that reported new rolling stock ordered during 1923 is 167, compared with 145 for 1922 and ninety-four for 1921. These railways are approximately 18 per cent of all those in the United States and Canada.

In order to show the progress of rolling stock purchased by the railway industry at a glance, the comparative amount of new rolling stock ordered since 1907 is given in a separate table. This divides the cars into four classes: Passenger cars, city or interurban, freight, express and miscellaneous cars, and electric

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locomotives. The miscellaneous cars include service cars, snow plows, sweepers, work cars, etc. A chart is also given showing the number of cars ordered since 1916. This divides the number of cars purchased into those for interurban service and city service.

A special comparison of cars ordered during the last eight years is given in Table II. Separate tabulations are given for cars in city service and those for interurban service. Referring to this table, it is interesting to note how the number of safety cars purchased increases each year from 1916 up to and including 1920, and during the same period how the number of large two-man cars shows a gradual increase. A comparison by percentage that the number of safety cars purchased is of the total number of motor passenger cars purchased for city service shows that the highest percentage for safety cars was reached in 1919, and since that time there has been a gradual return to the use of larger cars.

Details of the rolling stock ordered by individual companies are shown in Table III. The railways in each state are grouped and the various states arranged into four districts, in a manner similar to that followed in previous years. Canadian companies are listed separately. The only details of construction given are type, over-all length, weight and number of motors. The service for which the cars are purchased is also given. The district north of the Ohio and east of the Mississippi River purchased 2,203 cars and locomotives, which is 54 per cent of the total rolling stock that was ordered.

Compared with last year, the New England district shows a decrease in the number of cars and locomotives ordered of 33.2 per cent. The territory north of the Ohio and east of the Mississippi River shows an increase of 36.4 per cent. The district south of the Ohio and east of the Mississippi River has an increase of 6.7 per cent. The territory west of the Mississippi River shows an increase of 14.8 per cent, and the Dominion of Canada shows a decrease of 32.3 per cent. A recapitulation of the total for cars and electric locomotives ordered during 1923 is given in Table VI, which gives the various types of cars and the respective numbers ordered by each of the districts.

The railways which purchased electric locomotives during 1923 are given in Table IV. The total number

Table V (Continued)—Cars Rebuilt During 1923

South of the Ohio and East of the Mississippi River

Railway	Number	Class	City or Interurban	Motor or Trailer	Single or Double Truck	One or Two Man	Length Over All Ft. In.	Seating Capacity	Total Weight Light (tons)	Number of Motors
Wisconsin										
Wisconsin Pub. Serv. Corp.	4	Passenger	Interurban	Motor	Double	One	42— 0	40	17.50	2
Milwaukee El. Ry. & Lt. Co.	58	Passenger	City	Motor	3 Truck	Two	89— 1	93	37 50	4
E. Wisconsin El. Co.	1	Passenger	City	Motor	Single	One	28— 0	24	9.00	2
Wisconsin Rapids St. R.R.	1	Plow	City	Motor	.....	.....	.....	...	.....	...
Milwaukee Northern	10	Passenger	City	Motor	.....	One	.....	...	.....	...
	2	Parlor	Interurban	Motor	.....	Two	.....	...	.....	...
Total North of the Ohio and East of the Mississippi River	607									
Alabama										
Birmingham Ry., Lt. & Pwr. Co.	10	Passenger	City	Motor	Double	Two	40— 6	52	13.00	4
Mobile Lt. & Ry. Co.	3	Passenger	City	Motor	Single	One	32— 0	28	12.50	2
Alabama Power Co.	2	Passenger	City	Motor	.....	One	.....	...	.....	...
Florida										
Jacksonville Traction Co.	4	Passenger	City	Motor	Double	One	42— 0	44	17.00	2
Georgia										
Savannah El. & Pwr. Co.	6	Passenger	City	Motor	Double	Two	.....	42	.....	2
Augusta-Aiken Ry. & El. Corp.	3	Passenger	Interurban	Motor	Double	Two	.....	52	.....	4
	7	Passenger	City	Motor	Double	One	.....	40	.....	2
Kentucky										
Kentucky Trac. & Ter. Co.	1	Passenger	City	Motor	.....	.....	.....	...	.....	...
Louisville Ry.	6	Passenger	City	Motor	Double	Two	42— 0	40	17.00	2
	2	Passenger	City	Motor	Double	Two	45— 0	41	22.50	4
North Carolina										
Durham Pub. Service Co.	1	Passenger	City	Motor	.....	.....	.....	...	.....	...
South Carolina										
Charleston Consolidated Ry. & Lt. Co.	10	Passenger	City	Motor	.....	One	.....	...	.....	...
Tennessee										
Jackson Ry. & Lt. Co.	4	Passenger	City	Motor	.....	.....	.....	...	.....	...
Virginia										
Roanoke Ry. & El. Co.	3	Passenger	City	Motor	Single	One	28— 0	28	.....	2
West Virginia										
Monongahela Pr. & Ry. Co.	8	Passenger	City	Motor	Double	One	40— 0	40	16.00	4
Total South of the Ohio and East of the Mississippi River	70									

West of the Mississippi River

Arkansas										
Southwestern Gas & El. Co	1	Passenger	City	Motor	Double	One	28— 0	40	20.00	2
California										
San Francisco, Napa & Calistoga Ry.	1	Passenger	City	Motor	.....	.....	.....	...	.....	...
San Francisco, Oakland Terminal Rwys.	1	Passenger	City	Motor	Double	One	34— 1½	40	.....	2
San Diego Electric Ry.	3	Passenger	City	Motor	.....	.....	.....	...	.....	...
Southern Pacific Ry.	1	Passenger	Interurban	Motor	Double	Two	.....	...	.....	...
Pacific Electric Ry.	1	Express	Interurban	Motor	.....	.....	.....	...	.....	...
	2	Tower	Interurban	Motor	.....	.....	.....	...	.....	...
Pacific Gas & Electric	4	Passenger	City	Motor	Double	Either	42— 0	44	19.50	2
Colorado										
Public Service Co. of Colo.	1	Flat	City	Motor	Double	.....	.....	...	.....	...
Denver Tramway Co.	10	Passenger	City	Trailer	Double	.....	40— 0	54	8.77	...
Iowa										
Iowa South. Utilities Co.	2	Passenger	City	Motor	.....	.....	.....	...	.....	...
Dubuque Electric Co.	11	Passenger	City	Motor	Single	One	.....	28	.....	2
Mississippi Valley El. Co.	1	Passenger	City	Motor	Single	One	26— 0	32	.....	2
Sioux City Service Co.	8	Passenger	City	Motor	Double	One	38— 0	40	17.00	2
	4	Passenger	City	Motor	Single	One	30— 0	33	14.00	2
	9	Passenger	City	Motor	Double	One	33— 0	37	15.00	2
Kansas										
United Traction Co.	9	Passenger	Interurban	Motor	.....	.....	.....	...	.....	...
	1	Box	Interurban	Motor	.....	.....	.....	...	.....	...
Minnesota										
Twin City Rapid Tran. Co.	75	Passenger	City	Motor	Double	Two	46—10	48	.....	...
Missouri										
Kansas City Clay Co. & St. Joseph Ry.	6	Gondola	Interurban	Trailer	Double	.....	.....	...	.....	...
Kansas City Rys.	24	Passenger	City	Motor	Double	Either	.....	...	.....	...
United Rwys. of St. Louis.	107	Passenger	City	Motor	Double	Two	45— 8	57	24.40	4
Montana										
Anaconda Copper Min. Co.	2	Work	City	Motor	Double	.....	.....	...	.....	...
Butte Electric Ry.	12	Passenger	City	Motor	.....	One	.....	...	.....	...

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Table V (Concluded)—Cars Rebuilt During 1923

West of the Mississippi River (Continued)

Railway	Number	Class	City or Interurban	Motor or Trailer	Single or Double Truck	One or Two Man	Length Over All Ft.	Length Over All In.	Seating Capacity	Total Weight Light (tons)	Number of Motors
Oklahoma											
Chickasha Street Ry.	1	Passenger	City	Motor	.....	One	.....		.....	.....	.....
Northeast Oklahoma R.R.	1	Line	Interurban	Motor	.....	.....	.....		.....	.....	.....
Muskogee Elec. Trac. Co.	3	Passenger	Interurban	Motor	Double	Two	40—	0	60	9.00	2
Shawnee-Tecumseh Tr. Co.	2	Passenger	City	Motor	Single	One	30—	0	54	8.00	2
Texas											
El Paso Electric Ry.	5	Passenger	City	Motor	Double	Either	43—	0	44	20.00	4
Northern Texas Tract. Co.	22	Passenger	City	Motor	Double	One	40—	6	40	18.00	4
Marshall Traction Co.	1	Passenger	City	Motor	Single	One	28—	0	32	8.50	2
Galveston Electric Co.	10	Passenger	City	Motor	Single	One	32—	0	34	15.00	2
Utah											
Salt Lake & Utah R.R.	3	Box	Interurban	Motor	.....	.....	.....		.....	.....	.....
	1	Tank	Interurban	Motor	.....	.....	.....		.....	.....	.....
	1	Flat	Interurban	Motor	.....	.....	.....		.....	.....	.....
Washington											
Pacific Northwest Tr. Co.	1	Combination	Interurban	Motor	Double	Two	59—	0	57	39.00	4
Seattle Municipal St. Ry.	42	Passenger	City	Motor	Double	One	40—	0	44	23.57	4
Spokane United Rwys.	4	Passenger	City	Motor	.....	One	.....		.....	.....	.....
Total West of the Mississippi River	393										

Dominion of Canada

Ontario											
Chatham, Wallaceburg & Lake Erie Ry.	7	Gondola	Interurban	Motor	Double	.....	34—	6	.....	.....	.....
Fort William Elec. Ry.	2	Passenger	City	Motor	Single	One	.....		.....	.....	.....
	1	Passenger	City	Motor	Double	One	.....		.....	.....	.....
Toronto Transportation Comm.	90	Passenger	City	Motor	Double	Two	44—	6	.....	.....	.....
	13	Passenger	City	Motor	Double	Either	47—	0	.....	.....	.....
	1	Passenger	City	Motor	Double	Two	44—	8	.....	.....	.....
	1	Passenger	City	Trailer	Double	.....	44—	4	.....	.....	.....
Quebec											
Hull Electric Co.	1	Passenger	City	Motor	Single	One	30—	0	36	5.50	1
	1	Passenger	City	Motor	Double	One	43—	0	44	18.00	2
Montreal & So. Co. Ry.	1	Milk	Interurban	Motor	.....	.....	.....		.....	.....	.....
Quebec Ry. Lt. & Pwr. Co.	10	Passenger	City	Motor	Double	Two	40—	0	36	11.00	2
Saskatchewan											
Moose Jaw El. Ry. Co., Ltd.	6	Passenger	City	Motor	.....	.....	.....		.....	.....	.....
Total for Canada	134										

of new electric locomotives is ninety-two, which is the largest since 1915, when these data were first compiled by the ELECTRIC RAILWAY JOURNAL.

Tables V and VII contain information in regard to cars reconstructed during the year 1923. One hundred and eleven railways reported the reconstruction of 1,226 cars. There were 565 cars reconstructed for one-man operation in city service and twenty-six for interurban service. A total of seventy-seven cars were reconstructed for one-man two-man operation.

The information given in the various tables of rolling stock was obtained from replies received to questionnaires sent to all the electric railways in the United States and Canada. It is quite impossible to receive replies from all railways when a definite time of publication must be met, but this year replies were received from more than 90 per cent of all the railways. The information thus obtained has been added to by items previously published and by a very complete list furnished by the car builders. These lists from the manufacturers have enabled us to check very carefully the figures obtained from the various railways, and in some cases, where replies were not received from the operating companies, the information furnished by the car manufacturers has been used in the tables.

TABLE VI—RECAPITULATION BY DISTRICTS OF CARS ORDERED DURING 1923

	New England District	North of the Ohio and East of the Mississippi River	South of the Ohio and East of the Mississippi River	West of the Mississippi River	Total for United States	Total for Canada	Grand Total
Number of companies reporting	15	80	24	35	154	13	167
City Service							
One-man cars, 28 ft. body	2	95	124	83	304	8	312
One-man cars other than 28 ft.							
Single truck	1	36	....	5	42	13	55
Double truck	....	64	29	35	128	....	128
One-man two-man cars	266	608	55	135	1,064	12	1,076
Two-man cars (surface)	21	515	45	322	903	64	967
Motor cars for rapid transit trains	....	130	....	....	130	....	130
Trailers	....	157	25	....	182	65	247
Service and miscellaneous cars	7	78	15	14	114	7	121
Total cars city service	297	1,683	293	594	2,867	169	3,036
Interurban Service							
One-man double-truck cars	....	54	2	....	56	....	56
One-man two-man cars	11	24	3	....	38	....	38
Two-man cars	....	88	2	65	155	5	160
Trailers	....	3	....	....	3	....	3
Motor cars for train service	....	170	....	....	170	....	170
Express and freight cars	....	149	8	293	450	1	451
Miscellaneous cars	2	20	....	1	23	....	23
Total cars, interurban service	13	508	15	359	895	6	901
Electric locomotives	13	12	44	23	92	....	92
Total cars and electric locomotives	323	2,203	352	976	3,854	175	4,029

TABLE VII—RECAPITULATION BY DISTRICTS OF CARS REMODELED DURING 1923

	New England District	North of the Ohio and East of the Mississippi River	South of the Ohio and East of the Mississippi River	West of the Mississippi River	Total for United States	Total for Canada	Grand Total
Number of companies reporting	8	50	13	32	103	7	110
City Service							
Number remodeled for one-man operation	4	380	37	129	550	5	555
Number remodeled for one-man two-man operation	10	19	....	33	62	13	75
Number remodeled for two-man operation	....	89	24	182	295	101	396
Number passenger cars remodeled, no type given	13	32	6	16	67	7	74
Number of service and miscellaneous cars remodeled	25	13	....	3	41	....	41
Total remodeled cars city service	52	533	67	363	1,015	126	1,141
Interurban Service							
Number remodeled for one-man operation	....	26	....	....	26	....	26
Number remodeled for one-man two-man operation	....	2	....	....	2	....	2
Number remodeled for two-man operation	....	30	3	4	37	....	37
Number passenger cars remodeled, no type given	....	1	....	9	10	....	10
Express, freight and miscellaneous cars remodeled	....	15	....	17	32	8	40
Total remodeled cars for interurban service	....	74	3	30	107	8	115
Total city and interurban cars remodeled	52	607	70	393	1,122	134	1,256

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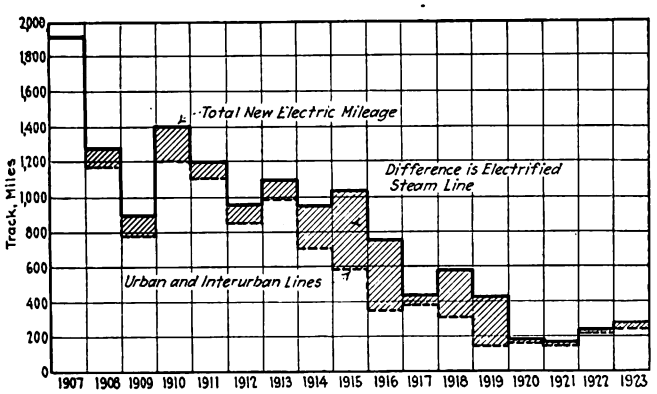
Track Extensions and Reconstruction Greatest in Eight Years

Electric Railway Track Forces Have Been Busy with Reconstruction and More Miles of Track Were Rebuilt During the Past Year than Ever Before—The Amount of New Track Built Shows 36-Mile Gain Over 1922 and 100 Miles Over 1921

THE outstanding feature brought out by the track statistics for 1923 is the large amount of track which was rebuilt. The amount of new track built during the past year by electric railways is slightly greater than for 1922 and consists of 259.31 miles. This is made up of 169.61 miles for city lines, 63.54 miles for interurban lines and 26.16 miles of electrified steam lines. The greatest amount of extensions reported by any electric railway was 14.2 miles of new city track by the Twin City Rapid Transit Company, Minneapolis, Minn. Of this 11.7 miles were open construction and 2.5 miles in paved streets. The city of Detroit added 8.57 miles in paved streets and 1.66 miles of open construction, making a total of 10.23 miles. Some of the other large extensions for city service reported were the Toronto Transportation Commission, 7.15 miles; the Northern Texas Traction Company, 6.65 miles; the Cleveland Railway, 6.04 miles, and the Dallas Railway, 5.68 miles. The longest extension reported for interurban service was 6.36 miles over private right of way by the Columbus, Delaware & Marion Electric Company.



Miles of Track Built, by Years, Since 1917

Compared with previous years, the mileage reported for track extensions during 1923 is 36 miles greater than for 1922. It is 104 miles greater than that reported for 1921. The accompanying graph gives a comparison of the miles of track built each year since 1907. The lowest point for urban and interurban track extensions was in 1919, with but 140.57 miles. There were 287.60 miles of steam lines electrified that year, however, which brought the total electric extensions up to 428.17 miles.

Electrification of steam lines, represented by the shaded area in the graph, in 1923 was 26.16 miles, which is the highest since 1919, but is still very small when compared with the 448 miles for 1915.

Track forces have been very busy, as is evidenced from the fact that 854.63 miles of track were reconstructed. A total of 241 companies reported reconstruction of their tracks. This mileage for reconstructed track is the largest reported since the ELECTRIC RAILWAY JOURNAL has been compiling these data and exceeds last year's high record by 114.93 miles.

The accompanying tables, prepared from information received from 90 per cent of all electric railways in the United States and Canada, give a comparison of track construction by years since 1907 and also individual single track mileage built and rebuilt by the urban and interurban railways during 1923. This main table has the various companies grouped by states, and these in turn are geographically arranged into five districts, as has been the practice for several years past.

COMPARISON OF TRACK CONSTRUCTION

Year	No. of Companies	Extensions: Urban Track	Extensions: Interurban Track	Extensions: Electrified Steam Lines	Extensions: Total	Track Rebuilt
1907	(a)	(a)	(a)	.....	1,880.00	(a)
1908	157	1,174.5		84.00	1,258.50	(a)
1909	160	774.7		112.40	887.16	(a)
1910	217	1,204.8		192.40	1,397.20	(a)
1911	223	1,105.0		86.50	1,191.50	(a)
1912	171	869.4		80.80	950.20	(a)
1913	181	974.9		119.00	1,093.90	(a)
1914	163	716.5		229.00	946.40	(a)
1915	136	596.0		448.20	1,044.20	(a)
1916	104	115.40	240.90	388.00	744.30	(a)
1917	121	251.10	125.60	66.00	442.70	375.40
1918	80	216.41	97.41	275.70	589.53	155.43
1919	73	110.90	29.67	287.60	428.17	390.64
1920	87	145.69	30.87	8.92	185.48	361.77
1921	78	108.15	38.95	8.08	155.18	615.21
1922	104	126.27	85.11	12.35	223.73	739.70
1923	272	169.61	63.54	26.16	259.31	854.63

(a) Not available.

SUMMARY OF TRACK CONSTRUCTION FOR 1923

	New England District	North of the Ohio and East of the Mississippi River	South of the Ohio and East of the Mississippi River	West of the Mississippi River	Total for United States	Canada	Grand Total
Track Extensions							
Number of companies...	9	52	13	44	118	14	132
Miles of track constructed							
Urban	10.09	61.75	13.48	49.37	134.69	34.92	169.61
Interurban	4.91	18.04	0.72	33.56	57.23	6.31	63.54
Total track extensions	15.00	79.79	14.20	82.93	191.92	41.23	233.15
Track Reconstructed							
Number of companies...	24	105	31	62	222	19	241
Miles of track reconstructed							
Urban	73.43	267.04	60.60	120.41	521.48	38.29	559.77
Interurban	33.27	176.61	3.70	76.89	290.47	4.39	294.86
Total track rebuilt....	106.70	443.65	64.30	197.30	811.95	42.68	854.63

ELECTRIFIED STEAM LINES

	Extensions, Miles
Chicago, Milwaukee & St. Paul Ry	0.334
New York Central R.R	0.425
Niagara Junction Ry	0.950
Northeast Oklahoma R.R	12.864
British Columbia Electric Ry	6.180
Glendale and Montrose Ry	3.500
New York, New Haven and Hartford R.R	
Total	26.163

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Track Built and Rebuilt During 1923

New England District

Railway	Extensions, Miles City	Extensions, Miles Interurban	Rebuilt, Miles City	Rebuilt, Miles Interurban
Connecticut				
The Bristol & Plainville Elec. Co.	.....	.....	0.50	.....
The Connecticut Co.	1.56	0.18	17.89	2.19
Maine				
Fairfield & Shawmut Ry.	.....	.....	0.25	0.25
Bangor Ry. & Elec. Co.	.....	.....	0.46	0.54
Cumberland County Pwr. & Lt. Co.	.....	.....	1.45	0.48
York Utilities Co.	.....	2.10	.....	.....
Biddeford & Saco R.R.	.....	.....	0.32	.....
Massachusetts				
Eastern Mass. St. Ry.	0.34	0.54	13.37	8.35
Boston Elevated Ry.	3.38	.....	18.12	.....
Boston & Worcester St. Ry.	.....	.....	1.08	.....
Connecticut Valley St. Ry.	.....	.....	.....	0.15
Mass. Northeastern St. Ry.	.....	.....	1.19	.....
Nahant & Lynn St. Ry.	.....	.....	1.60	6.80
Milford & Uxbridge St. Ry.	.....	.....	.....	2.00
Berkshire St. Ry.	.....	.....	0.99	0.11
Plymouth & Brockton St. Ry.	.....	.....	1.00	.....
Springfield St. Ry.	1.88	2.09	3.36	4.30
Worcester Cons. St. Ry.	0.29	.....	2.30	4.70
Holyoke St. Ry.	0.33	.....	2.53	.....
Union St. Ry.	0.08	.....	1.51	.....
Middlesex & Boston St. Ry.	.....	.....	.....	3.40
Northampton St. Ry.	.....	.....	1.27	.....
New Hampshire				
Berlin St. Ry.	.....	.....	0.10	.....
Rhode Island				
United Elec. Rys.	2.23	.....	3.14	.....
Vermont				
Burlington Trac. Co.	.....	.....	1.00	.....
Total	10.09	4.91	73.43	33.27

North of the Ohio and East of the Mississippi River

District of Columbia				
The Capital Trac. Co.	0.87	.....	2.61	.....
Washington Ry. & Elec. Co.	.....	.....	6.50	.....
Illinois				
Aurora, Elgin & Chicago R.R.	.....	.....	3.00	4.50
Chicago Surface Lines	2.37	.....	9.75	.....
Southern Illinois Ry. & Pwr. Co.	.....	.....	0.42	.....
Chicago & Joliet Elec. Ry.	.....	.....	1.14	.....
Central Illinois Public Service Co.	0.11	.....	0.83	.....
Peoria Ry. Terminal Co.	.....	.....	0.87	1.12
Rockford & Interurban Ry.	.....	.....	0.83	0.33
Chicago & Interurban Trac. Co.	0.42	.....	.....	40.00
Chicago & West Towns Ry.	.....	.....	.....	1.00
Metropolitan West Side Elev. Ry.	1.51	.....	7.48	.....
Chicago, North Shore & Milwaukee R.R.	.....	1.13	0.72	0.78
East St. Louis & Sub. Ry.	.....	.....	4.07	1.84
Illinois Power Co.	.....	.....	0.88	.....
Tri-City Ry.	0.51	.....	1.50	.....
Indiana				
Union Trac. Co. of Indiana	0.98	.....	0.55	1.27
Southern Indiana Gas & Elec. Co.	.....	.....	1.66	0.34
Indiana Service Corp.	2.15	.....	2.05	.....
Terre Haute, Indianapolis & Eastern Trac. Co.	.....	0.15	.....	.....
Northern Indiana Power Co.	.....	.....	0.50	0.40
Lafayette St. Ry., Inc.	0.28	.....	0.16	.....
Chicago, South Bend & Northern Indiana Ry.	1.50	.....	1.80	.....
Terre Haute Trac. & Light Co.	.....	.....	1.00	0.60
Gary St. Ry.	1.50	.....	0.75	.....
Maryland				
United Rys. & Elec. Co.	.....	.....	21.00	.....
The Potomac Edison Co.	.....	.....	0.58	.....
The Potomac Public Service Co.	.....	.....	0.70	.....
Michigan				
City of Detroit—Dept. of St. Rys.	10.23	.....	4.12	.....
Lake Superior District Pwr. Co.	.....	.....	1.00	5.00
Escanaba Pwr. & Trac. Co.	.....	.....	0.50	.....
Grand Rapids Ry.	1.16	.....	2.10	.....
Detroit United Ry.	4.35	0.97	0.48	.....
Detroit, Jackson & Chicago Ry.	.....	0.18	0.28	.....
Rapid Ry. System	0.06	.....	.....	.....
Detroit, Monroe & Tol. S. L.	0.04	0.43	.....	.....
New Jersey				
The Morris County Trac. Co.	.....	0.21	0.10	.....
Penna.-New Jersey Ry.	.....	.....	0.50	.....
Trenton & Mercer Co. Trac. Corp.	1.09	.....	2.61	1.49
Cumberland Traction Co.	0.10	.....	3.40	8.00
New York				
United Trac. Co.	1.06	.....	6.00	0.25
Auburn & Syracuse Elec. R.R.	.....	.....	0.71	.....
International Ry.	0.19	0.21	0.54	2.08
Binghamton Ry.	.....	.....	0.95	.....
The Cortland County Trac. Co.	.....	.....	.....	0.50
Ocean Elec. Ry.	0.50	.....	.....	.....
The Brooklyn City R.R.	.....	.....	9.59	.....
Brooklyn-Manhattan Transit Corp.	0.59	.....	7.50	.....
Interborough Rapid Transit Co.	3.09	.....	.....	.....
Southern N. Y. Pwr. & Ry. Corp.	0.06	.....	.....	1.00
Hudson River & Eastern Trac. Co.	.....	.....	0.33	.....
Poughkeepsie & Wappingers Falls Ry.	.....	.....	2.00	.....
New York State Rys. (Rochester)	2.92	.....	8.42	.....
Schenectady Ry.	.....	.....	0.52	0.15
Syracuse & Eastern R.R.	.....	.....	0.38	.....
Buffalo & Lackawanna Trac. Co.	0.09	.....	1.25	.....
New Paltz, Highland & Poughkeepsie Trac. Co.	.....	.....	.....	1.00
Richmond R.R.	.....	.....	3.00	.....
Empire State R.R. Corp.	.....	.....	.....	7.30
New York State Rys. (Syracuse)	0.72	.....	1.69	.....
New York State Rys. (Utica)	1.04	.....	2.90	0.45
Ohio				
Youngstown Municipal Ry.	.....	.....	0.83	.....
The Springfield & Xenia Ry. Co.	.....	.....	0.62	.....
Springfield Ry.	.....	.....	1.75	.....
Northwestern Ohio Ry. & Pwr. Co.	.....	.....	0.50	27.00
City of Ashtabula—Div. of St. Rys.	.....	.....	0.28	.....
Cincinnati, Georgetown & Portsmouth R.R.	.....	.....	.....	1.00
The Cincinnati Trac. Co.	1.09	.....	4.61	.....
The Cleveland Ry.	6.04	.....	10.25	.....
The Cleveland, Southwestern & Columbus Ry.	.....	.....	7.50	.....
The Columbus, Delaware & Marion Elec. Co.	.....	6.36	0.76	.....
The Columbus Ry., Pwr. & Lt. Co.	1.36	.....	10.29	.....
Scioto Valley Trac. Co.	.....	.....	0.50	.....
The Dayton & Western Trac. Co.	.....	1.41	.....	.....
The Ohio Public Service Co.	.....	.....	0.50	.....
Indiana, Columbus & Eastern Trac. Co.	.....	.....	.....	1.10
The Community Trac. Co.	0.64	.....	2.69	.....
Cincinnati, Lawrenceburg & Aurora Elec. St. R.R.	0.80	.....	.....	.....
Peoples Ry.	.....	.....	0.95	.....
Pennsylvania				
The Lewistown & Reedsville Elec. Ry.	.....	0.19	.....	.....
Shamokin & Mt. Carmel Transit Co.	.....	.....	.....	12.00
Allegheny Valley St. Ry.	.....	2.55	0.41	.....
Pittsburgh Rys.	0.64	0.09	35.35	2.74
West Penn. Rys.	0.08	.....	3.55	.....
Reading Transit & Lt. Co.	1.00	0.30	2.00	16.10
Philadelphia & West Chester Trac. Co.	.....	0.51	.....	.....
West Chester St. Ry.	.....	.....	.....	7.50
York Rys.	.....	.....	0.51	1.24
Westmoreland County Ry.	.....	.....	0.47	.....
Lehigh Valley Transit Co.	0.56	.....	0.51	2.39
Altoona & Logan Valley Elec. Ry.	.....	1.58	0.62	0.11
Conestoga Trac. Co.	1.46	0.16	1.46	1.40
Beaver Valley Trac. Co.	.....	.....	2.23	.....
North Branch Transit Co.	.....	.....	.....	9.00
Westside Elec. St. Ry.	.....	.....	0.19	.....
Philadelphia & Easton Transit Co.	.....	.....	0.25	.....
New Jersey Interurban Co.	.....	.....	1.00	.....
Northampton Transit Co.	.....	.....	.....	0.62
Buffalo & Lake Erie Trac. Co.	.....	.....	2.00	1.00
Northwestern El. Service Co. of Pa.	.....	.....	.....	2.00
Schuylkill Ry.	.....	.....	0.47	0.95
Harrisburg Rys.	.....	.....	3.61	.....
Indiana County St. Rys.	.....	.....	0.32	0.42
The Irwin-Herminie Trac. Co.	.....	.....	0.50	.....
Philadelphia Rapid Transit Co.	4.36	.....	19.49	1.70
Scranton Ry.	.....	.....	1.83	.....
Wisconsin				
Wisconsin Ry. Lt. & Pwr. Co.	.....	.....	2.42	.....
Madison Rys.	0.38	.....	1.13	.....
The Milwaukee Elec. Ry. & Lt. Co.	3.85	1.42	8.98	4.94
Eastern Wisc. Elec. Co.	.....	.....	1.37	4.00
Wisconsin Valley Elec. Co.	.....	.....	0.42	.....
Lake Superior District Pwr. Co.	.....	.....	0.75	.....
Wisconsin Public Service Corp.	.....	.....	0.75	.....
Wisconsin Rapids St. Ry.	.....	.....	0.20	.....
Wisconsin Trac. Lt. Ht. & Pwr. Co.	.....	0.19	.....	.....
Total	61.75	18.04	267.04	176.61

South of the Ohio and East of the Mississippi River

Alabama				
Birmingham Ry., Lt. & Pwr. Co.	0.74	.....	1.22	.....
Mobile Light & R.R. Co.	.....	.....	1.32	.....
Alabama Power Co.	.....	.....	1.30	.....
Florida				
Pensacola Elec. Co.	.....	.....	1.20	.....
Municipal Ry. of St. Petersburg.	0.52	.....	0.34	.....
Jacksonville Trac. Co.	1.57	.....	0.13	.....
Miami Beach Elec. Co.	5.00	.....	.....	.....
Georgia				
Georgia Ry. & Pwr. Co.	2.80	.....	8.70	.....
Rome Ry. & Lt. Co.	.....	.....	2.00	.....
Augusta-Aiken Ry. & Elec. Corp.	.....	.....	3.45	0.30
Kentucky				
Louisville Ry.	0.51	0.12	2.57	1.40
Paducah Elec. Co.	.....	.....	0.03	.....
Cincinnati, Newport & Covington Ry.	.....	.....	2.50	.....
Kentucky Trac. & Terminal Co.	0.41	.....	1.96	.....
Mississippi				
Hattiesburg Trac. Co.	.....	.....	1.13	.....
Jackson Public Service Co.	.....	.....	5.00	.....
Laurel Lt. & Ry. Co.	.....	.....	1.00	.....

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Track Built and Rebuilt During 1923—Concluded

Railway	Extensions, Miles City	Extensions, Miles Interurban	Rebuilt, Miles City	Rebuilt, Miles Interurban
North Carolina				
Durham Public Service Co.	.....	.....	0.40	.....
Tidewater Power Co.	.....	0.60	2.00	.....
South Carolina				
Charleston Consol. Ry. & Ltg. Co.	.....	.....	0.75	.....
Tennessee				
Chattanooga Ry. & Lt. Co.	0.64	.....	1.69	.....
Jackson Ry. & Lt. Co.	.....	.....	2.00	.....
Knoxville Pwr. & Lt. Co.	0.11	.....	0.65	.....
Johnson City Traction Corp.	.....	.....	1.00	.....
Virginia				
Newport News & Hampton Ry., Gas & Elec. Co.	.....	.....	1.00	.....
Richmond-Ashland Ry.	.....	.....	.....	2.00
Radford Water Pwr. Co.	.....	.....	3.00	.....
Petersburg, Hopewell & City Pt. Ry.	.....	.....	2.00	.....
Virginia Ry. & Pwr. Co.	0.64	.....	9.33	.....
West Virginia				
Monongahela Pwr. & Ry. Co.	0.17	.....	0.73	.....
Princeton Pwr. Co.	.....	.....	1.63	.....
Charleston Interurban R.R.	0.38	.....	0.57	.....
Total	13.48	0.72	60.60	3.70
West of the Mississippi River				
Arizona				
Tuscon Rapid Transit Co.	.....	.....	1.23	.....
Arkansas				
The Pine Bluff Co.	.....	.....	0.75	.....
Southwestern Gas & Elec. Co.	.....	.....	0.04	.....
Arkansas Central Power Co.	0.22	.....	3.16	.....
California				
San Francisco-Oakland Term. Rys.	1.16	0.26	6.11	.....
Petaluma & Santa Rosa R.R.	.....	0.83	.....	.....
San Diego Elec. Ry.	1.20	.....	6.40	.....
San Francisco-Sacramento R.R.	.....	.....	0.60	6.96
Market St. Ry.	.....	.....	4.75	1.21
Municipal Ry. of San Francisco	1.86	.....	.....	.....
Southern Pacific Co.	0.02	0.07	.....	.....
Santa Barbara & Sub. Ry.	.....	.....	0.40	.....
Pacific Gas and Electric Co.	.....	.....	1.96	.....
Visalia Electric R.R.	.....	0.07	.....	9.66
Glendale & Montrose Ry.	.....	0.60	.....	.....
Pacific Electric Ry.	.....	21.44	.....	20.37
San Diego & Arizona Ry.	.....	.....	.....	0.19
Colorado				
The Western Lt. & Pwr. Co.	.....	.....	1.73	.....
Colorado Springs & Interurban Ry.	.....	.....	1.00	.....
The Denver & Intermountain R.R.	.....	0.49	.....	11.80
The Denver Tramway Co.	1.50	.....	5.48	0.06
Southern Colorado Power Co.	.....	.....	2.00	.....
Idaho				
Boise St. Car Co.	.....	.....	0.48	.....
Iowa				
Cedar Rapids & Marion City Ry.	.....	.....	1.00	.....
Clinton, Davenport & Muscatine Ry.	.....	0.24	0.10	0.19
Clinton St. Ry.	.....	.....	1.00	.....
Des Moines City Ry.	1.90	2.20	4.10	.....
Dubuque Elec. Co.	.....	.....	1.25	.....
Mississippi Valley Electric Co.	0.13	.....	1.39	.....
Keokuk Electric Co.	.....	.....	1.28	.....
Waterloo, Cedar Falls & North. Ry.	.....	0.06	0.33	0.22
Tri-City Ry. of Iowa	0.06	.....	1.70	.....
Burlington Ry. & Lt. Co.	.....	.....	2.00	.....
Sioux City Service Co.	0.23	.....	1.20	.....
Kansas				
The Hutchinson Interurban Ry.	.....	.....	1.00	.....
United Traction Co.	0.75	.....	4.00	21.00
The Arkansas Valley Interurban Ry.	.....	0.50	.....	.....
Salina St. Ry.	.....	.....	0.50	.....
Louisiana				
New Orleans Public Service, Inc.	0.13	.....	8.95	.....
Municipal St. Ry., Monroe	.....	.....	0.25	.....
Minnesota				
The Duluth St. Ry.	1.81	.....	0.70	.....
Mankato Elec. Trac. Co.	.....	.....	0.70	.....
Twin City Rapid Transit Co.	14.20	.....	3.00	.....
Wisconsin Ry., Lt. & Pwr. Co.	.....	.....	3.41	.....
Missouri				
Cape Girardeau-Jackson Int. Ry.	.....	.....	1.00	.....
Kansas City, Clay County & St. Joseph Ry.	.....	.....	.....	0.60
The Kansas City Rys.	.....	.....	3.89	.....
Montana				
Helena Light & Ry. Co.	0.38	.....	0.19	0.38
Butte Electric Ry. Co.	0.20	.....	.....	.....
Nebraska				
Omaha & Council Bluffs St. Ry. Co.	.....	.....	10.00	.....
North Dakota				
Northern States Pwr. Co.	0.28	.....	.....	.....
Oklahoma				
Oklahoma Union Ry.	.....	0.68	0.33	.....
Northeast Oklahoma R.R.	0.48	.....	.....	.....
Oregon				
Portland Ry. Lt. & Pwr. Co.	0.48	0.56	3.41	1.48
Texas				
Texas Electric Ry.	0.71	.....	.....	.....
The Abilene Traction Co.	0.50	.....	0.50	.....
Eastern Texas Elec. Co.	0.68	.....	0.75	.....
Dallas Ry.	5.68	.....	2.59	.....
El Paso Elec. Ry.	1.38	.....	2.00	.....
Northern Texas Traction Co.	6.65	.....	3.20	.....
Galveston Houston Elec. Ry.	.....	0.11	.....	.....
Marshall Traction Co.	.....	.....	0.34	.....
Port Arthur Traction Co.	.....	.....	0.70	.....
San Antonio Public Service Co.	1.10	.....	2.35	.....
Wichita Falls Traction Co.	2.50	.....	.....	.....
Galveston Electric Co.	.....	.....	1.00	.....
Austin Street Ry.	0.40	.....	.....	.....
Utah				
Utah Lt. & Trac. Co.	.....	.....	0.59	.....
Salt Lake & Utah R.R.	.....	1.03	.....	.....
Washington				
Lewiston-Clarkston Transit Co.	.....	.....	1.00	.....
Willapa Electric Co.	0.36	.....	.....	.....
Seattle Municipal St. Ry.	0.76	.....	7.59	.....
Spokane United Rys.	1.28	.....	4.53	.....
Walla Walla Valley Ry.	.....	4.63	.....	1.26
Yakima Valley Transportation Co.	0.56	0.05	.....	.....
Pacific Northwest Traction Co.	.....	.....	.....	1.51
Wyoming				
Sheridan Ry. Co.	.....	.....	0.50	.....
Total	49.37	33.56	120.41	76.89
Canada				
British Columbia				
British Columbia Elec. Ry.	1.31	.....	0.69	.....
Manitoba				
Winnipeg Electric Ry.	1.25	.....	0.95	.....
New Brunswick				
New Brunswick Power Co.	.....	.....	2.36	.....
Nova Scotia				
N. S. Tramways & Pwr. Co., Ltd.	.....	.....	1.44	.....
Ontario				
Hydro Electric Rys.	3.59	1.31	1.98	.....
Cornwall St. Ry., Lt. & Pwr. Co.	0.50	.....	1.00	.....
Fort William Electric Ry.	0.50	5.00	.....	.....
Grand River Ry.	.....	.....	.....	0.75
Dominion Pwr. & Trans. Co., Ltd.	1.00	.....	1.02	.....
Kingston, Portsmouth & Cataraqui Elec. Ry. Co.	.....	.....	0.50	.....
The London St. Ry.	.....	.....	2.88	.....
Toronto Transp. Commission	7.15	.....	7.77	.....
Kitchener & Waterloo St. Ry.	1.48	.....	.....	0.95
Ottawa Electric Ry.	.....	.....	4.00	.....
Quebec				
Sherbrooke Ry. & Power Co.	.....	.....	0.81	.....
Three Rivers Traction Co.	1.40	.....	.....	.....
Montreal Tramways Co.	4.00	.....	9.35	.....
The Hull Electric Co.	.....	.....	0.42	2.69
Levis County Ry.	.....	.....	2.00	.....
Quebec Ry., Light & Pwr. Co.	0.28	.....	.....	.....
Saskatchewan				
Regina Municipal Ry.	0.38	.....	0.12	.....
Saskatoon Municipal Ry.	0.08	.....	.....	.....
Moose Jaw Elec. Ry.	12.00	.....	1.00	.....
Total	34.92	6.31	38.29	4.39

The State of Pennsylvania has the largest mileage for track rebuilt, with 25 railways reporting 76.77 miles of city track and 59.17 miles of interurban track reconstructed. Massachusetts, Illinois, New York and Ohio also report a large amount of rebuilt track. These five states also reconstructed 424.77 miles of track, which is 52 per cent of the total for the United States.

Data has been obtained for paved and open track. From this it appears that 58 per cent of the extensions to city tracks were in paved streets and 42 per cent had open construction. Of the interurban extensions 21 per cent had paved and 79 per cent open construction. For track rebuilt 91 per cent of that reported for city service was in paved streets and but 9 per cent had open construction. Mileage for reconstructed interurban tracks showed 17 per cent with paved and 83 per cent with open construction.

	Paved	Open
City extensions	98.37	71.21
Interurban extensions	13.34	50.20
Reconstructed city tracks	509.39	50.38
Reconstructed interurban tracks	53.93	240.93

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Orders for Automotive Equipment on the Increase

PURCHASES of motor buses by electric railways more than doubled during 1923 as compared with the preceding year, and there was also a healthy increase in the number of motor trucks ordered for various kinds of service work. These figures indicate clearly the growing tendency of the industry to appreciate the advantages of automotive equipment, both for passenger transportation and for auxiliary operation in connection with running and maintaining the railway systems.

The following table summarizes briefly the total orders placed for automotive equipment by electric railways in 1922 and 1923.

	Motor Buses Ordered	Trolley Buses Ordered	Gas Rail Cars Ordered	Service Trucks Ordered	Total
1923	621	15	4	148	797
1922	240	6	2	112	360
Increase	381	9	2	36	437

Further analysis of the tabulation of motor buses ordered shows that 69 individual companies placed orders in 1923 as compared with 28 in 1922.

Measured in terms of passenger capacity, a decided preference is shown by the railways for buses with seating accommodations for about 25 passengers. With only a few exceptions, the buses ordered are provided with over 20 seats. Double-deck buses, seating from 51 to 67 passengers, were ordered by three electric railways. There were thirty-one of these double-deck types ordered during the year.

Of the fifteen electrically driven trackless trolley buses ordered, five went to one company and ten to another.

As for the class of automotive equipment known as service trucks ordered during 1923, the 148 shown include tower trucks, dump cars, emergency wagons, trucks for handling freight and express, and miscellaneous trucking vehicles. There are also included in this figure, three gasoline-driven tractors, one snow loading machine, and one trailmobile.

Elsewhere in this issue there is given a complete summary of the motor bus equipment now owned and operated by the electric railway companies. The table here shows only buses ordered during the year just closed.

Not all of the buses ordered have been delivered and placed in actual operation at the present time.

Automotive Equipment Ordered During 1923

Company	No. of Vehicles	Class of Service	Type of Chassis	Body Builders	Capacity — Seats (Buses)	Capacity — Tons (Trucks)
Div. of St. Rys.—City of Ashtabula, Ohio	1	Motor Bus	Mack	Kuhlman	29	..
	1	Service Truck	Mack	.....	.....	2½
Community Trac. Co. (Toledo, Ohio)	1	Service Truck	Ford	.....	.....	1
	1	Express Truck	Overland	.....	.....	½
Youngstown (O.) Municipal Ry. Co.	24	Motor Bus	White	Bender	25	..
	2	Service Truck	Garford	Co.'s Shop	.....	1
Pennsylvania-Ohio Elec. Co. (Youngstown, Ohio)	7	Motor Bus	White	Bender	18–25	..
	1	Motor Bus	Garford	Bender	25	..
No. Ohio Trac. Lt. Co. (Akron, O.)	6	Motor Bus	White	Kuhlman	25	..
	1	Motor Bus	White	Lang	18	..
	1	Motor Bus	Maccar	Kuhlman	25	..
Youngstown (Ohio) & Suburban Ry. Co.	4	Motor Bus	White	Kuhlman	17	..
Altoona & Logan Valley Elec. Ry. Co. (Altoona, Pa.)	2	Motor Bus	Dodge-Graham	.....	16	..
	5	Motor Bus	Garford	.....	21	..
Schuylkill (Pa.) Ry. Co.	3	Motor Bus	Reo	McKay	18	..
Lewiston (Pa.) & Reedsville Elec. Ry. Co.	2	Motor Bus	Reo	McKay	20	..
Citizens Trac. Co. (Oil City, Pa.)	2	Motor Bus	Dodge-Graham	.....	16	..
	1	Service Truck	White	White	.....	2
Philadelphia (Pa.) Rap. Tr. Co.	1	Trolley Bus	Commercial	Trackless Trolley Corp.	27	..
	9	Trolley Bus	Brill	Brill	28	..
	10	Motor Bus	Yellow Coach	Yellow Coach	67	..
	10	Motor Bus	Phila. Motor Coach	Brill	64	..
	16	Service Truck	(a)	.....	.....	..
Pittsburgh (Pa.) Rys. Co.	6	Service Truck	Autocar	.....	.....	2–3
The West Chester (Pa.) St. Ry. Co.	3	Motor Bus	White	Hoover	25	..
	2	Motor Bus	Reo	Hoover	20	..
	1	Service Truck	.....	.....	.....	..
York (Pa.) Rys. Co.	1	Motor Bus	Pierce-Arrow	Hoover	25	..
United Elec. Rys. Co. (Providence, R. I.)	4	Motor Bus	White	Brown	25	..
	1	Motor Bus	5th Ave. Bus	5th Ave. Bus	25	..
	6	Motor Bus	Mack	Mack	25	..
	4	Dump Cars	Reo	Reo	.....	1½
	1	Service Truck	White	White	.....	2
Sioux Falls (So. Dakota) Trac. System	5	Motor Bus	White-50	Eckland	25	..
Knoxville (Tenn.) Power & Lt. Co.	1	Service Truck	White	Co.'s Shop	.....	2
Eastern Texas Elec. Co. (Beaumont, Tex.)	1	Motor Bus	White-50A	Bender	21	..
San Antonio (Tex.) Public Service Co.	2	Motor Bus	Reo	.....	12	..
	1	Motor Bus	White	.....	21	..
	1	Motor Bus	Fageol	.....	29	..
Twin State Gas & Elec. Co. (Brattleboro, Vt.)	2	Motor Bus	White-50	Brown	25	..
	1	Motor Bus	Stewart	Paterson	27	..
Puget Sd. Int. Ry. & Power Co. (Everett, Wash.)	5	Motor Bus	Fageol	Fageol	29	..
	4	Motor Bus	White	Co.'s Shop	25	..
	2	Motor Bus	White	Co.'s Shop	19	..
Pacific Northwest Trac. Co. (Seattle, Wash.)	3	Motor Bus	Fageol	Fageol	22	..
	1	Service Truck	White	Co.'s Shop	.....	2½
Seattle (Wash.) Municipal St. Ry.	2	Motor Bus	Garford	Garford	29	..
	1	Motor Bus	Garford	Co.'s Shop	29	..
Monongahela-W. Penn. Public Serv. Co. (Fairmont, W. Va.)	3	Motor Bus	Pierce-Arrow	Kuhlman	25	..
	2	Motor Bus	White	Kuhlman	25	..
	2	Motor Bus	Garford	Kuhlman	21	..
Princeton (W. Va.) Power Co.	1	Motor Bus	Reo	Fitz-John	18	..
Milwaukee (Wis.) Elec. Ry. & Lt. Co.	5	Motor Bus	White	Bender	19	..
	1	Motor Bus	Fageol	Fageol	23	..
	10	Motor Bus	5th Ave. Bus	5th Ave. Bus	51	..
	9	Motor Bus	5th Ave. Bus	5th Ave. Bus	25	..
	38	Service Truck	(b)	.....	.....	..
Eastern Wisconsin Elec. Co. (Oshkosh, Wis.)	5	Motor Bus	White	Bender	22	..
Winnipeg (Canada) Elec. Ry. Co.	2	Motor Bus	G. M. C.	.....	24	..
	2	Motor Bus	Ruggles	.....	24	..
Nova Scotia Tramways & Power Co. (Halifax, N. S.)	1	Motor Bus	Reo	Studebaker	15	..
	1	Motor Bus	Reo	Can. Comm. Car.	15	..
Hydro-Electric Rys. (Windsor, Ont.)	4	Express Truck	Packard	Packard	.....	3½
	1	Tower Truck	Gotfredson	Gotfredson	.....	2½
Toronto Transp. Comm. (Toronto, Ont.)	4	Motor Bus	5th Ave. Bus	5th Ave. Bus	29	..

(a) Autocars, Whites, Fords, G. M. C.'s, Maccars. (b) Fords, Parkers, Reos, Whites, etc.

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Automotive Equipment Ordered During 1923—(Continued)

Company	No. of Vehicles	Class of Service	Type of Chassis	Body Builders	Capacity Seats (Buses)	Capacity Tons (Trucks)
Birmingham (Ala.) Ry. Lt. & Power Co.	4	Motor Bus	Reo	Fitz-John	12	..
San Francisco-Oakland Term. Rys. (Cal.)	2	Motor Bus	Fageol	Fageol	29	..
San Diego (Cal.) Elec. Ry. Co.	10	Motor Bus	Fageol	Fageol	29	..
	1	Service Truck	White	.....	.....	..
	1	Service Truck	Fageol	.....	.....	..
	1	Service Truck	Dodge	.....	.....	..
	1	Service Truck	Ford	.....	.....	..
Pacific Gas & Elec. Co. (Sacramento, Cal.)	1	Motor Bus	White-50	Co.'s Shop	25	..
Santa Barbara (Cal.) Sub. Ry.	3	Motor Bus	Moreland	Moreland	21	..
Pacific Elec. Co. (Los Angeles, Cal.)	2	Motor Bus	Reo	Pacific Motor Body	17	..
	10	Motor Bus	White	Motor Trans. Co.	25	..
	53	Motor Bus	White	Co.'s Shop	25	..
	21	Motor Bus	Moreland	Moreland	16	..
	16	Motor Bus	Moreland	Moreland	25	..
Los Angeles (Cal.) Motor Bus Co.	20	Motor Bus	Fageol	Fageol	29	..
(subsidiary of Los Angeles Ry. Co.)	81	Motor Bus	White	.....	25	..
Denver (Colo.) Tramway Co.	1	Service Truck	Ford	Co.'s Shop	.....	1
Shore Line Elec. Ry. Co. (Norwich, Conn.)	4	Motor Bus	Fageol	Fageol	29	..
	1	Motor Bus	White	Brown	24	..
	1	Service Truck	Pierce Arrow	.....	.....	1
New York, New Haven & Hartford R.R. Co. (New Haven, Conn.)	1	Rail Car	.....	Osg. Bradley	60	..
Capitol Trac. Co. (Wash., D. C.)	1	Motor Bus	Garford	Brown	25	..
	2	Motor Bus	White	Bender	25	..
	1	Motor Bus	Reo	.....	.....	..
	4	Motor Bus	5th Ave. Bus	5th Ave. Bus	25	..
	1	Service Truck	White	.....	.....	2
	2	Service Truck	Ford	.....	.....	1
Washington Ry. & Elec. Co. (Wash., D. C.)	8	Motor Bus	Graham Bros.	Hoover	20	..
E. St. Louis & Sub. Ry. Co.	2	Motor Bus	White-50	Badger	25	..
	1	Motor Bus	White-50	Kuhlman	25	..
	1	Service Truck	.....	Co.'s Shop	.....	1½
Chicago, No. Shore & Milwaukee R.R. Co. (Highwood, Ill.)	13	Motor Bus	White-50	Kastory	25	..
	7	Motor Bus	Fageol	Fageol	22–29	..
Peoria (Ill.) Ry. Co.	2	Motor Bus	White	Champion	26	..
Rockford (Ill.) Interurban Ry. Co.	1	Service Truck	G.M.C.	G.M.C.	.....	1
Indiana Service Corp. (Ft. Wayne, Ind.)	2	Service Truck	White	.....	.....	..
	4	Service Truck	Ford	.....	.....	..
Chicago, So. Bend (Ind.) & No. Ind. Ry. Co.	3	Motor Bus	White-50	Champion	25	..
Tri City Ry. Co. (Rockford, Ill.)	2	Motor Bus	White-50	Kuhlman	25	..
Des Moines (Ia.) City Ry. Co.	3	Motor Bus	White-50	Champion	25	..
Dubuque (Ia.) Elec. Co.	3	Motor Bus	Dodge-Graham	.....	18	..
Mississippi Valley Elec. Co. (Iowa City, Ia.)	1	Motor Bus	Garford	Garford	25	..
Waterloo (Ia.) Cedar Falls & No. Ry. Co.	2	Motor Bus	Mack	.....	25	..
Louisville (Ky.) Ry. Co.	12	Motor Bus	White-50	Bender	25	..
	2	Dump Car	Ford	Lee	.....	1
	1	Dump Car	White	.....	.....	5
	1	Trailer Flat	Trailmobile	.....	.....	5
	1	Service Truck	White	Co.'s Shop	.....	2
	1	Tower Truck	White	Trenton Tower Co.	.....	2
	1	Tower Truck	Ford	Schmidt	.....	1
	1	Tractor	Fordson	.....	.....	..
Potomac Edison Co. (Cumberland, Md.)	2	Motor Bus	White	Hoover	25	..
Eastern Mass. St. Ry. Co. (Boston, Mass.)	17	Motor Bus	Stewart	Paterson	27	..
	3	Motor Bus	White	Brown	25	..
	3	Motor Bus	White	Brown	16	..
Boston (Mass.) Elev. Ry. Co.	11	Motor Bus	Mack	Mack	25	..
	20	Motor Bus	White	Brown	25	..
	2	Tower Trucks	White	McCardle	.....	2
	9	Service Truck	Ford	Ford	.....	1
	4	Service Truck	White	White	.....	2
	1	Service Truck	White	White	.....	3½
	1	Service Truck	White	White	.....	5
	1	Service Truck	Mack	.....	.....	5
	2	Tractors	Fordson	.....	.....	..
	1	Snow-Loader	Barber-Greene	.....	.....	..
Holyoke (Mass.) St. Ry. Co.	1	Motor Bus	Mack	Mack	25	..
Middlesex & Boston St. Ry. Co. (Newton, Mass.)	10	Motor Bus	White	Bender	25	..
New Bedford (Mass.) & Onset St. Ry.	1	Motor Bus	Reo	Boston Body Co.	21	..
Union St. Ry. Co. (New Bedford, Mass.)	1	Motor Bus	Mack	Mack	25	..
Plymouth (Mass.) & Brockton St. Ry. Co.	2	Motor Bus	Reo	Boston Body Co.	20	..
Springfield (Mass.) St. Ry. Co.	1	Motor Bus	Selden	Kuhlman	29	..
	1	Motor Bus	White	Brown	25	..
	1	Motor Bus	Stewart	Paterson	20	..
	1	Motor Bus	Federal	Kuhlman	25	..
	1	Service Truck	Federal	.....	.....	½
	1	Dump Car	Federal	.....	.....	5
Grand Rapids (Mich.) Ry. Co.	6	Motor Bus	5th Ave. Bus	5th Ave. Bus	29	..
Saginaw (Mich.) Transit Co.	10	Motor Bus	White	Bender	25	..
	15	Motor Bus	Reo	Fitz-John	21	..
Twin City Rapid Tr. Co. (Minneapolis, Minn.)	2	Service Truck	Ford	.....	.....	1
	1	Service Truck	Mack	.....	.....	2½
United Rys. Co. of St. Louis, Mo.	1	Express Truck	White	Co.'s Shop	.....	2
	2	Tower Truck	White	Co.'s Shop	.....	2
	2	Dump Car	White	White	.....	2
	1	Dump Car	White	White	.....	3½
Cumberland Traction Co., Bridgeton, N. J.	2	Motor Bus	Reo	.....	16	..
Millville (N. J.) Traction Co.	1	Motor Bus	Ford	Co.'s Shop	18	..
Public Service Ry. Co. (Newark, N. J.)	1	Motor Bus	Fageol	.....	.....	..
	4	Motor Bus	Reo	.....	.....	..
	1	Motor Bus	5th Ave. Bus	5th Ave. Bus	25	..
	1	Motor Bus	5th Ave. Bus	5th Ave. Bus	51	..
	20	Motor Bus	White	.....	25	..
Trenton (N. J.) & Mercer Co. Trac. Corp.	5	Motor Bus	White-50	Kuhlman	25	..
	1	Service Truck	White-20	.....	.....	2
City Elec. Co. (Albuquerque, N. Mex.)	1	Motor Bus	White	White	15	..
Cortland (N. Y.) County Trac. Co.	1	Service Truck	Ford	Ford	.....	½
Pennsylvania R.R. Co. (Phila., Pa.)	1	Gasoline Rail Car	Steel Motor Service Co.	Brill	39	..
	1	Gasoline Rail Car	Steel Motor Service Co.	Brill	43	..
	1	Gasoline Rail Car	Steel Motor Service Co.	Brill	45	..
New York & Long Island Trac. Co. (Hempstead, N. Y.)	1	Tower Truck	White	Trenton Tower	.....	2
New York State Rys. Co. (Rochester, N. Y.)	5	Trolley Bus	Brockway	Kuhlman	25	..
	7	Motor Bus	Brockway	Kuhlman	25	..
	1	Service Truck	Reo	.....	.....	..
	2	Service Truck	White	.....	.....	..
	2	Service Truck	Ford	.....	.....	..
New York State Rys. Co. (Syracuse, N. Y.)	1	Tower Truck	White	.....	.....	2
	1	Dump Car	White	.....	.....	3½
	1	Dump Car	White	White	.....	3
International Ry. Co. (Buffalo, N. Y.)	3	Motor Bus	White	White	25	..
Schenectady (N. Y.) Ry. Co.	1	Emergency Truck	Reo	Co.'s Shop	.....	..

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The Readers' Forum

Budd's Approach to Problems Different

CITY OF DETROIT
Department of Street Railways
Dec. 31, 1923.

To the Editors:

I want to congratulate you upon your handling of the interview with Britton I. Budd. I think it is the best piece of work I have seen in the ELECTRIC RAILWAY JOURNAL in a long time.

Would also say that from the writer's standpoint Mr. Budd's approach to the various problems of railway service is entirely different from that of any of the past executives of the association. He has a conception of public service which, in my mind, is a splendid contrast to some of the ideas of his predecessors.

ROSS SCHRAM,
Assistant General Manager.

Interview Full of Inspiration

BEAVER VALLEY TRACTION COMPANY
NEW BRIGHTON, PA., Dec. 27, 1923.

To the Editors:

I have enjoyed reading very greatly your interview with Britton I. Budd and his statements on "Modernize and Merchandise." I believe this article is full of inspiration, and while a good many have had some similar thoughts this article should stir them to action.

C. D. SMITH,
Superintendent.

Budd's Views Should Reach Public

RAILROAD COMMISSION OF WISCONSIN
MADISON, Dec. 29, 1923.

To the Editors:

I have read with a great deal of interest your interview with Britton I. Budd as published in your issue of Dec. 22, 1923. The electric railway industry is to be congratulated upon having at the head of its association a man of his capacity. No doubt the publication of his views will be of great benefit to those who give careful attention to that article.

But it is to be regretted that there seems to be no way by which the general public, and especially the city and municipal authorities, can be reached by such a message as that presented in this interview.

These people seldom or never see these technical journals, and even if they do see them they have a feeling that everything contained therein is prepared for the benefit of the industry and must, therefore, be opposed to the public interest.

In our capacity as a regulatory body our problems are very much the same as those of the utilities and we find it very hard to secure co-operation from the city authorities in matters directly affecting the public interest. This is no doubt due to a lack of knowledge of facts and to a suspicion that all suggestions made by utilities are prompted by a selfish desire to impose on the people.

I am sure that if such clear statements as are made by Mr. Budd could be given such publicity that they would reach the public from time to time, the result would be of benefit to the communities as well as to the utilities.

C. M. LARSON,
Engineer.

Association News and Discussions

Program for the Paris Convention

THE program for the nineteenth convention of the Union Internationale de Tramways, de Chemins de fer d'Intérêt local et de Transports Publics Automobiles has been made public. The meeting will be held in Paris in 1924. A list of the subjects follows:

1. "Engagement and Training of Transportation Employees." By Mr. Bacqueyrisse, general manager of transportation and technical service of the Société des Transports en Commun de la Région Parisienne, and Mr. Prins, engineer attached to the executive department of the Tramways Bruxellois.

2. "The Effect of Local Transportation Systems on the Growth of the Cities and the Suburbs Which They Serve." By Mr. Delavenne, member of the Municipal Council of Paris, president of the Transportation Commission, and chairman of the budget committee of the Council of the Seine Department.

3. "Recent Improvements in Track Construction and Special Trackwork." By Mr. Bouton, vice-president Cie. des Tramways de l'Est-Parisien; E. d'Hoop, chief engineer Tramways Bruxellois; P. Lo Balbo, transportation manager Cie. Générale des Tramways a Vapeur Piémontais à Saluzzo; and J. Torres y Estrada, engineer maintenance of way, Barcelona Tramways.

4. "Recent Improvements in Rolling Stock, Particularly in Connection with the Reduction in First Cost, Maintenance, and Power Consumption, Divided as follows: (a) Body, Truck, Ball Bearings, Roller Bearings, Radial Trucks; (b) Reduction in Weight; (c) Electrical Equipment, Types of Motor, Regenerative Control, Controllers, Wiring, etc." By Mr. Ricaud, manager, Marseilles Tramways; Ch. Harmel, engineer-manager Tramways Est-Ouest de Liége, and H. Dubath, engineer Société Industrielle Suisse de Neuhausen.

5. "Gas Motor Cars for Rail Service." By P. Jourdain, manager Cie. des Chemins de Fer Secondaires du Nord-Est, Paris, and J. de Croes, chief engineer and director Société Nationale des Chemins de Fer Vicinaux of Belgium.

6. "Improvements in Steam Locomotives Adapted to Light Railway Work, Particularly from the Point of View of Fuel Economy, as by Superheating, Economizers, etc." By Mr. Renard, associate manager Cie. Centrale de Chemins de Fer, Paris, and Mr. Van den Broek, engineer of the Holland State Railways, The Hague.

7. "Motor Design for Buses." By Mr. Bonhomme, manager Société de Transports Automobiles Industriels et Commerciaux, Paris.

Indiana Utility Men to Meet

THE Indiana Public Utility Association will hold its annual meeting at Purdue University, Lafayette, Ind. Plans are being made for the sessions to be held Jan. 15 and 16.

The first day's program will include an afternoon meeting devoted to business and addresses, and a banquet to be served by the home economics department of the university.

The program for Tuesday, the second day, will be in charge of Dean A. A. Potter of the College of Engineering and Professor C. F. Harding of the Electrical Engineering School. A study of the ways in which Purdue can serve the utility industry and methods by which the utility heads can co-operate better with the university in handling engineering problems will be the topics.

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The News of the Industry

Governor Attacks State Regulation

Chief Executive of New York Laments Failure of Recommendation for Return to Home Rule

In his annual message to the Legislature, delivered on Jan. 2, Governor Smith of New York said that it was a matter of regret that at the last session no advance was made toward a removal of the obstacles standing in the way of the solution of the problem of the regulation of the public utilities of the State.

According to the Governor the present public service and the transit commission acts contain provisions that are utterly indefensible, and it is impossible to take from the public mind the idea that at least some of them were written into the statutes of the State in the interest of the utilities as against the public welfare. He said that it was indefensible to withdraw from the localities the power over their own contracts and lodge it in state commissions. According to him this power should be returned to the municipalities and they should be left free to deal for themselves with the corporations with which they made the original contracts.

Municipality Should Be Agent of State

In this connection the Governor went even a step farther and said that to his mind there was no reason why the state should not accept a municipality as its agent in the regulation of public utilities, particularly where the utility is entirely within a city. It is his idea that this does no violence to the theory of state regulation, because the municipality can act as the agent of the State just as well as could a commission appointed by the Governor. This would mean local control as to certain utilities.

On the other hand the Governor was quick to explain that this did not mean that municipalities should have forced upon them the power of control and regulation of their public utility corporations, because that would be an interference with the home-rule principle of the local community, but provision could be made that by vote of the common council, or, in the case of the city of New York, by its Board of Estimate and Apportionment, or for that matter, after a referendum to its people, petition could be made to the state to perform the regulatory service for the particular locality. It is the Governor's idea that where a city decides to carry on regulation it should be left free to determine its own agency, board, bureau or commission to perform that service. As to utilities that are not confined to a single city or whose operations are state-wide, the Governor would have the state retain its power of control and regulation. To make this policy effective the Governor would abolish the present Public Service Commission and empower the state's chief executive to appoint not more than three commissioners to regulate such utilities as are not to be regulated by the cities.

According to Mr. Smith there is a special situation in New York City with regard to rapid transit construction which should long since have ceased to be controversial. He says that nobody can dispute the established fact that rapid transit construction in the city of New York is a purely municipal enterprise and that no sensible reason has ever been advanced why the State of New York should interfere in the construction of rapid transit lines that are wholly within the corporate limits of the city of New York and built with the city's own funds without financial aid or assistance from the state. In this connection he said:

> Aside from any other argument there is no use for the Transit Commission. It merely duplicates what the city itself should be doing and creates an unnecessary agency that adds to the burden of the taxpayer and the rent payer. It should be abolished and full control over the construction of rapid transit railroads should be given to the local authorities.

The Governor wants the cities invested immediately with the power to own and operate any bus lines which in the opinion of local authority are required to meet the needs of the people. The Governor says that this introduces no new or untried principle in government, as New York City now owns railroads and owns and operates ferryboats. The carrying out of his recommendations would, according to the Governor, simply extend the principle to all forms of utilities and make it applicable to all cities.

Loyalty Draws a Dividend.—Appreciation of the loyalty of employees of the Bamberger Electric Railroad, Salt Lake City, has been recognized in the distribution of checks from the employees' service dividend fund, organized by former Governor Simon Bamberger, president of the road The dividend is based on the last six months' salary of all employees who have been in the service of the company more than a year. The president of the company issued a letter in which he said he was pleased to be able to give recognition to the value of the long and efficient service of the employees, and in view of the reduction in accident costs and loss and damage expense for the past year, the dividend was announced.

Declared Not an Interstate Carrier

I. C. C. Holds Washington Company Is Not Subject to Its Rules as Regards Depreciation

A decision was handed down on Dec. 8 holding that the Washington Railway & Electric Company is not an interstate carrier under the meaning of the interstate commerce act and so not subject to the regulations of the Interstate Commerce Commission so far as they relate to rates and depreciation. This case has been before the Interstate Commerce Commission for nearly two years. The railway contended that it was subject to the provisions of the act, while the Public Utilities Commission of the District of Columbia argued to the contrary. The American Electric Railway Association and the National Association of Railway & Utility Commissioners participated in the oral arguments. Charles L. Henry represented the American Electric Railway Association.

Other Similar Cases Cited

In its decision the commission describes the system of the company. This comprises about 131 miles of track within the District of Columbia and 33 miles in Maryland, of which 28 miles in Maryland and 15 within the District are on private right-of-way. Passengers are transported across the boundary line without change of cars. Of the total revenue of the system 99.3 per cent is from the transportation of passengers. Only 5.7 per cent of the total revenue is from transportation outside the District. In addition to its own service, the company has a trackage arrangement with the Washington, Baltimore & Annapolis Electric Railroad, under which the latter company transports interstate passengers, freight and express in its own cars over a part of the tracks of the Washington Railway & Electric Company into the District of Columbia.

In its decision the commission cites the case of the Omaha Street Railway vs. Interstate Commerce Commission, 230 U. S. 324, in which the Supreme Court held that an electric railway operating between Council Bluff, Iowa, and Omaha, Neb., was a street railway and not subject to the act, pointing out that the latter was intended to cover railroads engaged in hauling passengers and freight as channels of interstate commerce, whereas street railways are primarily designed for local transportation. It also referred to the decision of the Supreme Court in Washington Railway & Electric Company vs. Scala, 242 U.S. 630, in which the company was

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held to be a common carrier by railroad within the meaning of the employers' liability act, but the Interstate Commerce Commission declares that the decision of that case was under different statute, enacted for a different purpose and should not be considered as controlling in this case. The Supreme Court also distinguished it from the Omaha case, saying, in part:

> That case dealt with a purely street railway in the streets of two cities, and the decision was that it was not a "railroad," such as was intended to be placed under the jurisdiction of the Interstate Commerce Commission by the interstate commerce act of 1887. The case is of negligible value in determining either the construction of the act we are considering in this case or the classification of the defendant, which clearly enough is a suburban railroad common carrier of passengers within the scope of the Federal employers' liability act.

In consequence, the commission declared that the Washington Railway & Electric Company, together with its subsidiary electric companies, is not a carrier subject to the act and that it had no jurisdiction over the depreciation charges of these companies.

Transit Commission and City Officials of New York Agree on Subway Routes

The plan to put the proposed West Side-Washington Heights subway, New York City, under the westerly edge of Central Park has been abandoned. Announcement to this effect was made on Jan. 1 by George McAneny, chairman of the New York Transit Commission. The commission has reached an agreement with the transit committee of the Board of Estimate to shift the route of the section between Fifty-ninth and 110th Streets one block west to Columbus Avenue and has sent a revised and final routing of the Washington Heights subway to the board.

With this agreement the commission announced that it was in full accord with the transit committee of the Board of Estimate upon practically every detail of subway construction now awaiting the action of the two bodies, except for the choice to be made between Fulton Street and Lafayette Avenue for the westerly section of the proposed Brooklyn crosstown subway.

In accordance with an agreement with the committee, reached in conference, the commission has submitted to the Board of Estimate alternative routes covering both Fulton Street and Lafayette Avenue, with the request that the board indicate which route it approves and with the assurance that work will be started promptly on the route to receive the board's approval, whether or not the choice of the commission, in this instance the Fulton Street route, is followed.

The commission and the transit committee have been deadlocked since the commission was established to succeed the old Public Service Commission of the First District and the Transit Construction Commissioner. The agreement which has now been reached is believed to have removed the last obstacle to new subway construction.

Broader Regulatory Power Sought in New Jersey

Legislation which would permit the State Board of Public Utility Commissioners of New Jersey to apply directly to the Court of Chancery for a receiver to operate any public utility which refuses to provide service to the public in an emergency was recommended in the annual report of the board, submitted to Governor Silzer on Jan. 2.

The board also made recommendations growing out of the controversy between jitney owners and the Public Service Railway, and during the water scarcity which tied up many industries last fall.

The report said the attitude of the Public Service Railway toward the board's order to resume operation during the strike showed the necessity for legislation for emergency operation. After the board had ordered resumption of service the company had thirty days under the present law in which to appeal the order to the Supreme Court. The company filed its appeal on the last day, and meanwhile the public had no railway service and had still to wait until the Governor, at the request of the board, asked the Attorney General to apply for an injunction.

The report suggested that if the company believes such an order unfair, the company should notify the board of its intention to appeal the order and that the appeal be required to be made within five days after issuance of the order. Even in such cases, the report said, the Supreme Court should not grant a stay unless satisfied that the company cannot immediately fulfill the order and resume service.

It was also recommended that the present law imposing a fine of $100 daily upon companies which refuse to provide service when ordered to do so by the board be amended to make the fine $1,000.

Exclusion of jitneys from the public utility act and passage of another act giving power of regulation of buses and defining the extent of the regulatory powers were asked by the board. More rigid regulation of buses and a new method of licensing were requested.

Providence Employees Will Vote on New Wage

A referendum vote on the new wage and working agreement submitted by the union officials to the United Electric Railways, Providence, is to be taken shortly. The original demand presented two months ago provided for an increase of 19 cents an hour, but it is believed that this is down now to a 5-cent increase, which many employees are loath to accept, insisting that the union officials stick to a larger increase.

Business Agent James H. Coleman declines to state what the terms of the revised agreement are, and says that he wants the men to have an opportunity to express themselves by ballot before he has anything to say regarding it.

An increase of 5 cents an hour would make the maximum pay of motormen and conductors on two-men passenger cars 61 cents an hour, and of operators of one-man cars 66 cents, and would raise some of the mechanical department rates to 65 cents.

P. R. T. Will Determine Exact Purchasing Power of Dollar

To determine the exact purchasing power of the dollar, the Philadelphia Rapid Transit Company will institute at once a plan of market-basket shopping, according to an announcement made in the current number of *Service Talks*, the official magazine of the company. The results of the findings will be used in determining the wage scale.

The methods of the company's investigators will be exactly those of the housewife. They will make purchases in stores patronized by their employees, buying groceries, dry goods, fuel, and so on through the entire list of necessaries.

Wide differences of opinion among government experts and other economists as to the actual cost of living caused the company to decide to gather it own figures, substituting them for the three-city average which has been the basis of the wage scale in the past. The determination to compile statistics that will reflect purely local conditions is back of the plan.

Experiences in England, where wage scales were based upon general statistics which did not fit local conditions, are pointed to by the company as examples of the injustice of the widely used method.

Details of the plan will be worked out by the Co-operative Council.

Stock Yards Help Business.—Since the Indianapolis & Cincinnati Traction Company established stock yards at Rushville, Ind., business has shown a good increase. The stock raisers of Rushville ship their live stock to Indianapolis market the traction way because of the quick service maintained on the electric line. From this station alone there are shipped from three to five cars each morning to the Indianapolis live stock market. To take care of the increased freight business on the Rushville and Greensburg divisions, the company is planning to add another train.

Railway Official Made Bank Director.—Minot J. Hill, general manager of the Trenton, Bristol & Philadelphia Street Railway, Bristol, Pa., has been elected a director of the Bristol Trust Company.

Canadian Engineer Studies Service at Cost.—H. L. Vercoe of Toronto, engineer for the Canadian National Electric Lines, visited Rochester recently to study the provisions of the service-at-cost contract under which the Rochester lines of the New York State Railways are operated, with a view to putting a similar contract into effect between the city of St. Catherines, Ont., and the Canadian National Lines.

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Financial and Corporate

Issue of Securities Approved

Providence Company to Be Compensated to Extent of $2,079,200 for Extensions and Improvements

The United Electric Railways, Providence, R. I., has been authorized to issue bonds and stock to the amount of $2,079,200 by the Public Utilities Commission. That body has approved the company's amended petition, by which it will issue $1,455,000 of twenty-five year 6 per cent prior lien gold bonds and capital stock to the amount of $624,200. The company seeks to reimburse itself for expenditures made from its treasury for betterments, improvements and new equipment.

Prof. Charles B. Breed, engaged by the commission to examine the company's accounts and equipment, said that he was of the opinion that the total amount set forth in the company's petition was properly chargeable to capital, except $907.32, representing a part of the Federal excise tax paid by the company for certain equipment. This amount, Professor Breed, said should have been deducted by the company from its tax returns, thereby decreasing its operating expenses. The petition was accordingly amended to conform to the recommendations.

In touching on the value of the traction company, Professor Breed stated that if the property was worth $22,000,000 in 1920 at the time of the reorganization he believed that a fair value now is at least $25,000,000.

The only items that Professor Breed would not approve as proper to be charged to capital account were those including Federal excise taxes on buses, trucks and equipment. This total is given as $7,258.58. The company, he said, can claim a reduction from taxable income of this full amount, but as the income tax is 12½ per cent of taxable income, the company's operating expenses are reduced by this item only 12½ per cent. That part of the tax, $907.32, is operating expense, he stated, and the balance chargeable to capital account.

In speaking of the depreciation set up by the company, approximating $700,000 a year, Professor Breed said that it compared favorably with similar accounts approved by other state commissions on well-managed properties.

In conclusion, Professor Breed said:

> I therefore conclude that these new acquirements have been clearly for the increase of necessary facilities, both in amount and in type and quality, and that $2,079,227 is properly chargeable to capital account within the meaning of the act under which the petition is brought.

H. B. Shaftoe, comptroller of the company, revised the proposed stock and bond issues to conform to the change suggested by Professor Breed. His figures showed that a twenty-five year 6 per cent prior lien gold bond issue totaling $1,455,000 would be made and that the capital stock issue would be placed at $624,200. As indicated previously, these figures were approved by the commission.

Receiver Appointed for New York & Long Island Traction

Charles L. Addison, president of the company, has been appointed receiver of the New York & Long Island Traction Company, Hempstead, N. Y. The appointment was made in the Queens Supreme Court on Dec. 21 by Justice Van Siclen on the contingency that operation of the line is to be kept up.

The appointment of Mr. Addison as a receiver followed the serving of a summons and complaint upon officials of the railway in an action brought in the Nassau Supreme Court by Lincoln C. Andrews, receiver of the New York & Queens County Railway.

Several weeks ago the receiver of the New York & Queens Railway obtained an order directing the First National Bank of Hempstead, the depository of the funds of the New York & Long Island Traction Company, to pay to the Queens company receiver $29,107, money owed to the New York & Queens company for a number of years. An examination of the company's financial status in supplementary proceedings brought out the fact that the company is not financially sound and Mr. Andrews immediately began an action to have a receiver appointed. In addition it is alleged that several other large judgments are outstanding against the company.

No Intention of Abandonment by West Virginia Road

The Sistersville & New Martinsville Traction Company, Sistersville, W. Va., has no intention of discontinuing operation between Sistersville and New Martinsville. Information published in the ELECTRIC RAILWAY JOURNAL for Oct. 27 to the effect that such suspension of service was being sought is learned now to be without any foundation in fact. As a matter of fact, the company has purchased three new cars of the latest type and equipment and they are expected to be delivered by Feb. 1, 1924. The Sistersville & New Martinsville Traction Company is the successor of the Union Traction Company and it operates over the same right-of-way and through the same communities in which that company operated for several years, until purchased and reorganized in July, 1919, since which time the property has been rebuilt and put in good operating condition.

Readjustment Terms Announced

United Light & Railways States Conditions of Security Exchange Now Pending

In addition to dropping the name of "Railways" and substituting that of "Power" and incorporating under the laws of Maryland instead of those of Maine, the financial readjustment plan of the United Light & Railways Company, Grand Rapids, Mich., provides for the issue by the company of two classes of preferred and two classes of common stocks.

The proposed plan narrows the control of the company by dividing the present common stock into two classes and giving voting power to only one of these classes.

It gives owners of first preferred a 6½ per cent issue instead of the 6 per cent stock they hold at the present time. The new stock is Class A preferred, to be exchanged share for share, callable at $105 a share, cumulative, with preference in liquidation and in dividends over all other classes of stocks of the company, entitled to receive $100 and all accumulated dividends in event of liquidation.

Present holders of participating preferred, a 7 per cent issue which has been paying an extra dividend of 1 per cent this year, receive the new Class B preferred, two of the new for one share of the old. The new Class B pays $3.50 per share per annum, quarterly, cumulative, participating to the extent of 50 cents per annum per share whenever common stock pays at the rate of more than $1.40 per share per annum. As the new common will probably be started off on the basis of $1.60 per annum for the first quarter it appears that the Class B would net 8 per cent actually as does its equivalent, the present participating preferred. The new Class B is to have preference in liquidation and dividends over all classes of common, callable at $60 per share, holders to receive $50 per share and accumulated dividends in case of liquidation.

Common stockholders, for each share of the present issue, are to receive three shares of the new Class A common, two shares of the new class B common and an optional purchase warrant entitling the holder to buy one share of class A common at $35 a share any time before Dec. 31, 1925. Class A and Class B common is to be in all respects the same except that Class B has the sole voting rights.

These common stocks will receive the first quarterly dividend by May 1, 1924, to be at the rate of $1.60 per annum.

Of the four new stocks there are authorized 500,000 shares of Class A preferred, no par value; 500,000 shares of Class B preferred, no par value; 250,000 shares of Class A (non-voting) common no par value, and 250 000 shares of Class B common, sole voting, no par value.

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Good Showing by I. R. T.

New York Company Succeeded in Cutting Deficit in Net Corporate Income from $2,766,798 to $131,795

The annual report of the Interborough Rapid Transit Company, New York, for the fiscal year ended June 30, 1923, shows a net operating income deficit of $131,794. This, however, is an improvement of $2,635,002 over the year before.

The more favorable results in net corporate income for the year were brought about largely by a decrease of $2,490,000 in the dividend rental paid for use of the elevated lines, together with a net reduction of $184,937 in interest on various securities and all other income deductions.

COMPARATIVE STATEMENT OF INCOME ACCOUNT OF INTERBOROUGH RAPID TRANSIT COMPANY

Year ended June 30	1923	1922
Gross operating revenue...	$55,559,435	$53,540,859
Operating expenses.....	34,392,508	32,272,509
Net operating revenue..	$21,166,927	$21,268,350
Taxes.....	2,662,316	2,802,824
Income from operation.	$18,504,616	$18,465,526
Non-operating income....	573,850	652,875
Gross income.....	$19,078,466	$19,118,401
Income deductions.....	19,210,261	21,885,199
Net corporate income for the year.....	*$131,795*	*$2,766,798*
Add:		
*Surplus, June 30, 1922, and June 30, 1921...	*$524,866*	$2,242,878
Other credits, net.....	145,638	19,343
Totals.....	*$511,025*	*$504,575*
Appropriated for:		
Miscellaneous charges..	$13,759	$20,290
Total appropriations...	$13,759	$20,290
*Profit and loss.....	*$524,783*	*$524,866*

* Stated exclusive of accruals under Contract No. 3 and related certificates payable from future earnings.

The percentage of expenses to earnings at which the company operated was 61.90. The number of passengers carried was 1,025,175,131. This figure includes 155,786 half-fare (2½ cent) passengers made up of school children handled during the New York City Jubilee from June 4 to June 22. The daily average of passengers carried increased 86,801, but the total of passengers carried on the "L" lines for the two years differed only between the figure of 348,524,700 for the 1923 year and 348,517,216 for the 1922 year, or only 7,484 passengers. This small increase, however, compared with a very substantial decrease in the previous year indicates that the falling off in the elevated travel has terminated.

Gross operating revenue for the year was a gain of $2,018,576, the result of a gain on the subway division of $1,701,417, and a gain on the elevated railway division of $317,159.

The gain in the revenue from the transportation of passengers was $1,577,759 and the increase in the other street railway operating revenue (principally from the sale of power) $440,817.

Operating expenses increased $2,119,999, of which $1,590,714 was on the subway division and $529,285 on the elevated division, the increase being due substantially to cost of additional train service and an increase in the cost of coal, but lessened by the savings due to use of multiple-unit door control on subway cars and of automatic turnstiles on stations.

During the year $9,305,846 was spent for maintaining the structure, roadway, power houses, electrical equipment and rolling stock in good operating condition.

For additions and betterments to the property $4,086,621 was spent during the past year. This sum includes the company's contribution toward new construction and equipment and expenditures in the acquisition of 100 new subway steel trailer cars.

Of the increase in transportation and traffic expenses the sum of $1,343,622 was in the item of "fuel for power," reflecting the high cost of fuel during the year as well as the additional coal required due to the strike in the summer of 1922.

Expenditures for maintenance and improvements were unusually large. Considerable replacing and reinforcing work, together with other miscellaneous repairs and improvements, was performed on the elevated structure, always keeping it up to the standard required for safe and economical operation.

The $19,210,261 of income deductions was made up of the following items:

STATEMENT OF INCOME DEDUCTIONS OF INTERBOROUGH RAPID TRANSIT COMPANY

Interest and sinking fund on city bonds.	$2,584,035
Interest on Interborough Rapid Transit Company first and refunding mortgage 5 per cent gold bonds.....	8,032,090
Sinking fund on Interborough Rapid Transit Company first and refunding mortgage 5 per cent gold bonds....	2,136,051
*Interest on ten-year 7 per cent notes...	2,303,076
Interest on ten-year 6 per cent notes....	65,146
Interest on equipment trust certificates, series "A".....	389
Interest on Manhattan Railway consolidated mortgage 4 per cent bonds..	1,627,320
Interest on Manhattan Railway second mortgage 4 per cent bonds.....	180,920
Manhattan Railway rental (organization).....	50,000
Dividend rental on Manhattan Railway capital stock.....	1,710,000
Interest on unfunded debt.....	175,901
Other rent deductions.....	295,653
Interest on investment of depreciation reserve.....	48,800
Amortization of debt discount and expense on Manhattan Railway second mortgage 4 per cent bonds....	880
Total income deductions.....	$19,210,261
Per cent expenses to earnings.....	61.90
Passengers carried.....	†1,025,175,131

* Includes interest on three-year 7 per cent notes from July 1 to Sept. 1, 1923.

† Includes 155,786 half-fare (2½-cent) passengers—school children, during New York City Jubilee June 4 to June 22, 1923.

The increase in service to the company's schedule during the year made necessary large improvements and additions to the power house equipment. As for cars 100 new subway trailers have been received for additional service. In this connection it is explained that since the period covered by the report, the 100 cars just mentioned have been put into service and that 100 additional motor cars have been ordered for the subway.

Detroit Compensation Fixed

Report Presented by Arbitrators Appointed to Adjust Charges Between Municipal and Private Line

The findings of the board of arbitrators, appointed in accordance with the purchase contract between the city of Detroit and the Detroit United Railway when the city took over the Detroit United lines to decide what the company should pay the city for the use of tracks of the municipal railway and what the city should pay the Detroit United Railway for power and for the use of Detroit United Railway tracks will reduce the estimated net income of the municipal system approximately 50 per cent. Many complications were met by the arbitrators, and it is the opinion of some of the officials that the award will affect the municipal railway department's program for maintenance, rehabilitation and reconstruction in the future.

The first session of the board was held on Jan. 4, 1923. Since then the board has been in session eighty-six days. A voluminous record was taken. Many witnesses were called and numerous exhibits of statistics, operating costs and valuations were introduced. The findings of the board were unanimous. More than fifty factors were found to have a bearing in the case. The rules established provide that the company shall pay a rental including a proportion of the joint operating expenses, maintenance and replacement of property; a proportion of the taxes, of replacement reserves, interest on the investment in the fixed property and interest on the working capital used in the business.

Either a ton-mile or car-mile basis was used in figuring the operation of D. S. R. and D. U. R. cars over the tracks employed for joint operation. The fact the D. S. R. cars had an average weight of seventeen tons each and the D. U. R. interurban cars had an approximate average weight of twenty tons each was considered in estimating the amount of damage to roadbeds, the ton-mile unit being used to differentiate between the two classes of cars in the division of costs.

As a result of the award in the arbitration, auditors for the municipal system have started to compute the net earnings of the lines since the city took them over in May, 1922. Each month since May, 1922, the reports of earnings have included an estimate of the rental the D. U. R. would pay the city. This rental as decided by the arbitrators is more than 50 per cent less than the estimates carried from month to month.

It is estimated that the net income of the municipal railway for the fiscal year ended June 30, last, may be reduced from approximately $938,000 to $365,000 owing to the fact that the rentals were estimated at figures greatly in excess of the terms named in the award. It was further announced that the sum of $476,035 was due the city, being the balance between the

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sum of $549,962, which the company owed the city for the use of D. S. R. tracks for the fiscal year, and the $17,297 due the D. U. R. for the use of its tracks, and $56,629 the city owed the company for power used.

Provision for a sliding scale, or flexible compensation, was included in the report of the arbitrators covering the period since last July and retroactive to that month. Separate books will be kept by the company and the city and bills will be rendered monthly and rules established by the arbitrators will be followed by the auditors in determining what each party owes the other on track rental account.

The board of arbitrators was made up of the following members: William E. Davis, Cleveland, chairman; Prof. Henry E. Riggs of the University of Michigan, representing the company, and H. M. Gould, electrical engineer of the D. S. R., representing the city.

Bids for Massachusetts Properties Rejected

With the authority of the Massachusetts Supreme Court, D. P. Abercrombie, receiver for the Northern Massachusetts Street Railway, has rejected all bids submitted for properties of the company, which was ordered to suspend service on Dec. 31 and sell its holdings. The receiver was thereupon authorized to dispose of the properties by private sale at the best terms feasible.

An extension of time was granted for operating the section between Athol and Orange on pledges from fifty citizens of the two towns to make good any losses that might be incurred in operating the road up to March 31. Stock subscriptions to purchase this stretch of road will meanwhile be solicited, a substantial start having already been made on the enterprise.

On the day that this decision was reached by the court, announcement was made of the purchase of the section from Gardner to Templeton by a New York agent said to have acquired the line for a local company in process of formation, at a price much higher than that represented by the bid previously submitted. Included in this deal is a portion of the main line running from Reilly's switch in Templeton through East Templeton and West Gardner to South Gardner, and the branch line from Baldwinville through Otter River to East Templeton. The situation has been complicated, however, by the action of the City Council of Gardner in granting a license to the Flanagan Bus Company to operate buses from Gardner to Fitchburg by way of Westminster, and also of Templeton, East Templeton, Baldwinville and Otter River. This vote was taken on Dec. 28, immediately after the purchase of the railway property was announced.

There has been a great deal of sentiment in Gardner in favor of buses, whereas the prevailing sentiment in Templeton is strongly favorable to the trolleys as best meeting the needs of that town. The outcome of the Gardner-Templeton situation is not yet clear.

Of the Connecticut Valley Street Railway's lines, also offered for sale by Mr. Abercrombie as receiver, and on which service is ordered to be discontinued on March 31, the prospect is that the line from Northampton to Amherst will be kept running either through purchase in the meantime or pledges of local citizens to make good any losses pending satisfactory arrangements for operation by some other concern. At a meeting of the Northampton City Council on Dec. 27 a proposal for joint operation with the town of Hatfield of the line from Northampton to Hatfield under the transportation area plan was rejected. This action followed a citizens' mass meeting at which sentiments strongly adverse to this proposal were expressed. The prospect is, therefore, that the entire line between Northampton and Greenfield, by way of Hatfield and Deerfield, will cease to operate by March 31.

Auction Sales in New York.—At the public auction rooms of A. H. Muller & Sons there were no sales of electric railway securities this week.

Stock Increased for Purpose of Exchange.—The authorized and outstanding capital stock of the Charleston Interurban Railroad, Charleston, W. Va., has been increased from $1,500,000 to $3,000,000. The new stock is all preferred. It will be used in part, it is said, in carrying out an exchange for the stock of the Kanawha Valley Traction Company and the Charleston-Dunbar Traction Company, both of which the Charleston Interurban now operates under lease.

Net Income Increases. — For the eleven months ended Nov. 30, 1923, the Philadelphia Rapid Transit Company reports a net income of $1,890,729, against $1,850,259 for the same period a year ago. There were 837,033,668 passengers carried in the eleven months of the past year, which represents an increase of 64,058,332 over the traffic for the first eleven months of 1922. The passenger revenue increased from $37,937,833 for the 1922 period to $40,275,327 for the period from January through November, 1923.

Net Income Increases.—The Brooklyn City Railroad for the five months ended Nov. 30, 1923, reports a passenger revenue of $4,880,417, against $4,861,766 for the same period a year ago. Operating expenses and taxes showed an increase of from $4,016,433 for the period ended Nov. 30, 1922, to $4,048,268 for the same period of the past year. The net corporate income of 1923 for the five months ended Nov. 30 was $792,341. For the five months ended November, 1922, the net income was $783,016.

Discontinuance Allowed.—The New Hampshire Public Service Commission recently authorized the Massachusetts Northeastern Street Railway to discontinue service between Salem (N. H.), Pelham and Hudson and Taylor's Falls Bridge in Nashua. The award of the commission will permit the company to discontinue the service between Nashua and Lowell and Nashua and Lawrence. Fourteen miles of track are affected by the decision. The decision of the commission provides that the property shall be sold to the Nashua Street Railway or any other purchaser if the purchaser will pay as much for it as may be obtained by scrapping the road. In the petition to the commission by the Massachusetts Northeastern Company it was stated that the branch was not earning operating expenses.

Receiver Appointed.—An order placing the Alamance Railway, Burlington, N. C., in receiver's hands has been signed by Federal Judge E. Yates Webb upon petition of the American Trust Company of Richmond, Va. J. H. Bridges of Burlington is named receiver. The receivership is a result of defaulted payment of interest on $120,000 in bonds held by the petitioner. The receiver is authorized to continue the operation of the line connecting Burlington, Graham and Haw River. The line is 8 miles long.

Power House Property Sold.—After many postponements, the power house property of the New York Railways at First Avenue and Ninety-fifth Street and the North River, New York, was sold on Jan. 2 in foreclosure proceedings to the New York Edison Company at the upset price of $800,000. The sale must be confirmed by the court. The plant will eventually be modernized and used by the Edison company.

Committee on Consolidation Appointed.—Joseph Gilfillan and John J. Sullivan were appointed as a committee to represent the Union Traction Company in conferences to be held with the committee already appointed by the Philadelphia Rapid Transit Company and to be appointed by the Philadelphia Traction Company relative to the proposal for the consolidation of the street railway companies in Philadelphia. The meeting of Philadelphia Traction has been delayed, it is understood, due to slight illness of Joseph E. Widener. Recently Mr. Gilfillan, in a letter to the Philadelphia companies, pointed out that a plan looking to a simplification of the present corporate structure should be in the direction of a consolidated ownership of all lines in one corporation.

New Director Named.—Following a meeting of the Co-operative Welfare Association of the Philadelphia Rapid Transit Company, J. Morris Massey was unanimously chosen president for next year. By virtue of his office he will represent the employees on the company's directorate. Mr. Massey has worked for the Philadelphia company for the last twenty-eight years and is now a clerk in the Callowhill Street carhouse of the company. As head of the Welfare Association he succeeds Ralph R. Nyman.

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Traffic and Transportation

Jitney Ordinance Unconstitutional

Regulatory Measure Enacted at Detroit, Long in Litigation, Ruled Against by Circuit Court

The jitney ordinance at Detroit was declared unconstitutional by Circuit Judge Ormond F. Hunt in a decision handed down on Dec. 29. The court also made permanent the injunction restraining the city and its officers from enforcing the ordinance. The court opinion stated that the ordinance was unreasonable from the viewpoint of public demand and general welfare, in excluding jitneys from the main streets and allowing other forms of transportation to use them, and that it was not a regulation but a prohibition of jitney service, which is inconsistent in view of the license granted by the ordinance. The jitney measure, intended to bar jitneys from the main traffic arteries, was passed by the City Council in May, 1922. It was to have become effective in the month of October, that year.

A New Measure Planned

It has been announced by Richard I. Lawson, Corporation Counsel for the city, that a new ordinance will be prepared for submission to the Council covering similar ground but intended to surmount the legal obstacles which the court has ruled exist in the 1922 measure. In view of the victory won in the court, Attorney Edward N. Barnard announced that the two jitney organizations, the Red Star Motor Drivers' Association and the Blue Ribbon Auto Drivers' Association, intend to buy 100 new cars at once and generally improve their service.

In reviewing the case it was cited that the ordinance was passed by the Council mainly at the request of James W. Inches, former Police Commissioner. The ordinance was approved by the old Council and it is believed that the popularity of the jitney has been proved to such an extent that the present Council is of different mind toward jitney transportation. Before the ordinance was put into effect the jitney drivers' association petitioned for an injunction restraining the city from enforcing the ordinance and a temporary injunction was granted by Circuit Judge Moynihan. Testimony on the petition for a permanent injunction was taken from June 5 to July 13 and from Sept. 24 to Nov. 2. About seventy-five witnesses were questioned. In the meantime the jitney drivers continued to operate under their 1922 licenses.

The court said that the jitney ordinance must be construed as reasonable or unreasonable, as related to the problem of transportation in its major and not in its minor aspects. In other words, the question to be considered was: Would the enforcement of the ordinance as passed "promote the general welfare," the last phrase being quoted from the preamble to the Constitution of the United States?

The court recognized that the streets of Detroit, when they were laid out, were not designed to accommodate motor vehicle traffic, but said that only by the use of the surface by every known method of transportation could anything like an adequate and proper service be afforded. In other words, until Detroit had either a subway or an elevated line the general welfare demanded greater public service transportation facilities and not fewer.

In enacting the jitney ordinance the Council, so the court ruled, by implication of law, recognized the need of jitney service. Moreover, the need was confirmed by the testimony in the case.

The effect of the enforcement of the ordinance, excluding jitneys from the use of all the main arteries of travel, including parks and boulevards, would not be a regulation, but a prohibition of jitney service, a result not only inconsistent with the license granted therein, but unreasonable from the viewpoint of public demands and general welfare.

The court said that taking into consideration all the facts, circumstances and conditions of Detroit in relation to the demands for transportation, and the facilities for meeting that demand, the ordinance is in contravention of Section 28, Article 9 of the Constitution, which limits the authority and power of cities over their streets to "reasonable control."

Discrimination Is Unfair

It was held that the testimony showed that a seven-passenger automobile of standard model operated as a jitney was not in itself, or as operated, more dangerous than a motor vehicle privately operated. The court expressed the belief that to license buses and taxicabs to use all the streets, parks and boulevards, and at the same time exclude an ordinary automobile, called a jitney, from using the street, was discriminatory, class legislation and in contravention of Section 1, Article 2 of the Constitution of the State of Michigan, which provides:

"All political power is inherent in the people. Government is instituted for their equal benefit, security and protection."

Lower Fares in Effect.—The Des Moines City Railway accepted a fare of 7 cents from passengers on Dec. 27, a reduction of 1 cent over the rate in effect since Dec. 22, 1922. The points leading up to the fare cut were explained in the ELECTRIC RAILWAY JOURNAL, issue of Dec. 29.

Traffic Relief in Kansas City, Mo., Urged

The business men of Kansas City, Mo., are agitating for relief from the downtown congestion of traffic and for more convenient means for those people who live upon the boulevards to reach the shops. With 60,000 motor cars in the city a barricade of congestion has been thrown around the downtown business district. Parking rules are made and then remade. Still the traffic becomes more and more of a problem.

A committee has been appointed with J. Logan Jones as chairman, to make a survey of motor buses with the idea of introducing them in Kansas City, not only to relieve the congestion and to make the retail district more accessible to the shopper, but also to simplify crosstown travel. Mr. Jones has just returned from a trip east and is very enthusiastic about the idea of using the bus in Kansas City, not instead of the street car, but to work in conjunction with it, for he feels that in a city the size of Kansas City and doing the amount of business done there both the motor bus and the street car will be needed in order comfortably to handle the downtown crowds.

The business men feel that the street railway is the logical agency to operate the bus.

There are three types of bus service which Mr. Jones will outline to the business men of the Business District League:

1. A broad, comprehensive system of buses under a well-financed central management, covering the interurban territory in every direction in which good roads lead from Kansas City.
2. Intercity service between Kansas City, Mo., and Kansas City, Kan.
3. A Kansas City, Mo., service that would place buses on the boulevards and the main avenues.

It is anticipated that many people would patronize the bus who do not at present use the street car and are not likely to use the street car in the future. Most of these people either use their own motor car or else patronize the taxis.

It is felt by the business men that a broad plan of interurban, intercity and city bus lines would mean an increase by a third or a half of the shopping crowds in the retail district of Kansas City.

Jitneys Eliminated in Mobile

An ordinance adopted by the City Commissioners of Mobile, Ala., practically eliminates the jitneys from the streets. The ordinance was adopted Dec. 29. The vote on the adoption of the ordinance was two to one; Mayor Taylor and Commissioner Crawford voting for the ordinance and Commissioner Hartwell voting against it. The ordinance requires heavy indemnity bonds of the jitney owners. In fact these bonds are so heavy that it is said jitney owners will not be able to make them. Under the new ordinance the city will have the right to issue what will be known as "certificates of conveyance," under which buses can be

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operated to sections not covered by street car lines of the Mobile Light & Railroad Company. In the opinion of the City Commissioners the streets of Mobile will soon be cleared of the jitneys under this new ordinance.

Theater Schedule Successful. — The Indianapolis & Cincinnati Traction Company has recently put into effect a theater schedule from Connersville, Rushville and any intervening point to Indianapolis at one fare for the round trip. It was first advertised that if the patronage were sufficient the reduced fares and train schedules would maintain throughout the theatrical season. The new ruling permits a passenger to board any car after 2:30 o'clock in the afternoon for Indianapolis, attend the theater and return on the cars leaving Indianapolis at 9 o'clock or 11 o'clock. Results attained under this arrangement have been very satisfactory to the railway management. These fares and train schedules will be maintained during the present theatrical season. The company's plan was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Dec. 8.

New Ticket Fare in Effect.—The Tri-City Railway, Davenport, Iowa, is now selling tickets at the rate of fifteen for $1. The new fare went into effect on Jan. 1.

Will Discuss Transportation Problems.—Residents of the Irvington district of Portland, Ore., will make a concerted effort to obtain transportation facilities contiguous to the new Grant High School. The nearest car line to the new school is now eleven blocks away. At a community meeting to be held Jan. 21, President Franklin T. Griffith of the Portland Railway, Light & Power Company will send a representative of the company to meet with the Irvington Club and discuss transportation problems.

Splendid Safety Record.—The Nashville Railway & Light Company, Nashville, Tenn., is very proud of its safety record. During the year 1923 there were six different days in which no accident of any character whatever occurred. This means that all cars on the twenty-one local lines were piloted through Nashville's congested thoroughfares a total of 90,000 miles without even a minor mishap. Statistics compiled by the company show that ten motormen and conductors on the Meridian Street line hold the record of operating 30,000 miles without an accident. These gratifying results are attributed by the company to the persistent and steady safety campaign which has been carried on among the employees.

Buses in Operation.—Six buses have been placed in operation along Bailey Avenue in Buffalo by the International Bus Corporation, a subsidiary of the International Railway. A 7-cent fare or four tokens for 25 cents with free transfers is charged.

Passes in Case for Gifts. — The Tacoma Railway & Power Company, Tacoma, Wash., in order to stimulate the sale of its railway passes during the pre-Christmas period, placed on sale at various stores and theaters in Tacoma a leatherette pass holder, containing five certificates which are redeemable for weekly passes, and selling the case and certificates for $5. The holder and passes were suggested as suitable Christmas gifts.

Will Start Bus Operation. — The Lewistown & Reedsville Electric Railway, Lewistown, Pa., will start a bus service early in January, buses being purchased to be used for city traffic and interurban traffic to act as feeders for the traction line. The buses will carry twenty-one passengers, the cars now being especially fitted for passenger service to the Grove City, Pa., factory. The bus fare will be 6 cents, with transfer privileges to the trolley cars.

Bus Line Absorbed by Railway.—The West Penn Company, Pittsburgh, Pa., has purchased the Marietta (Ohio) Bus Company and it will, under the West Penn operation, be known as the Pioneer Transport Company. The new company will start operating buses early this year. The Marietta Bus Company owned five buses, which will now become the property of the new company. It is planned to use three of these buses for operation in connection with the city railway lines for part of the route over which they are operated, but they will be so scheduled that they come in between the scheduled headway of the street cars. The present rate of fare charged on the buses is four tickets for 25 cents and 7 cents cash. The rate on the street cars is 7 cents cash without the use of any reduced fare ticket.

Legal Notes

NEW JERSEY—*Quasi Public Corporation Must Perform Duties to Public.*

Where a mandamus is sought in a court of law to compel a public utility corporation to perform its duty to the public, the court of chancery will enjoin the performance of that duty pending the suit at law. It is not a defense that the company cannot operate at a profit; that is not the test; the duty resting upon a quasi public corporation must be performed, or its privileges and franchises must be surrendered; it cannot discharge its duty on and off, as it may find it profitable to do so. If the company does not obey the mandate of the court a receiver may be appointed. Mandamus is the proper remedy to compel a street railway company to operate its road for the benefit of the public. [McCran, Atty. Gen., vs. Public Service Ry. Co., 122 Atlantic Rep., 205.]*

NEW YORK—*Where Pedestrian Was Clearly Negligent a Charge Referring to Possible Error of Judgment Held Inapplicable.*

Where the defendant requested a charge that, if the jury found that plaintiff stepped in front of defendant's street car when it was going 9 or 10 m.p.h. and when it was only 10 ft. away at a point not at a street crossing, she was guilty of contributory negligence as a matter of law, and their verdict must be for defendant, and the court in response to the request, charged the jury so to find if they found it was negligent for her to do it, it was error for the court to add that it was for the jury to say whether plaintiff's act in pausing momentarily on the rail was a negligent act or merely an error of judgment. In this case there was no place for excuse of error of judgment. [Ford vs. New York City Interborough Ry. Co., 140 Northeast. Rep., 720.]

OHIO—*Warnings of Dangers of Automobile Traffic Not Necessary.*

It is not the duty of a conductor or motorman to warn passengers, upon leaving a street car at a regular stop, of the danger of automobile traffic in a city street, and failure to caution such passenger so will not render the company liable for injuries caused by an automobile passing the car at an excessive rate of speed, and striking the passenger after he had alighted from the street car in safety. [Reining vs. Northern Ohio Traction & Light Co., 140 Northeast. Rep., 84.]

MISSOURI—*Negligence of Passenger in Automobile. Action for Death of Wife.*

In a wife's action for injuries in a collision between a street car and an automobile driven by her husband, where there was evidence that she was sitting on the front seat and was fully conversant with all that occurred, and she testified as to the rate of speed at which the street car and the automobile were traveling, the court properly refused an instruction authorizing recovery, though she might not have exercised reasonable care, and properly told the jury that they must find she was exercising reasonable care.

Where the wife dies as the result of such injuries, the administrator cannot maintain an action for her death where she left a husband and minor children surviving her, but if the death was due to other causes than the injury, the administrator can bring action and recover the same damages which the wife could have recovered if she had lived. [Longan vs. Kansas City Railways, 153 Southwest. Rep. 758.]

*This decision was published in full in ELECTRIC RAILWAY JOURNAL, issue of Sept. 22, page 461.

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Personal Items

Gordon Campbell Retires

Gordon Campbell, president of the York Railways, York, Pa., will retire on Jan. 14. Mr. Campbell came to York Sept. 1, 1908, as vice-president and general manager of the company. In January, 1910, he was made president.

Mr. Campbell expressed the warmest appreciation of the many evidences of fairness which the company has received at the hands of public officials, the press and the citizens of York, which have materially contributed to bringing about the present excellent railway, lighting and power and steam service to the public. He also commended to York in the highest terms the loyal and efficient staff of the company, to which he gives the credit for such measures of success as he has had in his management. He understands that the property will be managed by Day & Zimmermann of Philadelphia.

Under his management, the revenue of the railway company has grown from $527,000 in 1908 to $2,000,000 in 1923, railway receipts from $388,000 to $952,000 and the light and power and steam receipts from $116,000 to $983,000.

More than $2,500,000 has been expended in improvements during Mr. Campbell's régime. All of York's railway lines have been reconstructed and new cars have been purchased.

He was graduated as mechanical engineer from Stevens Institute in 1886 and entered the railway field as a draftsman at the Denver shops of the Union Pacific Railway shortly thereafter. Subsequently he became superintendent of the Colfax Electric Railway, Denver; purchasing agent and master mechanic of the North Jersey Street Railway, Newark, N. J.; general superintendent of the railways in Providence, R. I., now operated by the United Electric Railways, and purchasing agent of the Washington Railway & Electric Company, Washington, D. C. This was followed by his connection in August, 1908, with the York Railways as vice-president and general manager, that position having been retained until he was promoted to the presidency of the York company. In June, 1918, he was elected president of the Pennsylvania Street Railway Association and served in that capacity for two years.

After a short rest Mr. Campbell proposes to devote himself to the study of public utility problems on a larger scale.

G. O. Nicolai has been appointed general manager of the Terre Haute division of the Terre Haute, Indianapolis & Eastern Traction Company, succeeding E. M. Walker, who resigned recently to accept the presidency of the Schenectady Railway. Mr. Nicolai was formerly superintendent of the light and power division of the Terre Haute Traction & Light Company.

Byron E. Bramble Appointed Comptroller of Illinois Property

Byron E. Bramble has been appointed comptroller of the Illinois Power & Light Corporation and the North American Light & Power Company, with headquarters at Chicago, according to an announcement made by William A. Baehr, vice-president and general manager of the company.

Mr. Bramble was born at Decatur, Ill. After leaving school his first position was in the capacity of meter reader and clerk in the employ of the Decatur Gas & Electric Company.

B. E. Bramble

In 1904 the Decatur Gas & Electric Company became the property of the Illinois Traction Company and was one of the first public utility companies in Illinois taken over by the company, later to be known in Illinois as the McKinley system. In 1905 Mr. Bramble was transferred to the Champaign office of the company and became general auditor of the system. When the McKinley and Studebaker interests were merged in June, 1923, as the Illinois Power & Light Corporation. Mr. Bramble remained at Champaign as general auditor of the new corporation.

He is succeeded as auditor by his former first assistant, L. L. Campbell, Champaign, Ill.

C. P. Taylor, heretofore assistant superintendent of terminals at Norfolk, Va., for the Norfolk & Western Railway, has been appointed chief electrical engineer. He will be succeeded in his former position by B. L. Thompson.

Henry Grant with Tacoma Interurban

Henry Grant, superintendent for the Stone & Webster interests centering in Everett, Wash., has been promoted to the superintendency of the Tacoma interurban and allied lines, assuming his duties Jan. 1. Mr. Grant has been transportation head in Everett since May, 1919, upon his release from the U. S. Army service, in which he served as captain. During his service in Everett he supervised the transfer of the Everett traction lines from electric driven rail lines to motor buses. Mr. Grant will be succeeded by C. C. Coates, former assistant railway superintendent of the Stone & Webster interests in Everett.

C. C. Brown has been promoted from chief clerk of the accounting department of the New York State Railways at Rochester to the auditorship of the Utica-Oneida-Syracuse lines. In 1904 Mr. Brown entered the employ of the Rochester & Eastern as construction engineer. That same year he was appointed general freight and express agent, which position he held for about two years. In February, 1907, on the changing of the ownership of the road, he was placed in charge of the Canandaigua office, where he remained until 1909, when he was transferred to the Rochester office. In August, 1919, he was appointed chief clerk by J. M. Joel and has served in that capacity up until the time of his promotion on Dec. 1 of last year. His headquarters are at Utica.

Obituary

James Adkins, secretary and treasurer of the United Railways Company of St. Louis and its predecessors for the past thirty-three years, died on Dec. 25. For years he had the reputation of being the worker with the longest day at the United Railways headquarters. Mr. Adkins was seventy-two years old. In 1890 he became secretary and treasurer of the old Lindell Railway and continued in that position with the St. Louis Transit Company and later with the United Railways. He was also president of the United Railways Savings & Loan Association.

Edward Preston Usher, active in electrical invention in New England in the earlier days of the industry, died at Grafton, Mass., on Dec. 26. He was born at Lynn, Mass., in 1851, and about thirty years ago became president of the Milford & Hopedale Street Railway, where he invented a storage battery for street car propulsion which attained considerable success until its displacement by the overhead trolley system. His patents were later used in general storage battery manufacture and were sustained in prolonged litigation between the Brush Electric Company and the Hopedale Electric Company, the latter being formed to exploit the Usher apparatus.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Progress of Industrial Standardization

An appeal to manufacturers throughout the country to give more attention to the elimination of excess varieties during 1924 is contained in a pamphlet just issued by the Fabricated Production Department of the Chamber of Commerce of the United States. The department suggests that manufacturers who have not already done so undertake to simplify and standardize their products at the next inventory.

During the past year industrial standardization has continued to develop as one of the most active and important phases of American industry. Progress has been made in the standardization of raw materials, manufacturing processes and finished products. This is equally true whether looked at from the point of view of the factory, of the industrial or technical association or of a national movement. More than 150 undertakings now have official status before the American Engineering Standards Committee, the national clearing house for standardization. Fifty standards have received final approval by the committee, twenty-two of which were approved during 1923.

By the elimination of excess varieties which manufacturers are producing and carrying in stock the annual inventory can be more easily made.

Increased facility of inventory taking is only one of the manifold benefits and savings that accrue from a simplification and standardization project. For instance, such items as raw materials, purchased parts, component parts, finished product, cartons and packing cases are all amenable to the simplified practice treatment.

The dealer benefits through the reduced number of lines with their repair and accessory parts which he must carry in stock, the ultimate consumer finds the ready interchangeability of parts on his several machines of immense value and the supplier of raw materials experiences a substantial improvement in the facility with which his orders are processed and handled.

Large Increase in Copper Output

Smelter production of copper in 1923, as determined by the Department of the Interior from reports of the smelters showing the actual production for eleven months and the estimated production in December, was about 1,477,000,000 lb., compared with 950,000,000 lb. in 1922, an increase of slightly over 55 per cent. The smelter production of copper for December, as estimated by the producing companies, was 132,000,000 lb., or at the rate of about 1,584,000,000 lb. a year.

Production of new refined copper from domestic sources was about 1,435,000,000 lb., compared with 905,000,000 lb. in 1922. In 1923 the production of new refined copper from domestic and foreign sources plus the imports of refined copper amounted to about 2,118,000,000 lb., compared with 1,359,000,000 lb. in 1922. In addition to the output of new refined copper about 130,000,000 lb. of secondary copper was produced at the refineries, compared with 146,000,000 lb. in 1922, so that the total output of refined copper was about 2,248,000,000 lb. in 1923 and 1,505,000,000 lb. in 1922.

Stocks of refined copper in the hands of domestic refineries on Dec. 31, 1923, as estimated by the refining companies, were about 256,000,000 lb., compared with 216,000,000 lb. on Dec. 31, 1922. The stocks of blister copper and material in process of refining, in the hands of the smelters, in transit to refineries and at refineries on Dec. 31, 1923, were estimated by smelting and refining companies at about 490,000,000 lb., compared with 361,000,000 lb. on Dec. 31, 1922. The quantity of primary refined copper withdrawn on domestic account in 1923 was about 1,305,000,000 lb., compared with 897,000,000 lb. in 1922.

Outlook for Business Good

By John F. Ohmer
President Ohmer Fare Register Company, Dayton, Ohio

Industrial, financial and mercantile activities in the year of 1923, the fifth year after the World War, were without precedent. The production of our mines and forests was severely taxed to supply material for fabrication into commodities of every description. The requirements for steam and electric rolling stock taxed the capacity of car shops, and the automotive industry has had unlimited growth. No production has compared with the phenomenal increase in the number of vehicles manufactured last year. Notwithstanding the fact that more than four millions of automobiles were made and disposed of, the electric railway companies will show increased earnings.

The automobile has taught people to ride. Although it has congested the traffic in our cities to the point of intolerance, it is nevertheless certain that the well-managed electric railways and taxicab companies will profit by the automobile invasion.

Business apparently will continue good during 1924. The new business received by this company in 1923, the twenty-fifth year of its existence, has been the best in its history. Practically all expiring contracts were renewed for long terms, many of them by companies that have used Ohmer registers for more than twenty years. This mark of appreciation assures us that the successful manager realizes the importance of safeguarding that most important factor in his business—fare collection.

ELECTRIC RAILWAY MATERIAL PRICES—JAN. 2, 1923

Metals—New York

Copper, electrolytic, cents per lb.	12.875
Lead, cents per lb.	7.80
Nickel, cents per lb.	28.00
Zinc, cents per lb.	6.625
Tin, Straits, cents per lb.	47.25
Aluminum, 98 to 99 per cent, cents per lb.	26.00
Babbitt metal, warehouse, cents per lb.:	
Fair grade	52.00
Commercial	25.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$4.675
Somerset mine run, Boston	2.125
Pittsburgh mine run, Pittsburgh	2.00
Franklin, Ill., screenings, Chicago	1.875
Central, Ill., screenings, Chicago	1.375
Kansas screenings, Kansas City	2.00

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$43.00
Standard open hearth rails, gross ton	43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	3.10
Tie plates (flat type), cents per lb.	2.575
Angle bars, cents per lb.	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.125
Steel bars, cents per lb.	2.40
Ties, white oak, Chicago, 6 in.x8 in.x8½ ft.	$1.70

Hardware—Pittsburgh

Wire nails, base per keg	3.00
Sheet iron (28 gage), cents per lb.	3.75
Sheet iron, galvanized (28 gage), cents per lb.	4.90
Galvanized barbed wire, cents per lb.	3.80
Galvanized wire, ordinary, cents per lb.	2.75

Waste—New York

Waste, wool, cents per lb.	11.14
Waste, cotton (100 lb. bale), cents per lb.:	
White	14–18
Colored	9–14

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), per gal.	$0.93
White lead (100 lb. keg), cents per lb.	11.37
Turpentine (bbl. lots), per gal.	$0.925
Car window glass, (single strength), first three brackets, A quality, discount*	84.0%
Car window glass, (single strength), first three brackets, B quality, discount*	86.0%
Car window glass, (double strength) all sizes, A quality, discount*	85.0%
Putty, 100 lb. tins, cents per lb.	4–6

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb.	15.50
Rubber-covered wire, No. 14, per 1,000 ft.	$6.65
Weatherproof wire base, cents per lb.	17.50

Paving Materials

Paving stone, granite, 4x8x4, f.o.b. Chicago, dressed, per sq.yd.	$3.60
Common, per sq.yd.	3.20
Wood block paving 3½, 16 treatment, N. Y., per sq.yd.	2.79
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots	54.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.75
Cement, Chicago consumers' net prices, without bags	2.10
Gravel, ¾-in., cu.yd., f. o. b. N. Y.	2.00
Sand, cu.yd., N. Y.	1.25

Old Metals—New York and Chicago

Heavy copper, cents per lb.	11.25
Light copper, cents per lb.	9.50
Heavy brass, cents per lb.	6.00
Zinc, old scrap, cents per lb.	4.125
Yellow brass, cents per lb. (heavy)	6.00
Lead, cents per lb (heavy)	6.75
Steel car axles, Chicago, net ton	$8.25
Old car wheels, Chicago, gross ton	20.25
Rails (short), Chicago, gross ton	19.75
Rails, (relaying), Chicago, gross ton	33.50
Machine turnings, Chicago, net ton	9.25

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Receiver Appointed for Missouri Car Company

Circuit Judge Landwehr of St. Louis on Dec. 27 named R. Vernon Clark, East St. Louis, Ill., real estate dealer, receiver for the Missouri Car Company, organized in St. Louis two years ago to manufacture a non-rollicking street car truck. The plant in East St. Louis never produced a single truck, although much machinery and other equipment were installed for the making of the trucks, street cars and automobile bus bodies.

The suit for the receivership was instituted Dec. 26 to checkmate a foreclosure on the company's plant and real estate by the East St. Louis Cotton Seed Oil Company for default on a note for $7,500 due last June 1, but extended to Dec. 15. The note was not paid on Dec. 15.

It is stated in the receivership petition that the company has assets appraised at $300,000 and liabilities totaling $175,000. The factory was purchased for $75,000, of which $16,000 has been paid. The company has agreed to the appointment of a receiver.

Officials of the company are said to contemplate a complete reorganization, but the legal controversies in which the company is now involved and the diversity of the interests affected, together with the uncertainty of lien priorities, made it difficult, without the aid of a receivership, to determine the rights of the various parties to pay off existing claims and to operate the plant. It is said the company has several offers to purchase its plant, patents and other assets.

Westinghouse Acquires New Building in Cleveland

The Cleveland branches of the Westinghouse Electric & Manufacturing Company and the Westinghouse Lamp Company have consolidated in one building their sales and service departments and their warehouses. The branches are now located in a new five-story building, called the Westinghouse Electric Building, on Ashland Road.

Contract Renewed

A contract for the lubrication of electric railway lines of the Brooklyn-Manhattan Transit Corporation and the New York Rapid Transit Corporation has been renewed with the Texas Company. This includes the supply of lubricants required for all surface, elevated and subway equipment of the entire system. The products furnished will provide for the lubrication of more than 112,000,000 car-miles yearly.

Rolling Stock

Mauch Chunk & Lehighton Traction Company, Mauch Chunk, Pa., recently suffered the loss of seventeen cars and a carhouse by fire. The damage approximates $200,000.

Maumee Valley Railways & Light Company, Toledo, purchased in 1923 from the Cincinnati Car Company six cars. The cars were constructed for one-man operation and have been operated so far in that way with an extra boy or veteran to flag railroad crossings. The seating capacity of the cars is forty-four.

Lewistown & Reedsville Electric Railway, Lewistown, Pa., has announced the purchase of four new cars, costing $60,000. The cars are equipped for train operation.

Evansville & Ohio Valley Railway, Evansville, Ind., is considering the purchase of ten new light-weight interurban passenger cars.

The Interborough Rapid Transit Company, New York, N. Y., has recently ordered from the General Electric Company 200 GE-260 motors and 100 PC-10 control equipments to be used on 100 new cars which the railway company has bought.

Wheeling Traction Company, Wheeling, W. Va., it is reported, is now securing bids for twenty-one new all-steel passenger cars. The cars are to be of the double-truck type and will having a seating capacity for about fifty passengers.

Track and Line

Baton Rouge Electric Railway, Baton Rouge, La., plans track and road improvement which will include reconstruction of the Florida Street line. Concrete foundation will be used and the street will be widened to accommodate the tracks and necessary roadway. The line known locally as the Dixie Railway extension will be completed about June 1, 1924.

Monongahela-West Penn Public Service Corporation, Parkersburg, W. Va., has plans under way for extensive traction line improvements, including the taking up of abandoned tracks, a general rebuilding of existing lines that are to continue in use, and it is expected shortly that new cars and modern equipment will be added.

Trade Notes

Clifford F. Rice of West Springfield, Mass., has ended forty years of service with the Wason Manufacturing Company, Springfield, now controlled by the J. G. Brill Company.

A. E. Tregenza has resigned from the position he has held for the past eleven years as general sales manager of the Economy Fuse & Manufacturing Company, Chicago.

Wason Manufacturing Company, Springfield, Mass., a subsidiary of the J. G. Brill Company, has announced changes in its personnel effective Jan. 1. A. H. Pease, formerly secretary, has been elected vice-president, succeeding Henry Pearson, who died recently. Charles F. Johnson will be general manager; Walter Abrahams, secretary and clerk, and R. T. Foster, superintendent.

Owen D. Young, chairman of the board of directors of the General Electric Company and recently selected as a member from the United States of the reparations committee to help balance the German budget and stabilize the mark, sailed for Europe from New York on Dec. 29. Two Americans were invited to serve, the other being Gen. Charles G. Dawes, former director of the United States budget.

New Advertising Literature

Department of Commerce, Washington, D. C., has issued a new edition of the Bureau of Standards circular on electric service standards. The material contained in the old edition has been revised when necessary and brought up to date. This first edition has been the basis for many of the rules for electric service which are now in force in many of the states, and which cover such subjects as the accuracy of meters and means for testing them, interruptions to service, variations in voltage on electric lines, safety provisions, methods of metering, etc. These rules for the various states are embodied in the circular and recommendations are made for the framing of such rules where they do not already exist. In collecting this material the Bureau of Standards sent its experts all over the United States to confer with commissions and engineers having to do with the regulation of public utilities. The department has also issued the first number of "Commerce Yearbook," a new annual of the Bureau of Foreign and Domestic Commerce. This new book presents in 700 exceedingly readable pages of text and diagrams the outstanding factors in domestic and foreign commercial development for 1922 and early 1923.

Two-thirds of the volume is devoted to domestic commercial growth for 1922, analyzing each of the great industrial and financial groups as to its trade, production, price changes and market conditions, these being conveniently tabulated and analyzed in relation to one another so that their interdependence may be readily recognized. The balance of the book is a survey of foreign conditions, particularly those affecting American trade. An economic review and statistical abstract of each of these principal foreign markets is presented.

Johns - Pratt Company, Hartford, Conn., has issued a pamphlet, "Both Sides of the Story." It tells how both the central station's needs and the contractor's requirements are met perfectly by the Noark universal service switch.

General Welding & Equipment Company, Boston, Mass., has issued a pamphlet with photographs on the automatic cutting machine for locomotive, railroad, machine parts and plate work.

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New York, January 12, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 63
Number 2

Baiting the Vote Hook in Illinois

EQUITABLE decisions, serving the best interests of both the public and the investor in utility securities, are insured when the personnel of state regulatory commissions is appointed on the basis of training, experience and general fitness for such positions. When these commissions are allowed to function without political interference, fair and constructive action has nearly always resulted. But the game played by spoils politicians exerts a degenerating influence on the commission form of regulation. Not only does it require appointments to be carefully distributed in accordance with vote-producing power, regardless of any other qualifications, but the politician-commissioner is usually so securely bound to the patronage-fed political machine, that these ties effectually strangle any impulse toward fair and constructive rulings.

The Illinois commission has done and is doing a great deal of constructive work. In recent years, however, its members have been handled very much as chess men, to be maneuvered about in accordance with the exigencies of the political game. The latest move has been the appointment of a negro as a member of the Illinois Commerce Commission. As a political maneuver to help Governor Small control the negro vote of the state it was probably far-sighted, but it is very doubtful if the best interests of the people of Illinois were the main consideration when weighing the qualifications, experience and influence of the new appointee.

New York Transit Lines May Extend in New Jersey

THE suggestion of the New York Transit Commission that the Interborough Rapid Transit System be extended by two lines from downtown Manhattan to New Jersey is in line with correct principles in city transportation. To secure economy in operation through a balanced load, trains should be routed through the business section of a community. Heretofore, state boundaries have been considered a barrier to the extension to New Jersey of a transit system built by money advanced by the city of New York. The result has been that these lines have been constructed within the city limits north, east and southeast from Manhattan Island, but with no outlet to the west. There has been some opportunity to balance traffic through the lines to Brooklyn, Queens and the Bronx, but no use has been made for this purpose of the vast army of commuters who do business in lower Manhattan but live west of the Hudson River.

To some it may seem anomalous that a purely municipal enterprise should extend its activities beyond the limits of the city and indeed of the state, but the principles of engineering are not changed by political boundaries. The municipal tramway systems of Great Britain found that they had to extend beyond the city boundaries to obtain best results, and there is no reason why the city of New York should not follow their example. The Port Authority, the interstate vehicular tunnel and the interstate park furnish precedents. The method of political control for such transit extensions may present greater complications than in the case of any of the earlier interstate undertakings mentioned, but this obstacle should not prove insurmountable. The citizens of New York City and of its New Jersey suburbs should not allow the possible conflicting interests of state politicians to stand in the way of such a real transportation improvement.

A Half a Loaf Is Better than No Bread

ONE of the most serious questions in the electric railway industry today relates to the preservation of the small city property. In a large city a great proportion of the riding is compulsory. The streets are too congested for much private automobile service, and the distances are too long to make walking a serious competitor of car riding. Hence, unless politics prevents the charge of an adequate fare, the road can usually be made to pay. Traffic may fall off slightly with an increase in fare, but even the largest increase in street railway fare which has been made in this country is small compared with either the service given or the increase in price of most of the commodities which the public has to buy. In consequence, at any fare up to 10 cents, or perhaps more, there is no danger that there will be a permanent falling off of any considerable amount of patronage on the large city railway.

But with the road in a small city, say with a population of from 25,000 to 100,000, conditions are almost reversed. In such a city automobile driving into the center of the community is not only possible, but there is often ample parking space. Moreover, the private auto usually provides not only quicker service than the trolley, but exclusive service, which most automobile owners think more of than they do of the higher cost of riding to business in their own cars. Finally, the distances in the small city between most points are so short that walking is possible for a great many trips, and if the car headway is at all infrequent walking is often the quicker way of getting from one point to another.

What should a railway do in these circumstances? Well, it can do a number of things. If there is jitney

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competition it can secure its reduction. It can reroute its cars if a study of the situation shows that to be desirable, and it can usually increase their schedule speed. It can employ one-man operation if that has not been done. It can discourage the use of private automobile by argument, so far as that is possible, and it can cultivate good public relations in a variety of ways. Finally, if these do not suffice, it can increase its fare.

But suppose that the railway company has done all these things and has reduced its operating expenses and increased its headways and its fare to the danger point, but still the income from operation is inadequate to pay a reasonable return on the investment. What can it do then, to be saved? This is not a purely hypothetical condition. It is a very real problem on a number of properties.

It is easier to answer the question what not to do in circumstances of this kind than to tell exactly what to do. The main thing not to do is not to get discouraged. Conditions like this cannot last always. It may be that in existing circumstances the investment in the property was unwise, but these conditions may change. The private automobiles in the city may become so numerous as to compel the passage of laws curbing their use or the extent of their parking in the downtown streets. There may be such a reduction in general wages as again to bring the operating ratio of the railway company to a reasonable figure. The city may grow so much as to make car riding necessary to many who now walk. In the meantime, if a reasonable return is not earned, the security holders should prefer a low return to none at all. If the road is abandoned, they certainly will at the best get very little of their money back.

Many manufacturers in dull times keep their factories going to avoid a greater loss. A railway in the condition described should realize the truth of the old adage that half a loaf is better than no bread.

Right Follow-Up Will Reduce Accidents of New Men

REVIEWING the accident statistics of a large street railway property recently it was clearly evident that new men are most likely to be involved in serious accidents after they have been in service for periods ranging from two months to one year. Experience of this company has also demonstrated that a new man who has one or two minor accidents during his early experience is less likely to have a really serious accident due to carelessness, than is the man who has been entirely free from accidents for several months, after first going into service.

Psychologically, the condition is probably explained thus. After the initial period of training has been completed the new man is keenly alert because of the newness of the work. As he becomes more accustomed to the job this work becomes more and more automatic. If he is fortunate enough to escape minor accidents during the first two or three months, his increasing self-confidence is very likely to be accompanied by a tendency toward carelessness. When this occurs the scene has been set, it seems, for a serious accident. On the other hand a minor accident or two early in the new man's experience brings him to a more permanent realization of the hazards.

A properly designed course of follow-up, or supplemental instruction for new employees, should therefore take the man back periodically over the fundamentals of correct and safe operation so as to overcome this increasing tendency toward carelessness, as far as possible, before his bad accident occurs. To this end a very important part of the safety man's work on a railway property is the study of the causes of accidents in which new men are involved, with a view toward developing charts and talks to form the basis of an instruction course that will carry the new man along progressively until he can be rated as an experienced operator. Even then, of course, experience has shown that continued effort in keeping the subject of safety in the limelight gives handsome returns in the form of reduced accidents.

Training Platform Men for Present-Day Conditions

CAR operation under present-day street traffic conditions is a very different problem from that of only a few years ago, and its bearing on the subject of trainmen's instruction is worthy of careful consideration. In many cases the course of instruction now being given to new men was prepared when traffic conditions were very different from what they are today. As a result, the period of training may be too short to prepare new operators safely to cope with modern street conditions, or some practices taught may be altogether out of date. A rule book containing many obsolete paragraphs or clauses, or failing to cover important new items, tends to lower the entire book in the respect of the trainman.

There also have been many developments and changes in car equipment. Among these is the requirement that both motormen and conductors must handle equipment. Developments in door operating apparatus and brake and control equipment are other examples. The increasing use of train operation in the form of motor car and trailer, or motor units equipped with multiple-unit control, have brought new operating problems that should be adequately covered in the course of instruction for new men as well as in instructions issued to old crews.

Material physical damage to new equipment sometimes has resulted from putting it into service in charge of men who, though old in the service, perhaps, were not properly instructed relative to its operation. Aside from the resulting repair bills, such practice causes serious operating delays and consequently the new equipment makes a bad initial impression on the public where a good impression was most important. In such cases the trainmen got the blame but it really belongs on the shoulders of the company officials who did not give the matter sufficient attention.

In addition to the need for more thorough and more appropriate training which is brought about by modern traffic conditions and new equipment, the close contact between the platform man and the traveling public makes his training an exceedingly important factor in the all-important question of establishing and maintaining favorable public relations. Thus liberal expenditures of time and money in the more thorough instruction of new employees would seem to be well justified. The opportunities available for improvement commend the subject to the attention of progressive managements.

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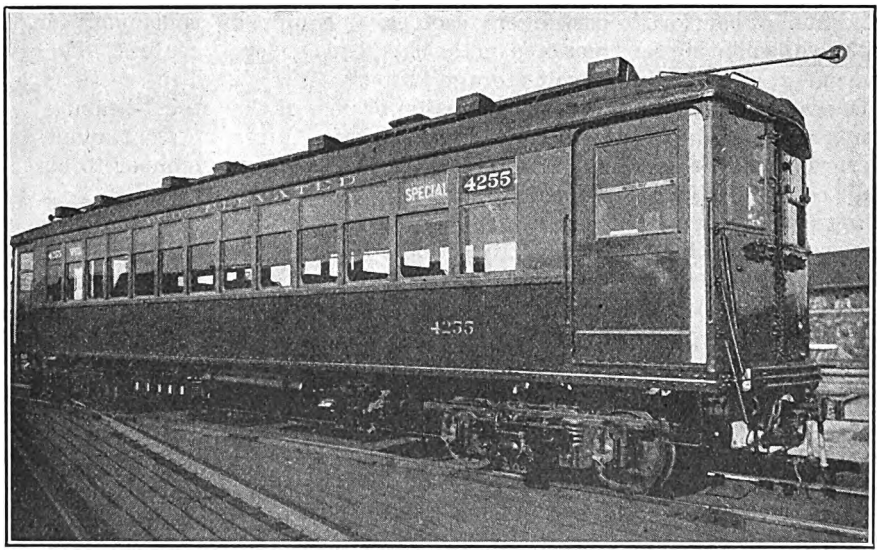
Passenger Comfort the Feature of the New Chicago "L" Cars

Although Low First Cost and Maintenance Were Considered, the Car Rider's Convenience Has Precedence—Plush Seats, Liberal Ventilation, and Insulation Against Noise and Cold Are Features—Wood Roof Considered Necessary for Overhead Trolley—Steel Headlining and Sub-Floor Reduce Fire Hazard

SAFETY and comfort of passengers have been the primary factors considered in the design of the new steel motor cars recently put in service by the Chicago Elevated Railroad. Although careful attention has been given to the design of the car structure and its apparatus, to secure low first cost and low maintenance, the comfort and convenience of passengers was made the controlling consideration. This policy is reflected both in the construction of the car itself and in the selection of its equipment. The psychological factor in winning public approval and good will has been taken into account and the appearance and finish of the cars were given careful thought.



Sliding Doors Are Protected by Reversing Shoe on Edge

The interior trim is in natural mahogany. Where steel panels or posts are exposed in the interior they are stained and grained to imitate the other finish. The headlining is painted a light cream color and is paneled with mahogany moldings. The steel curtain molding, stained to match, is made up in a simple and pleasing shape. It is formed at the upper edge to hold the advertising cards. This molding is carried across the bulkhead panel so as to carry out a stream-line effect on the interior. The curtains are made of double-faced Pantasote with Railway Supply & Curtain Company rollers and fixtures. Electric Service Supply Company roller signs are installed in the four corner windows of the body.

There are eighteen Hale & Kilburn reversible cross-seats spaced on 32½-in. centers, which corresponds with the spacing of the side posts, so as to give a full window opening at each seat. Longitudinal seats at the four corners of the body provide additional space for sixteen passengers, making a total seating capacity of fifty-two. The seats are of full spring construction and are upholstered in high-grade green figured plush. The slope of the backs was carefully considered from the standpoint of comfort, and with this point also in view the longitudinal seat cushions are tilted so as to make them as comfortable as possible.

The illumination in the body is furnished by twenty shaded 23-watt lamps installed in three rows. Two rows are spaced approximately over the centers of the cross-seats and the third is in the middle of the car. A separate circuit furnishes the illumination for vestibules and cabs. Four battery lamps in the body are controlled by a no-voltage relay, when the power supply is off, to keep the car from being in darkness.

Twenty-four Consolidated electric heaters of 630 watts capacity each are controlled by Utility thermostat equipment. In addition a 1,200-watt heater is installed in each motorman's cab. Although the Chicago ordinances require a minimum temperature of 50 deg. F. for the interior of cars, the thermostats have been set to cut the heat in at 58 deg. F. and out at 60 deg. F., with the idea that this temperature would be most comfortable for passengers in long-haul elevated service.

Grab handles are conveniently placed to give security and convenience to standing passengers, and the leather hand straps of the customary type have been replaced by rigid overhead grab handles of the "Rico Steelkar" type, arranged to spring back out of the way when not in use. These handles and their supports are finished in white enamel.

Floor Insulated Against Noise and Cold

Composition floors used on previous steel cars proved unsatisfactory on account of their coldness. On these new cars, therefore, a double wood floor was used. This consists of a layer of ⅞-in. tongue-and-groove yellow pine beneath, laid crosswise, with ⅞-in. x 2¼-in. tongue-and-groove maple above, laid longitudinally within the body and crosswise of the car in the vestibules. To insure a comfortable temperature and also to prevent the transmission of noise to the interior of the car, a ½-in. layer of compressed hair insulating material is laid between the steel underframe and the lower wood floor. In addition, two thicknesses of building felt are used between the upper and lower wood floors. Aisle strips are formed by rabbeting the top floor boards both on the interior of the body and in the vestibules. At the door thresholds these rabbeted grooves are tapered up flush with the top

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of the floor so as to facilitate cleaning. Safety treads are used at all door openings, and in addition a leather mat is set into a brass casting located at each sliding door, designed to drain off water and keep the car floor as clean as possible.

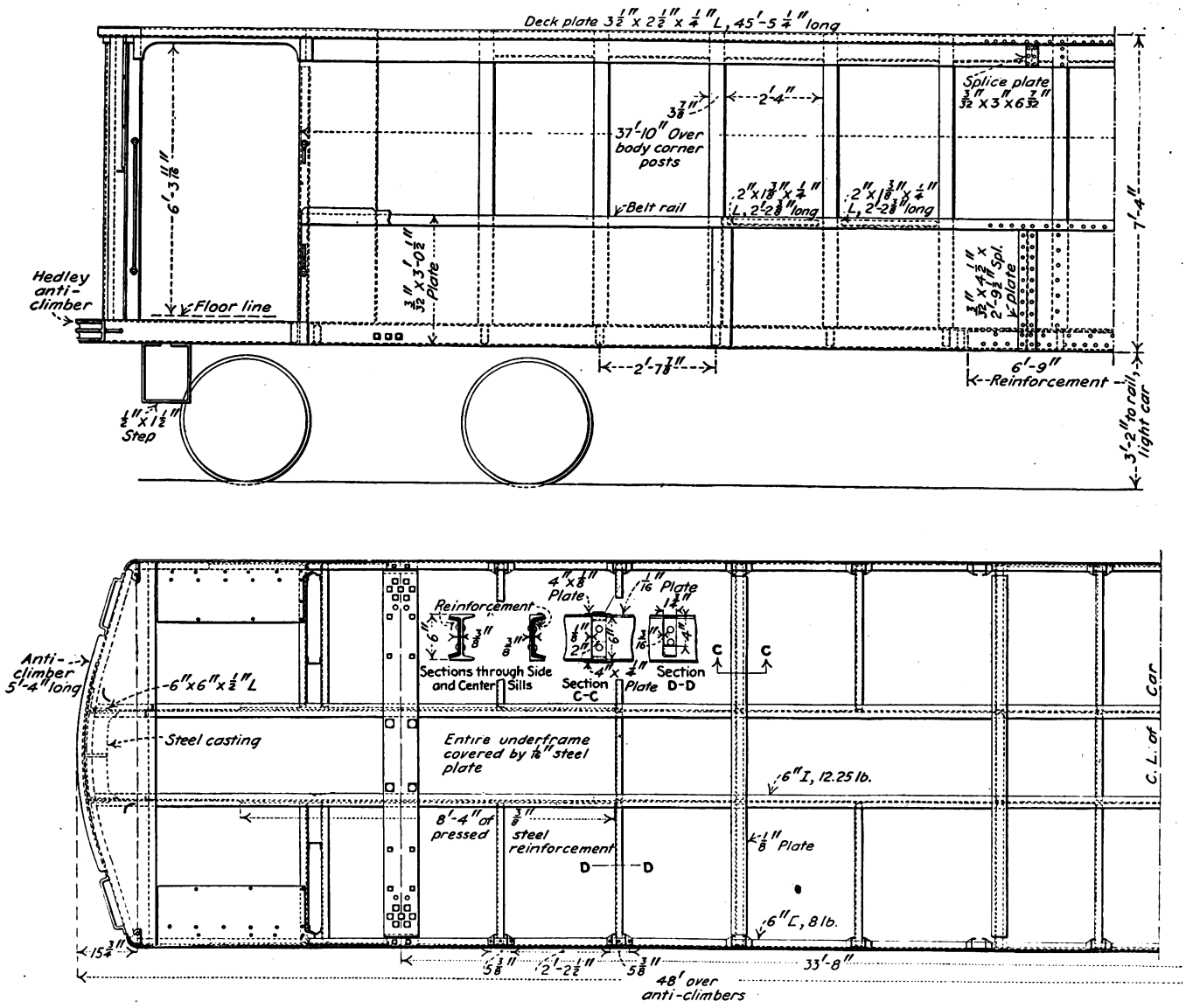
Liberal provision is made to insure good ventilation. Two Utility automatic air intakes are located at each end of the body, so arranged that the intake grilles are mounted in the body headers. There are two additional intakes at the center of the body. This equipment is designed to draw in air when the car is moving in either direction. Four Utility exhaust ventilators are spaced on the roof along each side of the car between the intakes. Carrying still further the policy of providing the maximum of comfort to passengers, each car is equipped with two oscillating fans mounted on the bulkhead headers and operated from the 32-volt storage battery.

Operation of these cars on the Evanston branch of the Northwestern line and on the Oak Park division requires overhead trolley equipment. The roof therefore has been made of wood to insure proper electrical insulation. The construction, however, has been designed to be as nearly fireproof as possible under these conditions. To this end the headlining is made of 1/16-in. steel. For the same reason a sheet of 1/16-in. steel covers the entire underframe structure below the wood floor, protecting the car against fire and tying the underframe members together in place of using the customary type of diagonal bracing.

The Car Framing Is of Rugged Construction

The underframe itself is designed to withstand impact incident to coupling of long trains, and is also reinforced longitudinally to prevent excessive damage in case of collision. The built-up body bolsters are made with a ¾-in. x 9-in. mild steel upper plate and a 1-in. x 9-in. bottom plate, separated by a steel casting at the center with an extension which is riveted to the center sills, forming an anchorage for the draft gear. The center sills consist of two 6-in. x 12¼-lb. I-beams in one continuous length between bumpers and spaced on 24-in. centers. These are reinforced at the bolsters by 8-ft. 4-in. sections of ⅜-in. pressed-steel channel riveted to the I-beam.

Continuous 6-in. x 8-lb. channel side sills are run from bumper to bumper. These are also reinforced with sections of ⅜-in. pressed-steel channel, both between the bumper and bolster and at the center of the car. The bumpers are 6-in. x 8-lb. channel and are reinforced with anti-climbers 5 ft. 4 in. long riveted to the outside. A 1/16-in. thick plate, 19 in. wide at the center, is riveted



Plan and Elevation of the Framing of the New Chicago "L" Car

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across the tops of the bumper, center sills and side sills. A second plate ¼ in. thick by 17 in. wide at the center is riveted across the bottoms of these members. Four main cross-sills are spaced in the underframe between bolsters, and consist of 6-in. x ⅜-in. pressed-steel channels riveted in three sections between the side and center sills. These cross-bearers are reinforced above by plates of ⅜-in. x 4-in. material and in addition by ¼-in. x 4-in. plates below. The upper reinforcing plates are riveted through the ⅛-in. floor plate, which is first laid directly on top of the underframe members. Intermediate floor supports are made of ⅛-in. x 4-in. pressed-steel channels carried between the side and center sills.

Pressed-Steel Posts and Brass Sash Used

Pressed-steel side posts of a plain box type, spaced on 32½-in. centers, are made of ⅜-in. material, flanged at the top and bottom. These are riveted to the side sills below, and to the ¼-in. x 2½-in. x 3½-in. body side top-plate angles above. Sash and curtain guides are formed of brass angles fastened to the side posts as shown on the accompanying cross-section drawing. Both the top and bottom sash are brass, the top sash being set in between the posts and held in place by an angle-shaped batten fastened to the post and clipped under the bottom rail of the upper sash. O. M. Edwards sash locks and compression devices are used on the lower sash.

Both the side girder sheet and the letterboard are made of ⅜-in. steel. The belt rail is a ½-in. x 3-in. bar, capped with a rolled-steel section ⅛ in. thick, supporting the mahogany arm rest.

Provision Is Made for Possible Addition of Center Door

As the center doors on the existing elevated cars are not used, it was considered desirable to build the new cars without center doors in order to provide more comfortable cross-seats in the middle of the car. This also gives an unobstructed window construction. The framing has, however, been arranged on the new cars so that a center door may be added if desired in the future. To this end the side girder sheet and letterboard are spliced at a point where the center door opening would be made; the side sills are reinforced below this section, and reinforcing angles have been installed on the belt rail adjacent to the section in which this opening would come. To install center doors it would only be necessary to remove the sections of the girder plate and letterboard, take out the side posts and install posts for the door pockets. All necessary reinforcing has already been put into the body structure.

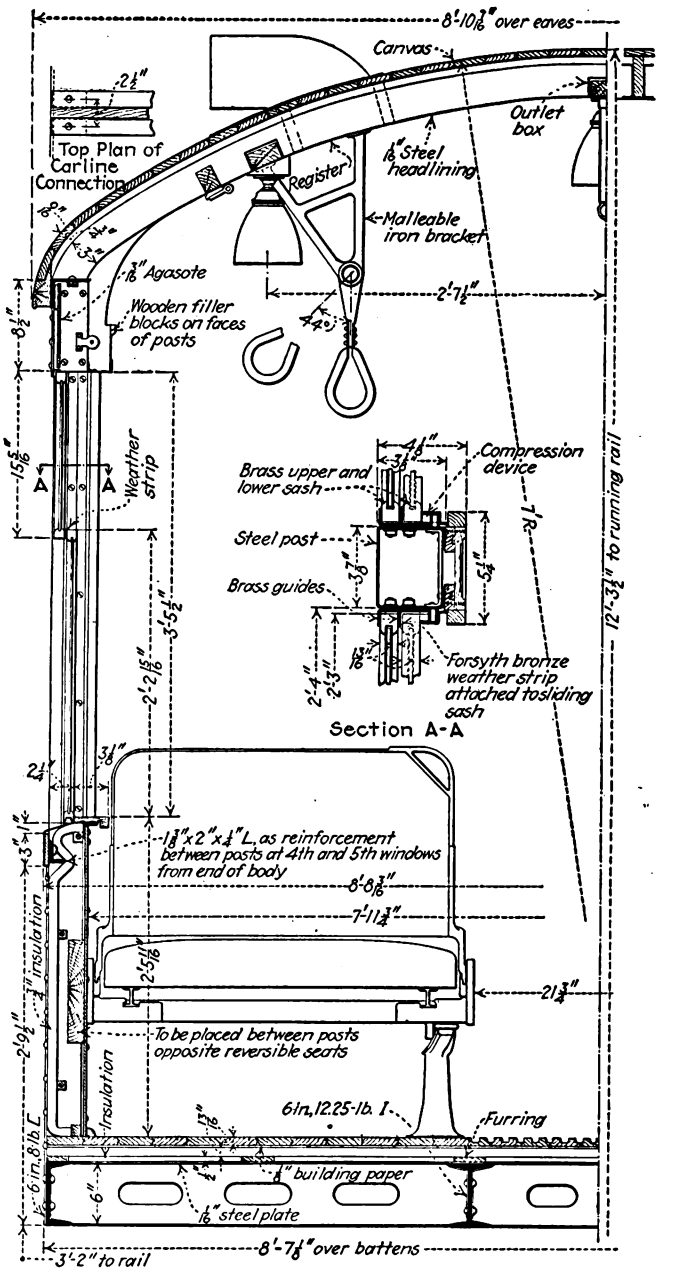
Still further to insure comfort and freedom from noise, insulating material has been applied to the interior of the steel frame. A layer of ⅛-in. Agasote is fastened to the inside of the letterboard, and a ¾-in. layer of compressed hair insulation is fastened to the inside of the side girder plate. Compressed hair ¾ in. thick is also put into the roof above the headlining. The inside lining below the arm rest consists of Agasote, painted and grained to match the mahogany interior finish. Back of this lining a ½-in. x 9½-in. seat mounting board is carried between side posts. This construction is designed to insure a secure fastening for the cross-seats. To guard further against loose seats, the pedestals are bolted through the floor and the ½-in. plate beneath.

The control equipment is mounted in the right-hand corner of each vestibule. The apparatus is inclosed between the dash and a swinging door, which when closed serves as the end wall of the vestibule and protects the apparatus against tampering. This swinging door when opened engages a small swinging panel mounted on the body end panel, and thus forms a cab.

In addition to the master controller, brake valve and air gage, a cab heater, a push-button switch for controlling the adjacent sliding door, a cab-light switch and a cab-heater switch are provided. The cab-heater switch is mounted so as to cut off the heat when the cab door is swung into the closed position.

Door Control Is Electro-Pneumatic

The four sliding doors on each car are controlled by National Pneumatic equipment. Push-button switches are located on the exterior of the dash. Two switches are located on each side of the dash corresponding to the doors on that side at each end of the car. A selector switch allows the control circuit to be arranged so that a guard between two cars may control the adjacent



This Section Through the Windows Shows the Side Post and Roof Construction

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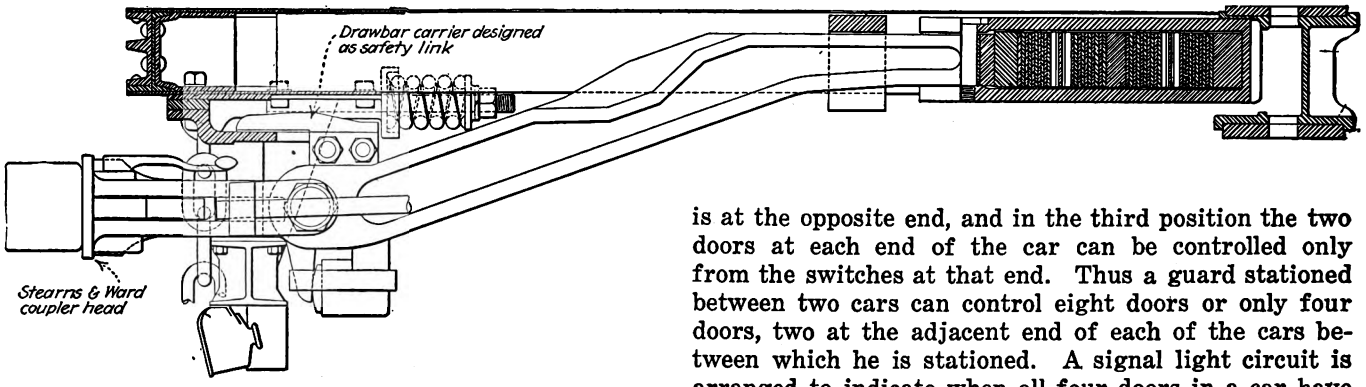
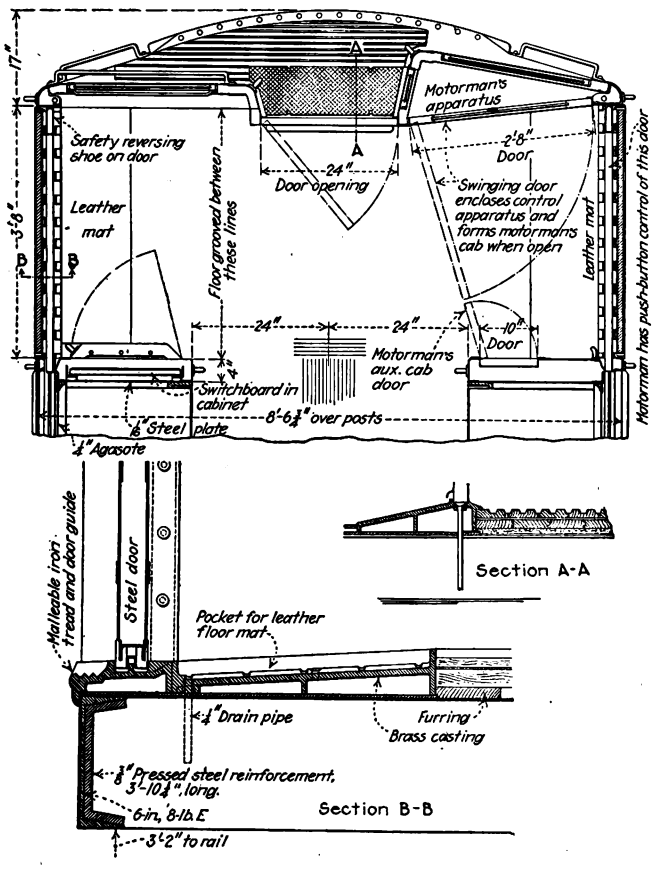
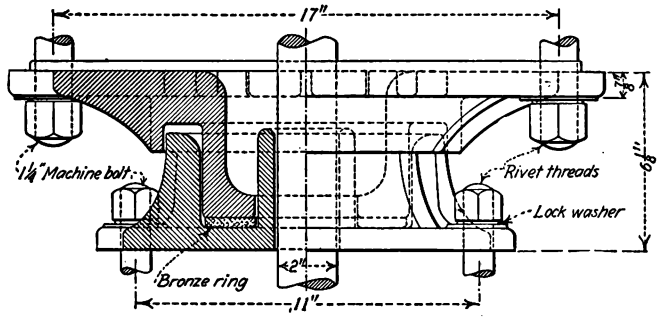


Design of the Drawbar and Coupler



Platform Construction Showing Arrangement for Motorman's Cab



Detail of Center Bearing

doors in each car or may take control of all four doors on each car. This arrangement allows the train to be operated with one guard for each two cars.

The selector switch has three positions. In the first the control of all four doors on a car is centralized at one end. In the second the control of all four doors is at the opposite end, and in the third position the two doors at each end of the car can be controlled only from the switches at that end. Thus a guard stationed between two cars can control eight doors or only four doors, two at the adjacent end of each of the cars between which he is stationed. A signal light circuit is arranged to indicate when all four doors in a car have been closed.

The door-control switch in the motorman's cab enables him to open the sliding door at his corner for observation along the outside of the train, without interfering with the control of the remaining doors in the car. An angle cock interlock on the air pipe leading to the motorman's brake valve short circuits the door contacts in the signal circuit when the cock is open, so that the rest of the door signal system on the car is not interfered with when the motorman opens his door.

The door signals on each car are independent and are not interconnected through the train. The starting signal is communicated to the motorman by bell cord, the door signal light system serving only to advise the guard when all the doors on each car have been closed. An automatic reversing switch is installed on the front edge of the door so as to reverse it in the event of a passenger being struck by the door in closing. A door-control cylinder is connected with the air line angle cock on the coupler. When the cocks are closed, as at either end of a train, this cylinder breaks the door-control circuit and makes the doors at that end of the car inoperative.

The cylinders which actuate the door-engine valves and the magnet valves which control the admission of air to these doors are spring operated in the closing position, so that failure of either the power or air supply leaves the doors closed. Each door can then be opened by a manually operated handle located on the engine under the longitudinal seat. Both the actuating cylinders and the controlling magnets are of the same type as those used in the multiple-unit control apparatus, avoiding the necessity of carrying special replacement parts.

Brakes, Trucks and Electrical Equipment

Each car has one motor truck and one trailer truck of Baldwin manufacture. The driving wheels have a diameter of 34 in. and the trailing wheels 31 in.

The brake equipment is Westinghouse universal type with a D-3-F compressor.

Two 165-hp. inside-hung motors, mounted on one truck, are geared for a maximum speed of 40 m.p.h. Westinghouse No. 567 motors are used on seventy-five cars and General Electric No. 243 motors are on the others. The use of two motors mounted on one truck is in accordance with the practice on this property. It is held to reduce the liability of derailment and to make a saving in the weight of trucks. All control and brake apparatus under the car is located so as to keep the car balanced. This allows the control apparatus and conduit to be grouped near the motor truck end of the body and the brake apparatus near the opposite

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end, which simplifies the control wiring and air piping.

The control is Westinghouse Type ABLFM on ninety-five cars and General Electric Type PC on ten cars. Duplicate jumper terminals are installed together with a change-over switch, so arranged that the new cars can be operated in trains with either the Westinghouse control equipment on the cars of the Metropolitan division or the General Electric equipment on the Northwestern and Oak Park divisions. The 32-volt storage battery is charged automatically from the power line through a fixed resistance, under the control of a watt-hour meter.

All wiring is installed in conduit. Auxiliary circuit switches and fuses are grouped on a specially designed panelboard located in a fireproof switch cabinet in one vestibule. The wiring for door-control circuits is run in individual ¼-in. conduits, one wire per conduit, to eliminate as far as possible the danger of short circuits.

	Lb.
Weight of body complete with control and brake apparatus	45,650
Weight of motor truck	11,650
Weight of trail truck	9,600
Weight of two 165-hp. motors	9,750
Total weight	76,650

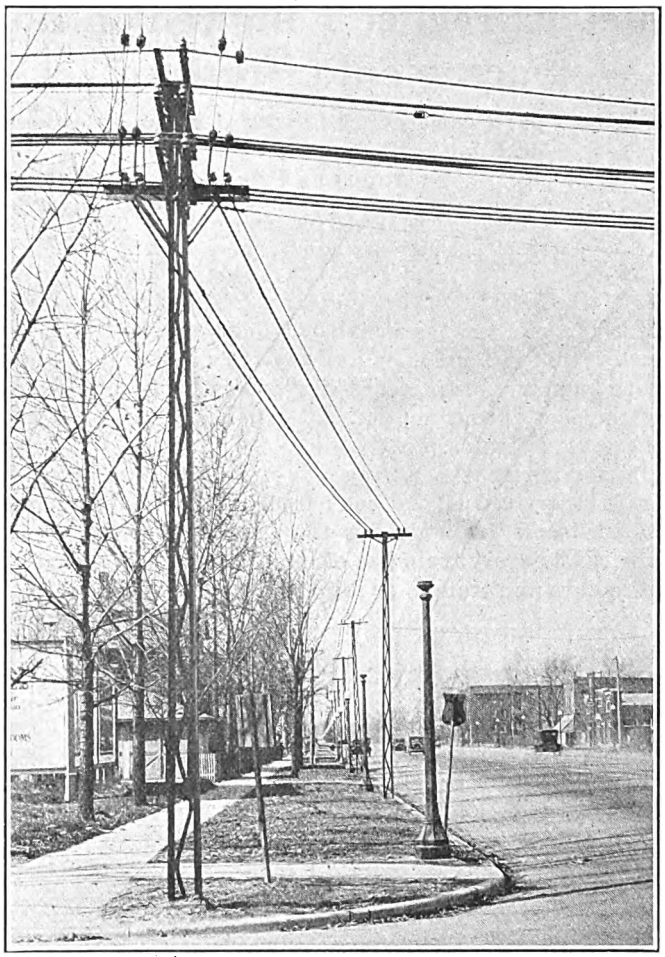
A brief description of this car was given in the ELECTRIC RAILWAY JOURNAL for Dec. 8, 1923 on page 993, including a view of the interior and a table of the principal dimensions. Weights of the car are given in the accompanying table.

Steel Poles Improve Street Appearance

THE Chicago & West Towns Railway has recently completed the work of rebuilding a section of its overhead line on West Madison Street, through the village of Oak Park, Ill. The reconstruction was necessitated by a widening of the roadway from 46 to 76 ft. The condition of the old poles was such that it was considered unwise to move them and hence it was decided to replace the entire line.

The new poles are of the Bates expanded steel type, set in concrete to a depth of 5½ ft. They were placed in position ready for the overhead construction before the old poles were removed. Fifteen men, split into four gangs, handled all of the work. Five men dug the holes, followed by two men who placed the forms, after which five men placed the poles in position and three men with a concrete mixer poured the concrete. A form 12 in. x 18 in. x 5½ ft. long was used and the base was cast in a position somewhat off the center of the pole, the bulk of the concrete being on the street side. After a set of ten days the line was in condition to receive the overhead wires. On the north side of the street a 30-ft. pole with a 5-in. top was installed, while on the opposite side a 6-in. top was used because it was necessary to mount a crossarm carrying four feeder cables. One of the accompanying photographs shows a 35-ft. pole with a 7-in. top carrying the line at a feeder intersection.

This entire installation was handled by the men of the West Towns Railway. A tractor trail truck was used to transport the poles from the railroad side track to the job. They were then mounted in position by means of pike poles and a small improvised derrick. No other special construction equipment was required and the poles were lined up by sight, without the use of an instrument. This was done by setting the first two poles with a rake away from the street an amount equal to the taper of the pole, thus bringing the far side of the pole into a vertical position as indicated by a plumb line. The third pole was then aligned by sighting along the first two. This process was continued until the complete line was set. The accompanying photograph shows the result obtained.



Chicago & West Towns New Overhead Construction. A 7-In., 35-Ft., One-Piece Pole Is Used as a Corner Pole at Feeder Intersection

Favorable comment on the installation has been received by the company from citizens and the village officials. An object of widening the street was to make it a very attractive thoroughfare. With the street light poles placed every 100 ft. along each side of the street and the railway poles every 110 ft., the appearance of the completed job has met with general approval.

Electric Railway Income Tax Statistics

THE following figures for electric railway companies appear in the report of the Commissioner for Internal Revenue on the income tax for 1921, just issued by the Treasury Department:

INCOME TAX DATA OF ELECTRIC RAILWAYS FOR 1921

Total number of corporations reporting		458
Corporations reporting net income:		
Total number		211
Amount of net income	$33,843,158	
Income tax	3,276,532	
War profits and excess profits tax	570,914	
Total tax		$3,847,446
Corporations reporting no net income:		
Total number		241
Deficit reported		$202,585,944

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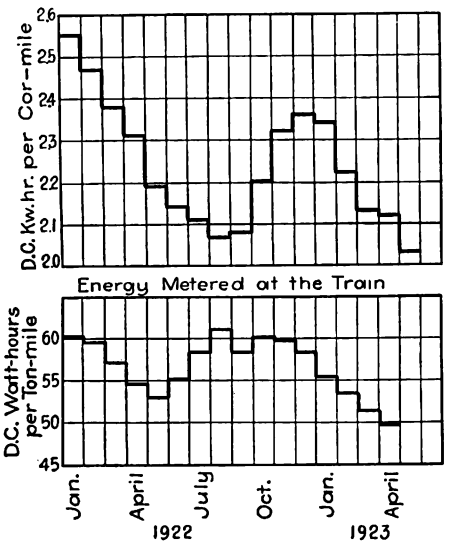
Meter Practice Followed on the Sacramento Northern

Nearly 9 per Cent Energy Saving per Car-Mile Over 1922 and Still Greater Over 1921— Vacations as Prizes

BY W. H. EVANS
Electrical Engineer Sacramento Northern Railroad, Sacramento, Cal.

IN NOVEMBER, 1921, the Sacramento Northern Railroad completed the installation of Economy watt-hour meters on nineteen of its interurban cars, and beginning with January, 1922, accurate records were kept each day of the energy consumption of the various motormen and the various trains.

Each month the average unit performance of each train is arrived at and compared with the performance of the same train during the preceding months. As practically every train has either a different combination of motors and trailers or different schedule conditions to meet, it is felt necessary to compare the record of each train with itself. At the end of each month the record of each motorman for each run on which he operates is compared with the unit consumption of that particular train for the corresponding month of the previous year, and the percentage saving made during each half year is credited to his power-saving record for that six months. For each six months interval, the motorman with the highest percentage saving of two-car trains or more receives seven days vacation with pay and the second highest, five days vacation with pay. For single-car trains the highest ranking motorman receives five days vacation with pay.



Energy Consumption Figures for Seventeen Months

Meter cards are made out by the motormen and handed in each day at the end of their runs with the information filled out concerning their run. A typical meter card is reproduced. In addition, the terminal inspectors read the meters of each motor car when the train is turned over to the motorman and when it is received back from the motorman at the various terminals. This, in addition to providing a check on the motorman's readings, allows us to obtain the energy consumption of the trains stored and handled in the terminal yards.

The meters are connected so as to measure the entire input to each motor car, including not only energy for traction purposes but also for air compressors, heaters and lights. By so doing we are able to obtain an accurate record of all energy used in interurban passenger service and have found this information valuable for statistical purposes in the segregation of certain expenses between passenger and freight service and in working up data as to cost of operation of various trains and various combinations of equipment.

The meters are equipped with inspection dials, but we have not yet depended upon the use of these dials to any great extent in handling inspection, as mileage records of the various classes of equipment have to be kept for other purposes. They are available therefore as a means of determining when equipment is due for oiling, inspection, etc.

The records for some fifteen to twenty interurban motormen are tabulated daily and summarized at the end of each month in order to arrive at unit consumption figures for each run for each motorman. This work requires about twenty-five to thirty hours per month. The cost of inspection and maintenance of the meters to date has been very small.

The accompanying tabulation showing direct-current kilowatt-hours per car-mile and direct-current watt-hours per ton-mile for the first five months of 1923, as compared to the same five months in 1922, indicates a saving in these five months of about 8.9 per cent. This percentage saving, when applied to the energy consumed per annum for interurban passenger service, will represent a saving in 1923 over 1922 of approximately $4,600.

SACRAMENTO NORTHERN R. R. METER CARD

MOTORMAN FO Hummel DATE June 8 23

TRAIN NO.	CAR NUMBERS MOTORS	CAR NUMBERS TRAILERS	STATIONS START	STATIONS END	METER READING START	METER READING STOP	K.W.H.	CAR MILES MOTORS	CAR MILES TRAILERS
16	130	224	Sac	Chi	3453	3841	388	9487	9487
25	106	228	Chi	Sac	4582	4994	412	9335	9335
							800		
REPORT UNUSUAL OCCURRENCES ON BACK OF CARD				TOTALS				18822	18822

Typical Meter Card

As the entire meter installation cost approximately $2,000, this yearly saving amounts to approximately 230 per cent return on the investment.

It will be noted from the tabulation and the graphic chart that the average unit consumption decreases from a maximum in January to a minimum during the summer months, rising again during the fall and winter months of the year. This is due to the increased train friction during the colder weather, as well as the additional use of energy for car heating and lighting.

ENERGY CONSUMPTION IN INTERURBAN PASSENGER SERVICE OF SACRAMENTO NORTHERN

	Direct-Current Kilowatt-Hours per Car-Mile 1922	1923	Direct-Current Watt-Hours per Ton-Mile 1922	1923	Per Cent Saving per Car-Mile, 1923 Over 1922
January	2.55	2.34	60.2	55.3	8.2
February	2.47	2.22	58.5	52.7	10.1
March	2.38	2.13	56.4	50.4	10.5
April	2.31	2.12	54.5	49.7	8.3
May	2.19	2.03	51.6	....	7.3
June	2.14	....	50.2	....	....
July	2.11	....	49.8	....	....
August	2.07	....	51.5	....	....
September	2.08	....	48.9	....	....
October	2.20	....	57.6	....	....
November	2.32	....	54.8	....	....
December	2.36	....	57.0	....	....

Energy metered at the train.
The train make-up averages 62.3 per cent of motor cars and 37.7 per cent of trailers.

It will be noted that the average consumption for 1923 is running about 8.9 per cent less than for the same months in 1922. There is no doubt also but that the average unit consumption during 1922 was less than during 1921, when meters were not installed. Therefore the total saving which our men have made has undoubtedly been greater than the 8.9 per cent obtained in 1923 over the 1922 figures.

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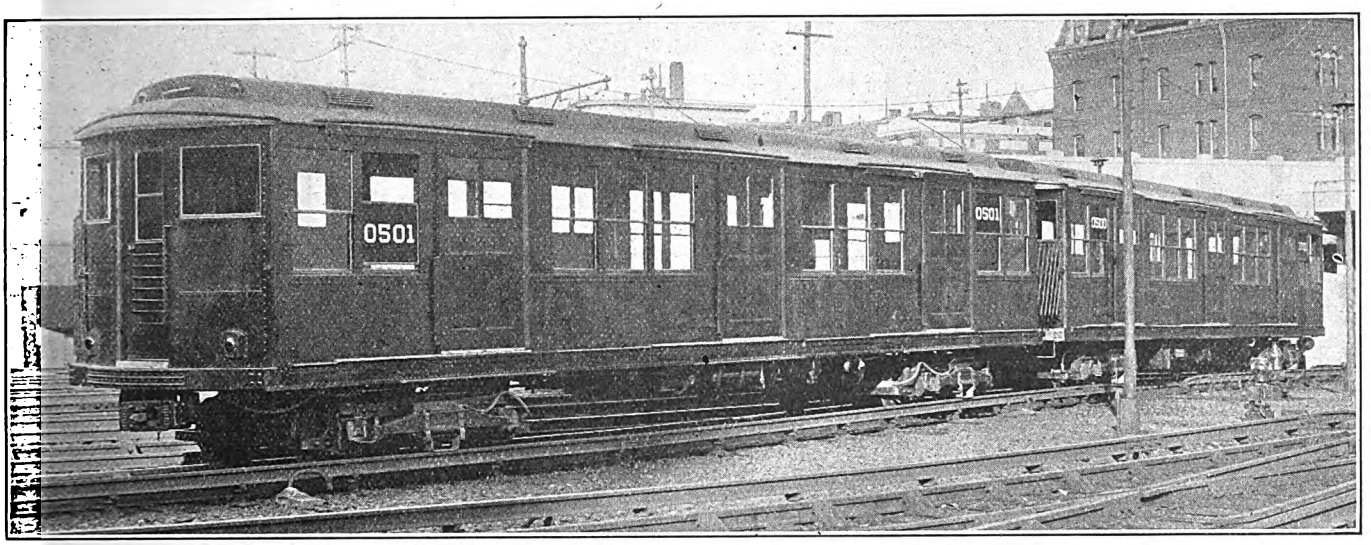


Two of the New Steel Cars to Be Used in the East Boston Tunnel

Relief Effected by Train Operation in East Boston Tunnel

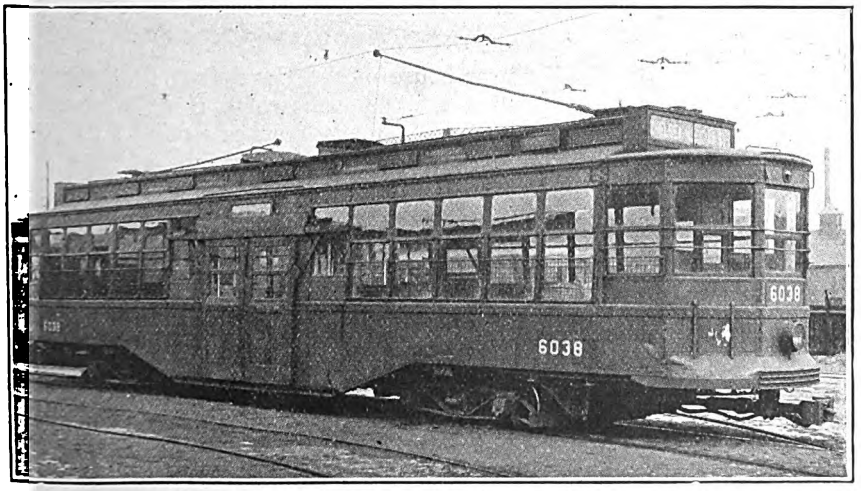
By the Addition of a Terminal Station at Maverick Square in East Boston and New Rolling Stock—Rapid Transit Service Will Be Substituted for Surface Car Type of Service—Rush Hour Capacity of the Tunnel Will Be Increased 136 per Cent

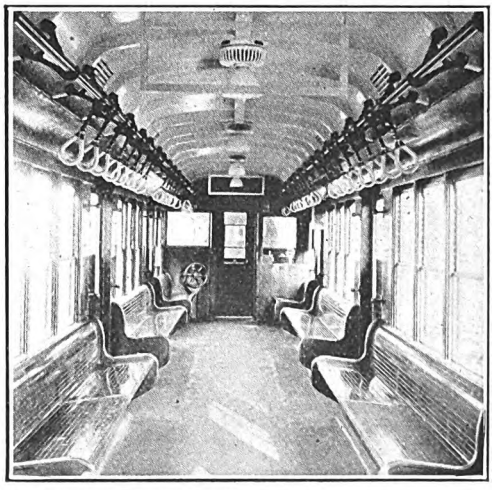
By Edward Dana
General Manager Boston Elevated Railway

THE East Boston Tunnel was originally constructed by the Boston Transit Commission under Sec. 17, Chap. 500, Acts of 1897. Work was begun on May 5, 1900, and the tunnel was open for public travel on Dec. 30, 1904. The total cost of this section of the tunnel was $3,370,000 and the approximate length 1.42 miles. The tunnel runs 82.3 ft. below low water at the bottom of the masonry. The maximum grade is 5 per cent for a total length of 880 ft.

An extension of 0.41 mile to Bowdoin Square was authorized by Acts of 1911, Chap. 741, and work on this section was commenced on Nov. 9, 1912. It was completed and operation started on March 18, 1916. This extension cost $2,287,000 and afforded relief and ushered in a period of greater use. The shifting of the trolleys on the cars at Devonshire Street Station, the original terminus, had reached an unbearable point. This extension also permitted the bodily transfer of passengers at Scollay Understation to cars operated in the Tremont Street Subway.

Up to the present time tunnel service has been supplied by surface cars which have entered and left the tunnel at the East Boston end. On March 1, 1924, there will be completed the Maverick Square Terminal in East Boston, which will then separate the tunnel operation from the surface tracks in East Boston and





At Left, Center-Entrance Car Now Used in East Boston Tunnel. At Right, Interior of New Steel Cars

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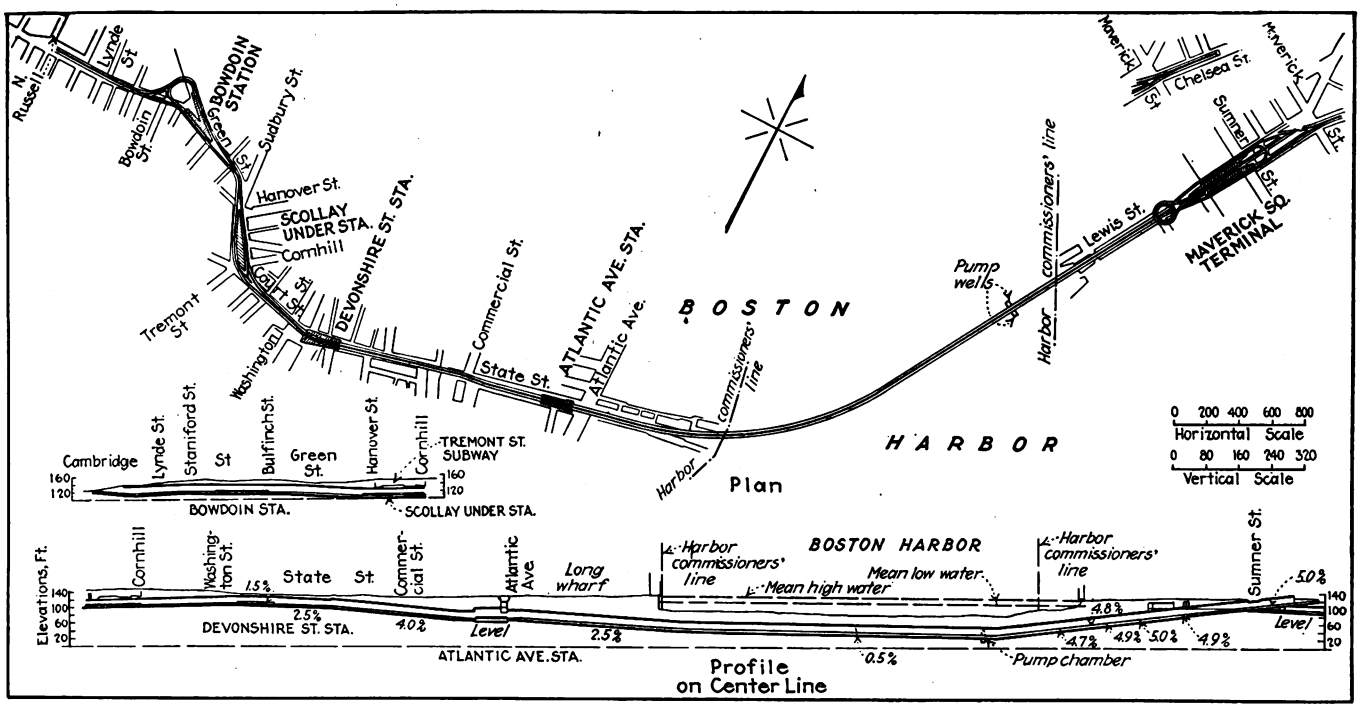

Plan and Profile of East Boston Tunnel, Showing Position of Maverick Square Station at East Boston End of Tunnel

permit only steel trains to be operated in the tunnel. This terminal and its connections will cost $2,500,000, which makes a total of $8,157,000 for the approximate construction cost. In addition, $904,879 will have been expended for equipment in the tunnel since it was constructed in 1904, making a grand total of $9,061,879.

The steel cars which are now being equipped in the company's shop are unique in many ways and were described in the ELECTRIC RAILWAY JOURNAL of Jan. 13, 1923.

The summary of statistics of these new cars as compared with the present center-entrance cars is as follows:

	East Boston Tunnel Cars	Center Entrance Motor Cars
Length over all	47 ft. 3 in.	48 ft. 9½ in.
Height from top of rail to top of roof	11 ft. 3⅜ in.	11 ft. 7⅛ in.
Width outside sills	8 ft. 3⅜ in.	8 ft. 5 in.
Width over all	8 ft. 7 in.	8 ft. 8¼ in.
Width of side doors	3 ft. 9 in.	6 ft. 6 in.
Diameter of wheels	26 in.	24 in.
Seated passengers	44	56
Standing passengers	136	95
Sashes	Brass	Wood and brass
Roof	Monitor arch	Monitor
Ventilators	Perry	Perry
Flooring	"Truss Plate" with Mastic Coating	Wood
Door engines	Consolidated Car Heating Company (elec.)	Consolidated Car Heating Company (pneu.)
Electric pneumatic brake	West. var. load (automatic)	West. S.M.E.
Motors	4 West-514-E	4 GE-247
Controller	GE P.C.-5	GE P.C.-5
Car straps	Rico	Leather
Manufacturers of car bodies	Pullman Company	Brill
Weight	44,400 lb.	45,000 lb.

It is expected that by March 1, 1924, steel trains will be in operation in the East Boston Tunnel between Maverick Square on the East Boston end and Bowdoin Square on the Boston end. The relief to passenger traffic effected by this change in method of operation can hardly be appreciated when one considers that except for the terminal station at Maverick Square the tunnel is, to all intents and purposes, the same tunnel.

The average daily weekday passenger load has constantly increased as shown in the following table:

1905	33,118	1915	51,712
1906	37,434	1916	63,506
1907	40,864	1917	72,970
1908	41,086	1918	69,124
1909	42,072	1919	78,585
1910	44,719	1920	75,669
1911	46,353	1921	73,765
1912	50,445	1922	77,053
1913	54,526	1923	78,970
1914	54,678		

The capacity of the tunnel at the present time has been reached for surface car operation. It is only possible to operate 121 surface cars through the tunnel during the rush hours, though many of these cars were connected up as three-car trains. The ultimate capacity (with six-car trains) under the arrangement made for operating steel trains will provide for 240 cars per maximum hour. As the maximum carrying capacity of the surface car is 151 and the new steel car 180, this increases the capacity of the tunnel 136 per cent in the rush hours. In the light of past growth in traffic, it is reasonable to suppose that this tunnel will be able to take care of the traffic for at least ten years to come.

Bell in Power House Announces Approach of Cars

IN THE power house of the Harrisburg Railways has been installed a signal bell which rings whenever a street car inbound to the city reaches a point half a mile beyond the power house. The purpose of this is to enable the power house men desiring to go home to wait under cover until the car is close by. They then have just comfortable time to reach the nearest trolley station. Formerly the men used to go out and wait on the street corner, but after many hours work in the heat of the boiler room the waiting in the cold wind out doors was very injurious to the health of the employees. Last summer during track construction work signal wires were strung on the company poles along the street. Upon the completion of the track job the line foreman allowed some of these wires to remain and the signal bell was connected with a contactor by this means.

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Building Good Employee Relations in Kansas City*

The Principles and Organization Plan of the Employee Brotherhood and Representation Plan Which Have Contributed to the Present Favorable Situation in Kansas City—Separate Committee Handles All Wage Matters—Membership in Brotherhood Is Entirely Voluntary

MORE and more is being heard of the fine relations existing between the management and employees of the Kansas City Railways. In view of the success that has been attained, it is interesting to present the company's view of the plan and its working. The company believes that its provisions for employee participation in the control of all matters relating to his welfare are novel, sound and successful and largely without parallel in the electric railway industry. Experience with the plan of co-operation in effect has demonstrated, it is felt, that these arrangements contribute in a vital way to every phase of the transportation service rendered. In fact, the cordial co-operation between the management and employees has been considered the very mainspring of the achievements and progress noted in respect to other phases of the railway operation.

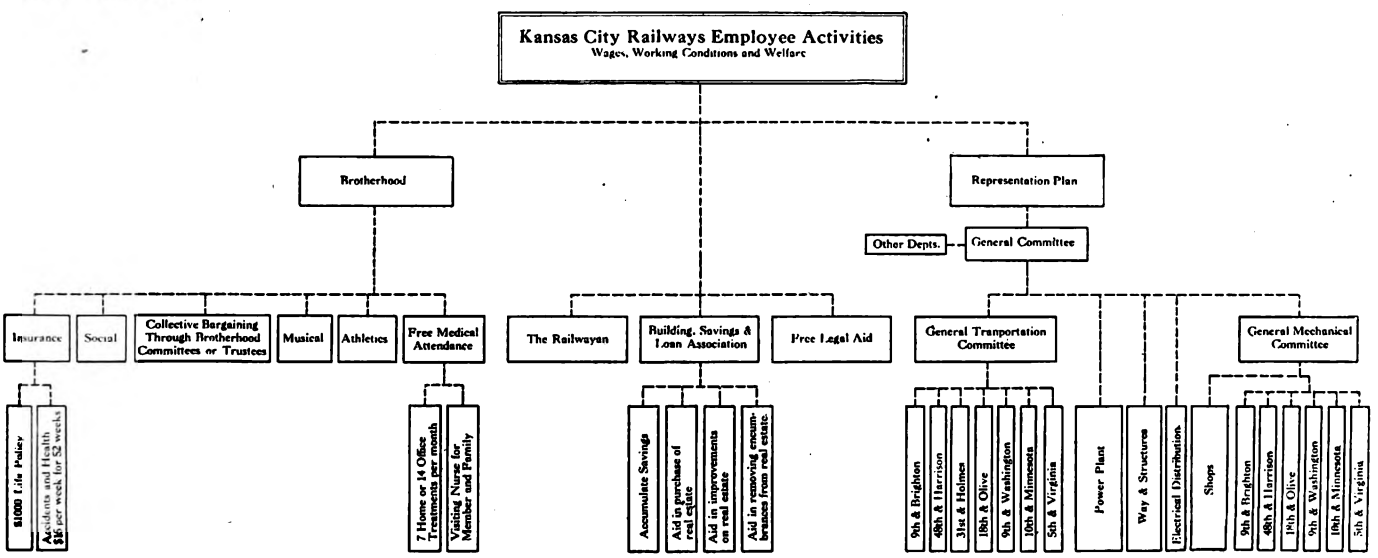

Chart Showing Kansas City Railways Employee Activities

In building up the various organizations and activities which have a bearing on employee relationship, the following ideas have been kept in mind as the cardinal principles, some of them differing fundamentally from the old accepted ideas:

1. There is no welfare work in the ordinary sense of the term on the Kansas City Railways. Men have the right to accept benefits of one kind and another, if they so desire, and not otherwise. The men pay for a large proportion of such benefits, and while the company assists financially, this assistance is never mentioned.

2. Membership in company organizations is purely voluntary.

3. The machinery for providing employee participation in the control of wages and working conditions is entirely separate and distinct from all other organizations on the property. The brotherhood, to which 97 per cent of the men belong and which handles all benefits, is distinct from the committees for adjusting wages and working conditions. The company feels that it has no more right to enforce a closed shop for its own brotherhood than it would have for a union. The plan for collective bargaining also permits the employees to act independently. There is no company dictation. The men have the right to act and deliberate as men and, to carry out this thought, meetings are regularly held in every carhouse and in every department.

4. It is maintained that there should be no secrets. Every man on the property should know what is going on, what the company is doing, what the financial reports show. These things are explained so that they may be understood. Any man, trainman or otherwise, works better when he works intelligently and when he knows the results of his work are an integral part of the organization. At the regular meetings these matters are all explained by company officials.

The above four statements represent the platform upon which the company's employee relations have been constructed. The two outstanding features are the representation plan and the brotherhood.

The Employees' Representation Plan

The representation plan of the Kansas City Railways employees provides for co-operation in the operation of the railway system. Its objects are as follows:

1. To insure to every employee exact justice in all matters of discipline or discharge.

*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.

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2. To settle or adjust properly all questions affecting wages and working conditions.

3. To provide for compulsory arbitration in a court of last resort.

4. To insure co-operation between employees and management in all matters affecting the operation of the company and the welfare of its employees.

5. To insure continuous, uninterrupted transportation service to the public.

The make-up of this organization is shown in an accompanying organization chart. There is provided an annual election in which every employee has one vote in selecting the committees representing the divisions, departments and separate units of the property. Elected representatives from these committees form department committees and finally a central committee, as shown in the chart. These committees also have management representation in the persons of various officials, but the employee members ordinarily outnumber the official members.

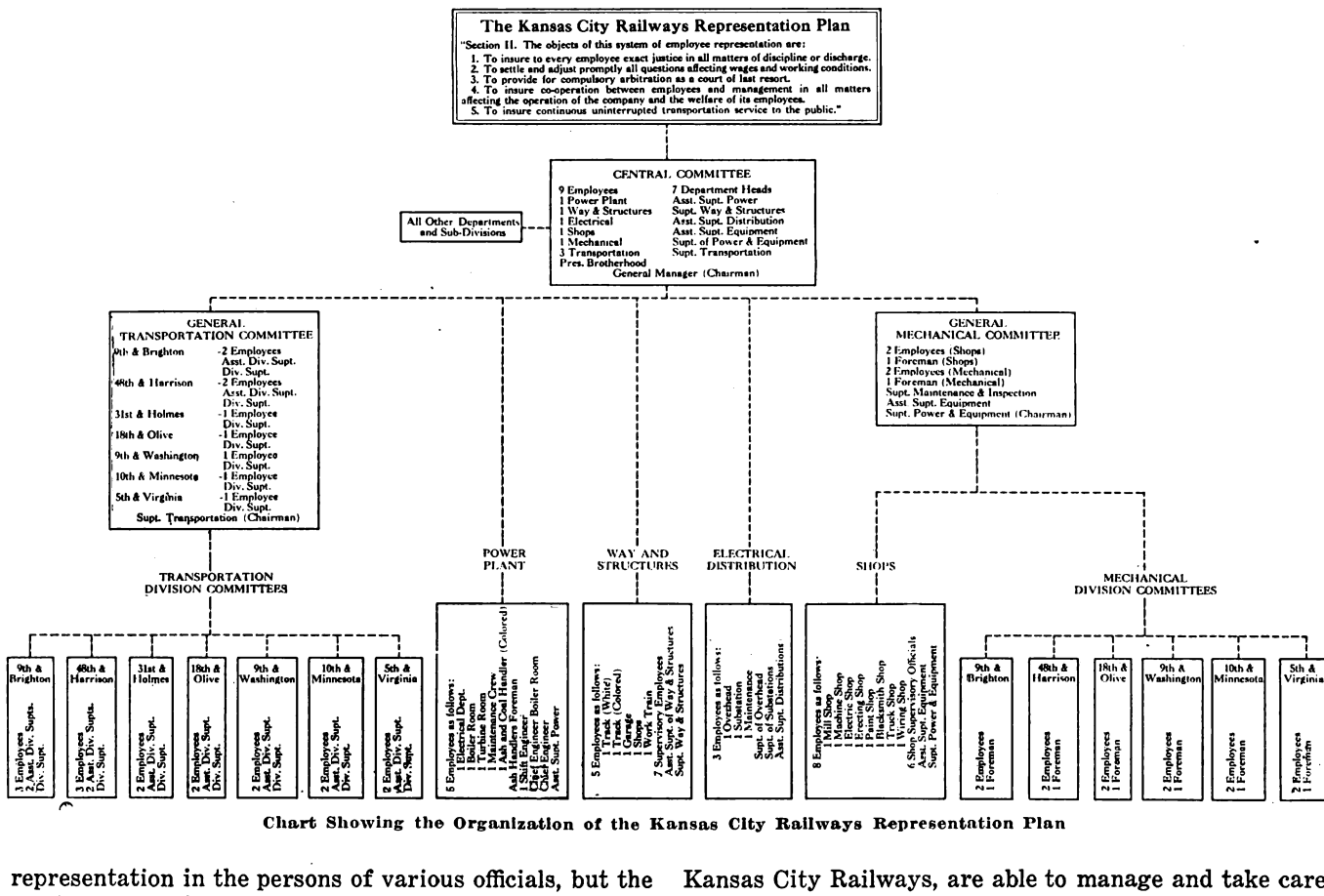

Chart Showing the Organization of the Kansas City Railways Representation Plan

The employees of each committee have separate chairmen, and at their request they can meet and act independently of the representatives of the management. These committees have the right to discuss and take up any question in connection with the operation of the system. Arbitration is provided for in the event that any matter comes up which cannot be finally disposed of in the central committee.

This representation plan has been in continuous operation since April 1, 1919, at which time it was adopted by vote of all employees. It has since been twice slightly revised. During the past two years the plan has worked so successfully that the department committees have handled all matters except two, which were appealed to the central committee, and settled there. The plan is very similar to that upon which the packing industry was organized two years ago, and it is now being extensively copied by many other industries.

THE EMPLOYEES' BROTHERHOOD

The Employees' Brotherhood of the Kansas City Railways is a voluntary organization governed entirely by the employees and formed for the purposes outlined in the constitution as follows:

"This organization is formed for the purpose of perfecting ourselves in the performance of our duties, to secure safe, continuous and reliable transportation service for the people of the Kansas Cities and vicinities, in so far as it is in our power to accomplish, and to promote frankness and a friendly spirit between ourselves and the officials of the company, having at all times due regard for the rights of the public. This association is founded upon our belief that we, as employees of the Kansas City Railways, are able to manage and take care of our own affairs and to look after our own interests without interference, advice or dictation by any individual or foreign organization; also that any organization of this nature should not have for its sole purpose only the welfare of its members, but that the spirit of loyalty to and co-operation with the company should be encouraged, and in the last analysis the welfare of the public should be paramount; that our employment is of a quasi public nature, which is too necessary for the public welfare to be interrupted by strikes of any nature whatsoever."

The brotherhood is the medium for contributing all benefits and for handling all social activities. All employees are eligible upon signing the constitution and agreeing to pay $1.75 per month. The direct benefits offered by the brotherhood are as follows:

1. A $1,000 life insurance policy. No physical examination is required, and all employees belonging to the

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brotherhood are also privileged to take out $2,000 additional insurance if they so desire.

2. A non-cancellable accident and health policy, which pays $15 a week for fifty-two weeks.

3. Free medical attendance, the brotherhood maintaining a corps of physicians, one located near each station, whose services are free to all brotherhood members.

4. Free nursing service through an arrangement with the visiting nurses' association.

5. Special entertainment, such as dances, picnics and other parties. The funds for this purpose are prorated among the various divisions and departments.

6. An eight-team baseball league, which plays upon a park owned and controlled by the brotherhood.

7. A fully equipped and well trained band.

8. The brotherhood furnishes counsel and handles the case of any employee who has been disciplined and who desires to present his case before one of the representation committees.

9. Free legal aid. An attorney is maintained by the brotherhood and his services are at the disposal of any member for any purpose.

10. A co-operative grocery store where food products may be bought at cost.

11. Completely equipped restaurants in the shops, power plant and divisions, where well cooked meals are served at cost price.

The brotherhood is managed by a board of sixteen trustees, all selected by the employees from the various divisions and departments.

Another part of the employee work on the Kansas City Railways is that of the Kansas City Railways Building, Savings and Loan Association. This organization is managed by the employees. It was organized in 1917 and today has assets of over $300,000. The employees are contributing savings at the rate of $10,000 monthly. Interest, compounded semi-annually, is paid at the rate of 6 per cent, and this money is loaned only to employees on real estate for house-building purposes.

Another important instrumentality in fostering good relations between management and employees is the publication monthly of an official magazine, the "Railwayan," under the supervision of the brotherhood trustees.

Something of the Results Obtained

It would be difficult to find a finer spirit of co-operation than that existing in Kansas City. The employees' organization has been subjected to numerous tests and has never failed to respond. As with public good will, it is extremely difficult to show tangible results from work of this kind, but the management believes that many phases of the showing made on this property in the last few years are directly traceable to the spirit existing among the employees. As examples of the ways in which this relationship has given tangible results, the following are cited:

Straight platform time only is paid, with the exception of five minutes for taking out and putting away cars and thirty minutes for an accident report. There are no so-called straight runs on the system, all daylight runs have noon release of from one hour and forty-five minutes to two hours and thirty minutes. The average run is 10.4 hours and no overtime is paid.

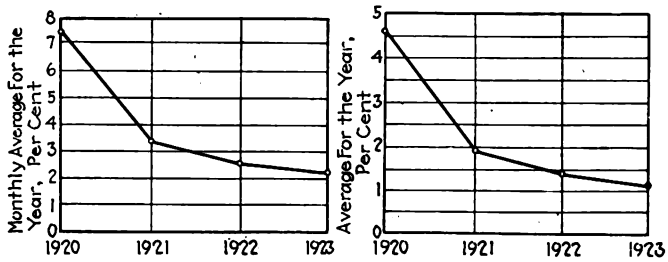
A monthly guarantee of $110 for all show-ups and for accepting all work offered costs the railway company, with its 1,800 trainmen, an average of less than $125 a month, this being the amount paid on guarantee over actual time worked.

In reducing forces, efficiency only is taken into consideration, and at every shake-up the least desirable men are laid off without controversy.

The brotherhood trustees and the various committee men, numbering 250, form a standing committee for the purpose not only of adjusting grievances but for securing better, more courteous and more economical service. Ninety per cent of the work of these committees is along such lines.

On every occasion the employees have manifested a most cordial and helpful feeling toward the company. For example, at numerous jitney hearings before the City Council the employees have presented petitions and their committees have appeared before these hearings to protest against the operation of jitneys.

When the property went into the hands of receivers the employees presented petitions to the courts and employed an attorney to represent them in the receivership proceedings, and their only request was that the rela-



Effects of Improved Employee Relations on Labor Turnover

At left, voluntary resignations and discharges of trainmen. At right, per cent of inspections showing irregularities in fare collection.

tions that existed be not disturbed and that nothing be done by the court or receivers that would permit the Amalgamated to secure a foothold. Several resolutions have been passed by the employees on special occasions during the past two years expressing similarly their satisfaction with the present conditions and emphatically discouraging any idea of unionization.

The Kansas City Railways exercises the same care in securing the proper class of employees, mentally and physically, that it does in purchasing machinery or equipment. Employment rules are very rigid. In so far as possible only men under thirty-six years of age are accepted for employment in any department. A strict insurance examination is given and applicants in all departments must meet this physical requirement. Bad teeth and other physical defects must be attended to before the company physicians will certify the applicant.

No man is employed who has worked for any other system. This is done for several reasons, one being to protect the property against men with positive views on labor matters irreconcilable with the brotherhood and representation plans. Another reason is that the company considers it better to instruct and educate its men in its own methods rather than to employ men who have had previous experience in other methods.

Photographs are taken and a record kept of the service performed by every employee in every department of the company. These photographs are sent with reference letters and all references checked up in Dun's and Bradstreet's. Fifty per cent of the employees are ex-service men. Old and disabled employees, whose length of employment justifies such action, are retired on a pension. The average monthly pension is $50.

In September, 1922, the company instituted schools of instruction for employees. The employees meet weekly

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and lectures are given by officials on all details of operation, mechanical and electrical matters, etc. A foreman's association, made up of all foremen, assistant superintendents and division superintendents, meets monthly. Lectures and instruction are provided by qualified men in the industry. Through arrangement with the International Correspondence Schools, 200 employees are taking courses. These men are assisted weekly by the technical men on the property.

"Better Service" Slips for Comments of Passengers*

ON THE lines of the El Paso Electric Railway all inspectors and trainmen are supplied with pads of "Better Service" slips, on which may be written any comments which come to their attention regarding the service. These comments are sometimes complimentary, and sometimes unfavorable, but in any event the slip is made out and is turned in to the proper department, where it receives immediate attention. Many suggestions from passengers are thus conveyed to the management and whenever possible are adopted, not only benefiting the service itself but almost invariably arousing the appreciation of the person making the suggestion.

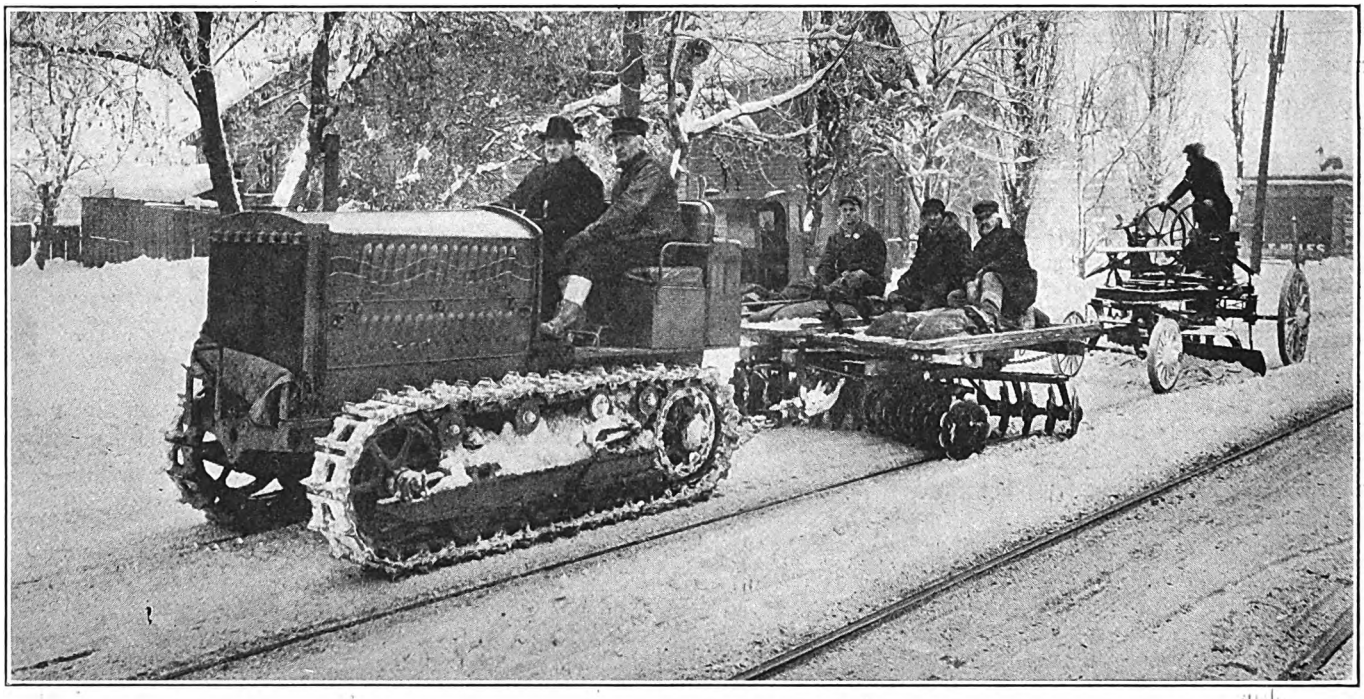
Warning Sign on Trolley Rope Protects Worker

THE Conestoga Traction Company, Lancaster, Pa., has reduced the danger of accidents to men working on the electrical car equipment in the railway shops by using a danger sign which is hung on the trolley rope. During repairs to controllers, circuit breakers, etc., the trolley pole is pulled down from the overhead wire. A small sign lettered in white on a red background reads: "Danger, Don't Put Up Trolley." This sign is fastened to a spring clasp which grips the trolley rope. As soon as the trolley pole is pulled down from the wire the warning sign is hung on the rope and it remains there as long as the electrician is working on the car.

Snow-Fighting Equipment in Spokane*

ALTHOUGH severe snows are not very common in Spokane, Wash., and a comparatively small snow-fighting equipment is required, occasionally there takes place what for Spokane is a very heavy fall. Such an event occurred last winter on Feb. 12, 1923. All of the snow-fighting equipment, including three rotary sweepers and two large shear plows, was put promptly into service. Even this equipment seemed at first inadequate to care for the storm, which was the most severe in the history of the company, especially as it was accompanied by high winds, which caused heavy drifts. Obviously some special efforts were required to keep the lines open, especially to clear the snow from the special work in the downtown district, and the ingenuity of the management was called into play.

Recourse was finally had for this kind of service to tractors with road graders and harrows, a 5-ton tractor pulling a road grader. Sixty men from the line, track and bonding crews followed, assisted by 140 extra snow shovelers.



Ten-Ton Tractor Hauling Heavy Duty Disk Harrow and Road Grader to Clear Track of Ice and Snow in Spokane

In the following twenty hours the company used a 10-ton tractor pulling a rotary disk harrow, followed by a grader, to cut out the packed snow and ice between the rails. This method, first used in an emergency to keep the motors from dragging and lifting the wheels from the rails, was found unusually successful. As far as the company knows, it is the first to use a rotary disk harrow in fighting snow and ice on the track. The disk was found to be the only implement that would cut hard ice down to the pavement without doing damage to the pavement.

The harrow used was a "heavy duty implement," made more heavy by being loaded with sand bags, and on account of the angle in which the disks are set, the ice is easily chipped out. This eliminates expensive labor cost in cutting and flanging with picks. The illustration shows the equipment at work.

*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.

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Arbitrators Specify Detroit Payments

The Report of the Board Discusses the Sums Payable as "Cost" and "Compensation" by the Detroit United Railway to Secure the Entrance of Its Interurban Cars Into the City of Detroit

WHEN the city of Detroit took over the city tracks and equipment of the Detroit United Railway in Detroit the contract between the city and the company provided that the latter should be allowed to use the city tracks for its interurban and suburban service substantially as was the case at the time the contract was signed. It was provided that these cars were to be operated by the crews of the company, that the company should pay all claims for damages caused by this operation while on the city tracks and that the cars should not carry local passengers. For the use of the track and power required by the cars while on these tracks the company was to pay the city "such compensation as may be fixed by agreement . . . or by arbitration." The contract also provided a somewhat different basis for certain other track belonging to the Detroit United Railway originally part of the interurban lines outside the city limits, but brought into the city through the annexation of the territory. Although the franchise on these lines had not expired and the company did not want to sell them, the city finally took them over because it thought it should own all the street railway tracks within the city limits. On these tracks, the contract specified, the company was to pay nothing for the use of the tracks and to pay only the "cost" for power. As it was impossible to reach an agreement the subject of the amounts which the Detroit United Railway should pay the Department of Street Railways for this use of city tracks was referred to a board of arbitration, consisting of William E. Davis, Cleveland, Ohio, chairman; Harold M. Gould, electrical engineer of the department, for the department, and Prof. Henry E. Riggs, University of Michigan, for the company. The news columns of this paper have given an outline of the decision of the board, recently rendered, but a more extended abstract follows:

Meaning of "Compensation" and "Cost"

In the arbitration the first question the board had to answer was what is meant by the terms "compensation" and "cost," as used in the contract, and to what extent if any either includes a return on the investment and deferred maintenance and rehabilitation charges. After extended discussion and quotation of cases, particularly Knoxville vs. Knoxville Water Company, 212 U. S. 13; Boston & Worcester Railroad Corporation vs. Western Railroad Corporation, 14 Gray's Reports, Mass. 255; Metropolitan Railroad Company vs. Quincy Railroad Company, 94 Mass. 271, and Metropolitan Railroad Company vs. Highland Railroad Company, 118 Mass. 291, the board decided briefly as follows:

"That 'compensation,' as used on the contract of March 10, 1922, means something more than 'cost.'

"Cost is clearly limited to a repayment of a proper proportion of all actual outlay for the proper maintenance and repairs of jointly used property, a proper proportion of all operating costs incurred by reason of joint occupancy, and of taxes, and of the cost of replacements of parts of the property as they wear out in service under the present owner; and over and above these, the board holds that some reasonable payment shall be made for the use of capital invested in the jointly used property (including working capital), which the board determines shall be the average rate of interest paid by the city.

"Compensation includes all of the elements included in cost, plus an increased rate of interest above that actually paid. This added increment the board has fixed at 1½ per cent after full consideration of cost of money to corporations and municipalities."

It was also determined that the value of the property should be considered as that at which it was taken over by the city, plus the cost of additions, betterments and rehabilitation, or, in the case of plant and equipment owned by the city and not acquired from the company, the cost of rehabilitation was not included.

Car-Mile or Ton-Mile Basis

Witnesses for the city contended that the heavier equipment of the Detroit United Railway caused excessive maintenance of roadway structures and overhead lines, whereas the company argued that the damage to the tracks was not in proportion to the weight of the cars, as the interurban cars ran at a more uniform and lower maximum speed, did more coasting and made fewer stops and starts. The company also contended that the "ton-mile basis" meant greater complication of accounting, especially as with passenger cars it would require an assumption of the average length of passenger ride and average weight per person.

The board decided in favor of the ton-mile in expenses relating to way and structures, equipment, conducting transportation and power, but to simplify calculations on this basis decided that from May 15, 1922, to June 30, 1923, an average freight load of 9 tons be taken for all the company's freight cars and an average load of 3 tons for all the city's freight carrying service cars. For all determinations after June 30, 1923, the average weight of freight carried by the two classes of equipment is to be determined monthly and applied, while for the passenger cars and non-freight carrying service cars the equipment weight only will be taken.

Allocation of Operating Expenses Between Joint Use and Sole City Use

The allocation of department expenses, outlined by the accounting officers of both sides, follows:

(*a*) *Way and Structures.*—Superintendence of way and structures (account 1) is prorated over and added to accounts 2 to 27 inclusive.

Equalization is to be cleared at the end of every fiscal period.

Track and track structures, accounts 2 to 27, except account 24, are considered as joint use. Account 24 is considered as joint use in the proportion that the cost of jointly used buildings for other than power purposes bears to the total cost of buildings not including those used with power.

(*b*) *Maintenance of Equipment.*—Superintendence of equipment is prorated over the other accounts.

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All cars and rolling stock are considered as exclusive city service, except the service equipment and locomotives, which are considered joint.

Air compressors in air charging stations are considered as joint or exclusive city service on the basis of actual use.

All other shop equipment, shop expenses and miscellaneous equipment expense, and accounts 40 to 43, if used, shall be considered joint as they relate to service cars. Allocation is made in the ratio of jointly used city service car ton-miles to the total city ton-miles.

Vehicles and horses are considered as being entirely for joint use.

(*c*) *Power.*—All power accounts shall be considered as joint use.

(*d*) *Conducting Transportation.* — Superintendence of transportation is prorated over the other accounts.

Accounts 64, 65, 68, 69, 76 and 77 are applicable entirely to the Department of Street Railways.

Accounts 66, 74, 75 and 78 are entirely for joint use.

All other accounts are considered joint to the extent that they refer to air compressors and air charging stations or service equipment.

(*e*) *Traffic.* — All traffic accounts shall be considered entirely applicable to the Department of Street Railways.

(*f*) *General and Miscellaneous.* — These accounts are allocated as between exclusive city use and joint use on various bases consistent with the method of allocation used in all previous accounts.

Contract Division Into Schedules "A" and "D"

The contract establishes an arbitrary division of track purchased into schedules "A" and "D." On schedule "A" tracks the company is to pay "compensation" for the use of track and power. On schedule "D" tracks the company is to pay the "cost" of power, but is not to pay rental in any form for the use of such track, nor any part of the cost of maintenance or replacement of the track or facilities, except those required for power distribution.

In commenting on this provision of the contract the board says that the actual keeping of operating expenses separately between these divisions is impracticable, and allocation cannot be made with mathematical accuracy. Schedule "D" property consists of 18.2944 miles of track. The buildings now associated with this track are so insignificant they may be disregarded. The capital value of the property listed in schedule "D" can best be secured by determining the average cost of all the track system purchased by the city from the company and allocating costs between schedule "D" track and schedule "D" on the basis of single-track mileage. The division of operating expenses on the same basis recommended is the division of the entire amount of operating expenses (except power) allocated to joint use, by the total ton-miles or car-miles (applicable under the rules established in the decision) by all cars of both interests on this division.

Grants for Special Damage

The city made claims for damages to rails, special trackwork and trolley wire because of the use by the D.U.R. of worn or wide tread car wheels and an overhead sliding current collector. The board eliminated all claims for damages due to alleged wheel wear, but at the request of both sides established, with their co-operation, a standard wheel wear gage for all foreign cars that may operate on city tracks.

In regard to the sliding shoe which is used extensively on the D.U.R., the board found that the company lubricates the trolley wires on all of its interurban lines where this collecting device is in use, but the city lines are not so lubricated, nor were they when owned and operated by the company. The board therefore decided, pending a further agreement between the two parties as to the proper form of contact, that the company should lubricate at its own expense the trolley wire on all lines of the city over which it operates cars equipped with the present type of shoe. This lubrication should be applied at least three times a week.

Allocation of Capital Charges

The division of operating expenses having been worked out, the report takes up the question of capital charges, i.e., "fair return" on the investment. The board found the total investment in physical plant, as of May 15, 1922, to be $33,659,913, made up as follows: Cost to the city of lines built and equipment newly purchased by the city, $11,502,659; cost to the city of the so-called "day to day" purchases, acquired for a lump sum, plus legal expenses, $2,307,254; amount paid to company under purchase contract of May 15, 1922, $19,850,000. The single track mileage is taken as 372.5931 on May 15, 1922, and 373.8510 on June 30, 1923.

It was also decided that a car-mile, and not a ton-mile, basis should be used for the division of fixed charges, because in this case there is lacking the element of increased cost due to the weight of cars, or if there is any greater investment, this investment is reflected by larger fixed charges.

The report then lists the capital accounts, according to whether they represent investment for joint use or sole use by the city, and it is found that of the total investment of $33,043,673 in the property in schedule "A," that portion to some extent in joint use represents an investment of $20,520,199, and the property used exclusively in city service represents an investment of $12,523,474.

In regard to working capital, the board considered it should be included as part of the investment and to keep the computation simple made an allowance of 4 per cent on the fixed plant investment as working capital to include working cash capital and stores and supplies. The resulting amount was divided between the parties to the contract in the same proportion as the fixed plant was divided, namely, investment allocated to power to be on the ton-mile basis, and all other investment on the car-mile basis.

In the case of superseded, but still existing property, the board holds that retirement from actual joint service should result in the property being taken out of capital allocated to joint service. Only where the necessity for reserve service and the actual use of the particular unit in such service can be clearly shown should an exception be made to the rule just stated, and a reasonable time limit should be fixed, in which there should be actual use.

Rate of Return

As the board had decided that the word "compensation" meant something more than cost, it had to determine a reasonable rate of return on the investment of the city. As the basis for the rate, the board decided that the weighted average rate of interest on all outstanding Department of Street Railways' obligations should be accepted, and that to this should be added, to cover the elements of excess cost of financing, cost of retiring securities, maintenance of credit, periods of financial depression, panic or other hazards, an additional 1½ per cent, and that this rate should be applied to the investment (including working capital) in the jointly used property.

The board found that for the period May 15, 1922, to

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June 30, 1923, the base rate, as so determined, was 5.5434 per cent, and so set this figure, plus 1.5 per cent, or a total of 7.0434 per cent, as the return for that period. It also found that for the month of July, 1923, the cost rate was 5.477 per cent and the compensation rate 6.977 per cent and recommended that the future rate be determined in the same manner, so long as the Department of Street Railways continues to have a funded debt. If all this debt should be paid off, the weighted average to be taken is that of all the city of Detroit indebtedness, for "cost," and that 1½ per cent is to be added to this figure for "compensation." The board also directed that payments to sinking funds made by the Department of Street Railways to retire its capital obligations should not be taken into account in fixing "fair return" or "compensation."

Taxes and Depreciation

Although municipally owned, the street railways of Detroit are subject to taxes, and the city charter of Detroit provides: "The rate of fare on such street railway system shall be sufficient to pay . . . taxes on the physical property of the entire street car system, the same as though privately owned." The board decided that the actual amount of taxes (real and personal) paid on the jointly used property should be apportioned upon the ratios already outlined.

In regard to depreciation, the board considered that a property in proper operating condition is worth the entire investment in it and that any decretion or "loss in service life" represented by the difference between the 100 per cent operating condition and the 80 to 85 per cent physical condition may properly be ignored either in valuation or accounting for replacement. Continuing, the board declares that until such time as the city actually establishes a reserve for replacement there shall be no charge for "replacement" or "depreciation" included in the compensation to be paid by the company. When such reserves are established, a separation shall be made as between the joint property and property devoted exclusively to city service.

As giving an idea of the extent of the use of the city property by the interurban cars, the following table used by the board in the rental computation from May 15, 1922, to June 30, 1923, is given:

	Car-Miles	Ton-Miles
City	55,613,892.00	954,987,807
Company	3,148,324.98	97,881,915

Part of the power used on the street railways in Detroit is generated and part is purchased from three sources, namely, Detroit Edison Company, Michigan Central Railroad and Detroit United Railway. Altogether, for the thirteen-and-one-half-month period mentioned, the total energy generated and purchased by the city was 192,451,573 kw.-hr. For the purpose of determining the payment for power for the period mentioned, and for the future until the two parties should have agreed to some other base, the board laid down the following units, to be assumed as the energy used for the propulsion and heating of cars:

	Watt-Hours per Ton-Mile
Company and city passenger cars	120.4
Company service cars and city's non-freight carrying service cars	120.4
Company freight cars and city freight carrying service cars	61.6

For heating, for the period mentioned, between Oct. 21, 1922, and March 31, 1923, the figures taken were:

	Kilowatt-Hours per Car-Mile
Heaters on city safety cars (Birney type)	0.52
Heaters on city (Peter Witt) cars	1.17
Heaters on Lake Shore electric cars	0.648

Based on the agreement and adopted units, the energy consumption of the system for the thirteen-and-one-half-month period mentioned is computed as follows:

	Kilowatt-Hours
Total energy used in heating	4,296,961
Company passenger and service cars	10,456,753
Company freight cars	879,132
City passenger and non-freight carrying service cars	114,713,163
City freight carrying service cars	136,792
Total car propulsion and heating	130,482,801

Energy used for other than city car operation, as for shops, amounted to 12,029,746 kw.-hr.

The board estimated the total losses in distribution and unaccounted for at approximately 25 per cent.

For the thirteen and one-half months under consideration the total cost to the city for power generated and purchased was $2,258,558.65, or $0.012022 per kilowatt-hour, and as the word "cost," as defined, includes the elements of interest on the investment, the board fixed the figure for payment at $0.015410 per kilowatt-hour for "cost" and $0.015860 per kilowatt-hour for "compensation."

Summary of Award

Based on the considerations mentioned, the board made the final award:

TO THE CITY	
Compensation for use of Division A tracks (including all general and miscellaneous and taxes)	$257,916.04
Power on Division A (excluding general and miscellaneous and taxes)	205,809.30
Total compensation on Division A (without interest on deferred payment)	$463,725.34
Cost of power on Schedule D tracks	39,723.20
Interchange power, sold by the city to the company	32,229.53
Total due the city on award (without interest)	$535,678.07
Interest on deferred payments	14,284.75
Total amount due the city on award, including interest on deferred payments	$549,962.82
TO THE COMPANY	
Interchange power, sold by the company to the city	$55,158.60
Interest on deferred payments	1,470.89
Total amount due the company on award, including interest on deferred payments	$56,629.49

The report occupies eighty-nine pages of a printed report. Included also in the report are an abstract of the findings, a list of the exhibits and a report of the energy consumption of cars and heaters. An abstract of this report on energy consumption will be published in a later issue of this paper.

Effect of Decision

On Dec. 19, following the report of this decision, the Detroit *Times* said that the sum mentioned above as that which the Detroit United Railway owes the city for power and use of tracks during the last thirteen and one-half months was considerably less than had been estimated by the city. According to the *Times*, the report for November for the municipal railway, printed before the board findings were announced, contained an estimated income of $78,786 for rent of tracks and facilities during the month. The decision would cut the department's November net earnings from $60,000 to approximately $21,000 and the net profits for the fiscal year ended June 30, 1923, from $938,000 to something less than $400,000.

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Railway Facts by Radio

Edward Dana Broadcasts an Explanation of Boston Elevated Conditions—Also Some Statistics on Boston Transit Requirements

THE radio authorities of Boston recently arranged with Edward Dana, general manager Boston Elevated Railway, to give four talks over the radio on railway conditions in Boston. Two of these have already been given, and were sent out from stations WNAC and WGI. Both related primarily to conditions on the Boston Elevated. Portions of these talks are reproduced below in the belief they may be of help to other railway managers who may be asked to give similar talks:

Evening finds the majority of those who constitute the large army of car riders enjoying home comforts. Even those whose patience is sorely tried during the evening rush hour, I feel sure, will gladly spare a few moments to reflect upon the problem of transportation which so vitally concerns everybody. Radio broadcasting, one of the marvels of our age, offers me the opportunity denied to the managers of yesterday.

The organization (which I represent) of 10,000 of your fellow citizens who render this necessary transportation service you require appreciate the opportunity offered by radio broadcasting. Under our present service-at-cost arrangement these 10,000 individuals become public servants and not profit-seekers, and they are concerned only in rendering the best service which the revenue received will allow. I can assure you that these men and women as a body appreciate this fact and are sincere in their desire to render satisfactory service.

They likewise go home after the rush hour just as you do. Their children go to school with your children. They attend church with you and the strain of the rush hour is just as much theirs as yours. The problem is a mutual one, and like all such problems is best solved when all concerned attempt to realize the difficulties and co-operate to overcome them.

Those of you who own automobiles and have taken a trip without allowing any too much leeway can remember your emotion when you faced a 10-mile detour. It was an annoyance. It may have irritated you, especially if the country road over which you detoured was poor and you may have been late for dinner, but you adjusted yourself to the difficulty, and, because you were your own master, it may be that you made up some of the lost time. But when a trolley car under similar circumstances comes to a drawbridge that is open, a railroad crossing blocked by a train, a fire, broken-down trucks or other obstructions, or a traffic jam, there is no detour. The car which for ten minutes is held up by an open drawbridge at half-past four would have passed through Park Street Subway station at five o'clock. The ten minutes it lost earlier cannot be made up, and the rush hour conditions are made worse. The passenger who is delayed and crowded cannot understand the reason because it happened a half hour before and miles away.

Your railway—the Elevated—carries 380,000,000 people a year. That is more than twice as many passengers as are carried on all the lines of the New England steam railroads. That is nearly four times the population of the entire United States.

To carry this traffic 52,000,000 car-miles are operated a year, which is equivalent to 109 round trips to the moon and over half the distance to the sun.

The tons of coal burned annually to generate the electric current which moves this traffic are 278,000. That amount of electric current would keep a 36-watt light burning in your front hall for 811,918 years.

Under modern conditions, winter and summer, snow or rain, we are so close to this service that we fail to appreciate its proportions, and we fail to notice its good qualities, what it means to us as the very life-blood of our metropolitan city. We are all too prone to criticise it for its weak points and its lack of detours.

The old idea or attitude toward a street railway was to regard it as a rich corporation and anything that could be got out of it as velvet. Such an idea today with reference to the Boston Elevated simply reacts to injure the car riders themselves.

Reduction in operating costs in the last two years has made possible the establishment of 5-cent lines, until now more than 300,000 passengers every day pay only a 5-cent fare. Anything which further reduces the cost helps to make possible these routes and the improvement of the service. On the other hand, when unnecessary expenses are forced on the railway it tends to restrict these routes and to prevent the improvement of the service.

When a demagogue argues that the Elevated should bear this or that expense or cart away all the snow from the streets where it has tracks, it still sounds good to some people, but what it really means is that a large number of car riders will pay a larger car fare than they would otherwise have to pay.

Similarly as to service. When a street car carrying fifty passengers is repeatedly held up by traffic congestion each of the persons on that car has lost valuable minutes of his own time and the cost of the service is increased, for the lost minutes increase the operating costs. All this might be saved if the car riders insisted, as they have the right to do, that as they constitute the large majority of citizens using the highways they should have the right to use them without being blocked to such a degree.

It has been discovered by study that there are five times as many automobiles in large cities as street cars but they carry only one-fifth as many people. Is it fair that 20 per cent of the people riding in five times as many vehicles should seriously interfere with the transportation of 80 per cent of the people?

In the past it has often been the practice to enact laws and ordinances hampering the economical and satisfactory operation of street cars. For example, on certain streets automobiles are permitted to go 20 miles an hour and ordinances forbid a street car to exceed 12 miles. The surest way for reducing costs and improving service today is for the car riders to appreciate this fact and to insist that their representatives enact laws and ordinances giving to them the right to have their street cars run without disastrous interruption by other vehicles.

Budget System Effective*

Kentucky Company Has Used This System of Control Since 1911—Management and Department Heads Enthusiastic Over Results

THE operation of the Kentucky Traction & Terminal Company is based upon the budget system of control, which has been used in connection with the various properties of this company since 1911. The budget estimates are made covering the period of a year, and are set up in detail for each month. Every officer or department head has his budget figures and his actual results at the end of each month.

The management believes that this matter of estimating future work by the organization has proved to be of great value, first in building up and bringing out the real worth of the individual department heads and sub-organizations; and second, in presenting to the board of directors statements which forecast the income and expenditures for the ensuing year. Since the budget has been followed for several years, it is possible to forecast several years in advance. Based on the total averages for the past twelve years the budgets have been within 1.1 per cent correct.

It is stated that the value of the budget as a progressive and constructive method of building up the sub-organization cannot be estimated, but it is fully realized by the department heads as well as by the board of directors. The preparation of these budgets, involving a great deal of work on the part of the organization, has been the means of uncovering many unnecessary expenditures, and the refinement in many ways of operating costs.

Based on these budget data, cash position forecasts are also worked out in detail for twelve months for the

*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.

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ensuing three-month period, for the purposes of the board of directors. Construction budgets are similarly prepared a year in advance, as far as practicable.

Of the value of the budget General Manager J. P. Pope says that it shows monthly what has been accomplished and tends to limit unimportant expenditures. It keeps the department heads advised of the actual compared with the theoretical position of their departments. It relieves executives of unnecessary conferences over expenditures and gives an opportunity for investigation and correction of accounts that are out of line.

From the standpoint of the auditing department, the budget expedites the work of auditing by enabling the bookkeepers to check the distribution of charges made by the department heads to the various accounts. From the standpoint of the treasury department, the budget makes it possible to prepare cash position statements for a period of many months in advance with almost unbelievable accuracy, and this has resulted in savings of many dollars of interest on the floating debt.

Henry Bush, superintendent of transportation, says that the budget keeps him in close touch with the earnings and expenses of his department, and furthermore, he believes it has a tendency to create a friendly rivalry between department heads which keeps every fellow on his toes. It is also very helpful to be able to foretell approximately the amount of business to expect by divisions and the expenses of each from year to year.

W. G. Stuck, master mechanic, commented that the budget control requires that constant attention be given every detail of expenses, and that special effort be made by each department head to meet his particular estimate in order that the company estimate may not be exceeded. It is conducive to greater co-operation by all departments, looking toward the success of the company.

Company Collects from Careless Automobile Drivers

THE claim department of the Holyoke Street Railway has adopted the policy of collecting damages from automobile owners who through negligence or carelessness have caused damage by collision to the street cars. The purpose is not so much to be reimbursed for the damage suffered as the psychological effect which the court decisions have upon operators of automobiles. In the past such drivers have seemed to act as if the street car had no right to the street.

The people who use the cars are in sympathy with this policy. They know that in the final analysis they have to pay the bill, and they also realize that such a policy tends to decrease interference with traffic and therefore contributes to better service.

Salt Car Prevents Ice Formation

THE York Railways, York, Pa., operates a salt car very similar in construction to the ordinary sand car, except that it is equipped with three outlets for each rail. One outlet throws the material inside the rail; a second on the outside of the rail, and the third throws it directly on the rail. Rock salt is mixed with sand, and the mixture is dropped on the rail in the usual manner. This car has been found useful to prevent the formation of ice in the groove of the rail or in switch frogs.

The Readers' Forum

Merchants React Favorably to Traffic Suggestion

THE Elmira Water, Light & Railroad Company, Elmira, N. Y., reprinted the editorial from ELECTRIC RAILWAY JOURNAL of Nov. 10, 1923, entitled "A Basis for Getting the Merchants to Accept Traffic Regulation" and sent it to the local merchants accompanied by a letter from F. H. Hill, vice-president of the company. This editorial pointed out in the main how it is to the business interests of the downtown merchants to co-operate in making street car operation rapid by elimination of parking and other practices that contribute to congestion. The reaction of the Elmira merchants to the suggestion made is widened by four of the letters received by Mr. Hill, which follow:

"Thank you for the reprint of ELECTRIC RAILWAY JOURNAL article on traffic regulations. Personally, I believe the points made in this article are sound, but I feel that it will require much educational work to get this viewpoint over to the average merchant.

"I shall be glad to co-operate at any time in any campaign that will tend to clear up the congested condition of our downtown streets, and to speed up traffic and business."

"I have yours of the 3d with inclosure reprinted from the ELECTRIC RAILWAY JOURNAL, which I have read with interest.

"In my opinion, our parking system has been radically wrong and I am firm in my belief that no cars should be parked on Lake Street between Market and Water Streets, on Water Street between Lake and Maine Streets, nor on Main Street between Water and Grey Streets. While I realize that some retail merchants would hold up their hands and say "murder" at this suggestion, nevertheless I feel sure that if they would figure it out they would agree it is best. I feel sure if an investigation could be made, they would find that the occupants of cars parked in front of their stores often walk a block or two to purchase goods from another store. If the street were clear of cars it would give freer access to those wishing to enter the stores and also allow for a better appearance of the store.

"I have read with a very great deal of interest the clipping regarding traffic regulations which you sent me on Jan. 2, and have been thinking this problem over ever since. I agree with the writer that it is one of serious moment, and I am sorry not to have in my mind a ready-made solution for it. I am keeping this clipping and intend to take up the subject matter with some of my friends and some of the business organizations and see if we cannot stir up a little sentiment which may help in the solution of the problem."

"Thank you for yours of the 3d inclosing a copy of a letter you sent to the downtown business men.

"Personally I believe the article contains meat for real thought and much sound logic. The traffic problem is rapidly getting to be very serious and it is going to call for the united and best effort of everybody concerned to effect any relief."

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Association News & Discussions

American Association Executive Committee

THE American executive committee held a regular meeting in New York on Jan. 11. The members present were President Britton I. Budd, Executive Secretary J. W. Welsh, C. L. Henry, W. H. Sawyer, F. R. Coates, R. P. Stevens, J. N. Shannahan, J. H. Hanna, R. I. Todd, H. A. Johnson, L. H. Palmer, W. H. Hyland, A. W. Brady, Edward Dana, C. E. Morgan, J. K. Punderford, W. F. Ham, E. F. Wickwire, C. S. Hawley, M. B. Lambert for H. D. Shute, A. A. Hale, J. G. Barry and C. R. Ellicott.

Secretary Welsh reported briefly for the joint committee on national relations, giving a summary of the committee's recent meeting. Mr. Budd stated that the committee assigned to consider the advisability of actively supporting the National Transportation Institute had not been able to meet as yet. Reporting for the committee on national relations, Mr. Henry said that he was endeavoring to get a postponement of the Jan. 23 hearing before the Interstate Commerce Commission on the interpretation of Section 15-A of the transportation act. He urged upon the members the very great importance of giving this matter close attention, as the question of whether electric railways are to be included under the provisions of the act, which requires that all earnings in excess of 6 per cent be returned to the commission, hinges upon the interpretation of the clause in the act to the effect that electric railways are not included under the provisions of the act unless they are part of a general transportation carrier or engaged in the general transportation of freight.

If the electric railways are included under this provision, the commerce and transportation acts are so worded that it is entirely possible that electric railways would also ultimately come under the jurisdiction of the United States Labor Board. Further details of this situation are presented in the summary of a letter about to be sent out to all member companies by Mr. Henry's committee, which is given on page 73 of this issue. Mr. Henry said that this provision of returning any excess over 6 per cent would be more serious to electric railways than to steam roads because they are not able to secure money at rates of 4 and 5½ per cent as the steam roads are. He pointed out that a few electric lines believe they are included under the act and want to be, because they are practically electrified steam roads and their principal business is in interchange of freight.

Mr. Coates reported for the committee on subjects and meetings, presenting an outline of the program for the Midyear Meeting and the speakers to be secured. This was approved by the executive committee and will be announced shortly. Mr. Lambert suggested that representatives of the motor vehicle industry be invited to attend the meeting; and as one of the subjects to be considered is traffic congestion it was thought especially appropriate that this be done.

Mr. Sawyer reported for the publicity committee and R. P. Stevens reported the additions and changes in the membership, these reports being approved.

Mr. Brady reported for the committee on relations with automotive industry organizations and said that considerable progress had been made at the meeting held early in December with a committee of the National Automobile Chamber of Commerce in establishing satisfactory relations. He said that the re-editing and revision of the annual bulletin of the chamber covering a discussion of the desirable provisions of laws regulating motor vehicle carriers had been given joint consideration and that some changes had been made which make the provisions more favorable and fair to the electric railways.

Mr. Budd proposed and the executive committee concurred in a suggestion to this committee that it give consideration to the advisability of, and to recommend some plan for, admitting bus operating companies to membership in the American Electric Railway Association. Mr. Budd said that if the electric railways are really going to take up the bus in the way that now seems to be advisable, they ought to provide some way for bus organizations to take part in the counsels of the association.

Mr. Sawyer, chairman of the committee on arrangements for the Midyear Meeting at St. Louis, March 4, reported briefly the progress of his work. He said it was planned to have no registration as it was desired that this meeting should not be just a street railway men's convention, but that it should be open to everyone. It is planned to advertise the meeting in the local papers and announce the program and invite anyone who desires to attend.

G. C. Hecker, of association headquarters, reported briefly on the recent meeting of the committees on city and interurban operation, stating that these two committees had taken up their work enthusiastically and that there was every prospect for fruitful work.

Mr. Johnson, president of the Engineering Association, requested for the use of the heavy traction committee an appropriation of not to exceed $500 for the purpose of revising and bringing up to date and putting in a readily usable form the bibliography of the various phases of electrification work.

E. F. Wickwire said that in connection with the work of the committee on co-operation with manufacturers, F. C. J. Dell had personally called upon fifty-three manufacturers in and around New York for the purpose of enlisting their more active interest and support. He said that this field work seemed to be highly appreciated and would no doubt promote greater interest in the association. Mr. Dell is to visit the manufacturers in other territories.

The executive committee authorized the appointment of a committee on date and location of the 1924 annual convention and exhibit.

Edward Dana, chairman of the committee on education, requested an appropriation of $5,000 to be used in the work of preparing a course on the fundamental economics of the street railway, for use of the rank and file of railway employees. This was not granted as it was suggested that such appropriations should come from the individual railway members instead of the association. It was suggested that the time has come when the several associations which are working toward the inauguration of courses in public utility economics in the universities should consolidate and co-ordinate their efforts. Mr. Dana was authorized to proceed in this direction.

G. T. Hellmuth, on behalf of President Hyland of the Claims Association, requested authority and an appropriation for the Claims Association to engage a safety engineer with the idea of providing a continuing management of this association and to secure the use by railway companies of the very valuable information developed by the association. It was estimated that this would cost from $5,000 to $6,000 a year, exclusive of traveling expenses. The matter was referred to the policy and finance committees.

A suggestion that the association subscribe for issues of public utility reports for its member companies who do not now subscribe, to the extent of $2,500, was laid over to the second succeeding meeting and the matter meantime referred to the finance committee.

The next meeting of the executive committee will be held at St. Louis on March 3.

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Interurbans Should Indicate Status

AT THE MEETING of the committee on national relations, held in New York on Jan. 10, Chairman Charles L. Henry spoke of the importance of the recent decision of the Supreme Court on all railroads included under Section 15a of the transportation act of 1920, and the need that all electric roads define their status as to whether they are "engaged in the general transportation of freight" and so come under the act. A hearing has been scheduled by the Interstate Commerce Commission for Jan. 23 to determine what electric roads are subject to the jurisdiction of the commission under Section 15a. All roads so included are limited, along with the steam railroads, to 6 per cent direct return on a fair valuation, and any excess is subject to the recapture clause as set forth in the act.

To apprize electric railways of the situation, the committee, with the approval of the executive committee, decided to mail to all interurban railways a circular letter urging them to advise the committee of their position. This letter, signed by Mr. Henry as chairman of the committee, says, in part:

"A hearing before the Interstate Commerce Commission is to be held on Jan. 23 to determine what electric railroads of the United States are subject to the jurisdiction of the Interstate Commerce Commission under Section 15a. If your road is subject to Section 15a, your earnings are limited along with the steam railroads to 6 per cent on a fair valuation, and any excess is subject to the recapture clause as set out under said section.

"There are other matters of importance included in the provisions of Section 15a, but the particular language of that section, which controls your inclusion or exclusion under the section, is whether or not your road is operated as 'a part of a general steam railroad system of transportation or engaged in the general transportation of freight.'

"It is necessary that you determine what your status is under this section and be prepared, if the subject is important to you, to attend the hearing before the Interstate Commerce Commission in Washington on Jan. 23. Your committee believes that the majority of electric interurban railways are 'not engaged in the general transportation of freight' in such a manner as to bring the roads under the jurisdiction of Section 15a. There are some roads that must be included.

"A personal appearance, we understand, is necessary at the Interstate Commerce Commission's hearing if the road desires to be heard. We suggest that you prepare your case from your viewpoint, send a copy of it to this committee, addressed to 949 Munsey Building, Washington, D. C., and we will go over the case for you and be prepared to discuss it with you at any time from Jan. 21 up to the time of the hearing on Jan. 23.

"So that you may know in a general way the committee's views on this subject, we append hereto a copy of a letter which was sent to the Interstate Commerce Commission under date of Jan. 24, 1923.

"It is important that the committee be informed at once of your position. Please, therefore, wire immediately upon receipt of this to James W. Welsh, executive secretary, at association headquarters, 8 West Fortieth Street, New York City, whether your company opposes or consents to coming under Section 15a. Let us have this telegram without fail."

(APPENDED LETTER)

Jan 24, 1923.

To the Interstate Commerce Commission
Gentlemen:

The Chicago, North Shore & Milwaukee Railroad has today filed with your honorable body its brief and argument, as an interurban railway, on Section 15a of the interstate commerce act, and particularly with reference to the language "engaged in the general transportation of freight."

The American Electric Railway Association, acting in behalf of its members, asks leave to intervene in the record of this case, and make the following observations:

1. To a large class of our members, the construction placed by the commission on the words "engaged in the general transportation of freight," if given a broad general application, will be vitally important.

2. It may be accepted as fact that a large number of interurban railroads are the handlers of freight business to a greater or lesser extent, and that there are a few interurban lines which believe themselves to be "engaged in the general transportation of freight," while the vast majority, such as the North Shore Line, consider themselves as entirely outside of the application of the quoted language.

3. If it be the commission's purpose to determine the broad, general question, in reviewing the North Shore Line's case, which is being filed today, and therefrom adopt such construction of the above-quoted language and issue such orders as will be determinative in most other interurban cases—then the American Electric Railway Association respectfully requests that the general subject of construction of the language "engaged in the general transportation of freight" be docketed for formal hearing, and we will be prepared at such hearing to go into every phase of interurban line operation, to furnish the ground-work for a general interpretation and construction of the meaning of such language. In other words, we respectfully suggest that a determination of the imminent case in such a manner as to bind the whole interurban railroad industry, without giving such industry a fair hearing, would not only be unwise but unjust.

4. In connection with the North Shore Line case directly, it may be remarked that from their record of physical operation and the absence of through routes and joint rates and interline billing arrangements, the most liberal effort to bring such line within the quoted language could only result in a finding that they are "engaged in the restricted transportation of freight," or "engaged in the transportation of freight in a limited way." If Congress had intended such roads to be included under your jurisdiction in Section 15a, then they would have written the law "engaged in a restricted or limited transportation of freight" or omitted the word "general" therein. But Congress put it on the statute books "engaged in the general transportation of freight," and obviously any interurban line not performing wholly and completely in the freight business in the same manner as a steam railroad conducts such business cannot, by strained construction, be put in a class with roads which are, in the universally accepted sense, "engaged in the general (not restricted or limited) transportation of freight."

5. Just one more thought directly in connection with this North Shore Line brief and argument: Congress did not make the quoted language read "engaged in the transportation of general freight." An interurban road might be handling freight of all classes of "general freight" if you please, and still be restricted or limited in the methods of handling or to a small part of its line, in such a manner as to be entirely out of the language as used in Section 15a—"engaged in the general transportation of freight."

In other words, we lay down the two broad general propositions, viz.:

(a) that a restricted or limited transportation of freight; and

(b) that the transportation of general freight—neither of the two bring an interurban road within the class of such lines as are "engaged in the general transportation of freight," and ipso facto within your jurisdiction in the matter of excess earnings.

6. This committee has, on several occasions in the past, asserted its desire to be helpful to your honorable body in your problems connected with the electric railway industry. We wish to restate that desire again at this time. If we can be of any service to you in any way we hope you will command us.

By order of the committee:
(Signed) CHARLES L. HENRY, *Chairman.*

Midyear Committee

THE third meeting of the committee on arrangements for the Midyear Meeting was held in St. Louis on Jan. 4, with Chairman W. H. Sawyer and the following members present: B. W. Frauenthal, B. W. Stemmerich, F. H. Richards, C. E. Allen (for M. B. Lambert), Col. A. T. Perkins, E. D. Payne (for E. P. Waller), F. O. Grayson, F. H. Rein, F. V. Cook, Col. H. D. McBride, J. B. Sheriden, C. O. Birney.

Reports were heard from the various sub-committees. It was announced that Mrs. A. T. Perkins had accepted the chairmanship of the ladies' entertainment committee. It is planned to have only local women serve on this committee with Mrs. Perkins.

The sub-committee on seating is busy making a drawing of table location and seating plan. It is tentatively to be laid out on the basis of a head table seating twenty-four, and all other tables to be round tables seating ten each.

It was planned that every member of the committee on general arrangements should be a member of the transportation committee and directly responsible for seeing to it that all members in his district receive the necessary transportation data and attend the meeting. There is some prospect of securing a round-trip ticket for fare and one-half.

The committee is planning to get out a general folder discussing the Midyear Meeting from all angles. An interesting part of the arrangement is that the dinner speeches are to be broadcasted through the St. Louis *Post Dispatch* station and possibly other stations.

E. D. Payne was made chairman of the dinner entertainment committee. It is planned to make arrangements for dancing at the Hotel Chase after the dinner.

The committee agreed that no cancellation of dinner tickets would be accepted after Feb. 29.

Bus Operation

PLANS for the coming year's work were laid out by the committee on bus operation, of the Transportation & Traffic Association at a meeting held on Jan. 8 in New York. It was

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decided to continue the study made last year, which resulted in the report which was presented at the Atlantic City Convention.

Sub-committees were appointed to study the various parts of the subject. Chairman Flickinger will be responsible for the analysis income statements and of the general features of operation. Messrs. Scanlon and Stewart will scrutinize the various types of operating methods, and Mr. Arnold will study maintenance practice as developed by the committee work. Messrs. Fritch and Keenan will make a study of bus operating rules.

Present at the meeting were W. J. Flickinger, chairman; Bert W. Arnold, H. F. Fritch, J. B. Stewart and V. E. Keenan of the committee and J. W. Welsh and G. C. Hecker of association headquarters.

Buildings and Structures

THE first meeting of the buildings and structures committee of the Engineering Association was held in New York on Jan. 7. Those present were N. E. Drexler, chairman; C. H. Clark, L. R. McKay, J. D. Kent, H. R. Stamm, Judson Zimmer and G. C. Hecker of association headquarters.

The chairman announced the appointment of Mr. McKay as vice-chairman and the personnel of the sub-committees, the subjects being 1a, Passenger Terminals, J. D. Kent, chairman; 1b, Freight Terminals for City and Interurban Lines, E. D. Eckroad, chairman; 1c, Combination Terminals, J. R. McKay, chairman; 2, Design of Building for Proper Storage and Maintenance of Buses, H. R. Stamm, chairman; 3, Review of Existing Standards, B. R. Brown, chairman.

It was decided to work along the following lines:

On the subject of passenger terminals the sub-committee is to get data on the Dixie Terminal and any other recent ones and work up a plan for a typical layout.

On freight terminals the sub-committee is to investigate the Detroit United layout, including the freight container plan; also the joint freight arrangement at Indianapolis. A questionnaire is to be prepared by the sub-committee to be sent to representative companies to obtain data on freight terminals to be used in connection with preparing a typical layout.

The combination terminals sub-committee is to go over plans obtained last year and any others which are now available with a view of making up a typical layout.

The sub-committee on bus garages prepared a questionnaire which will be sent to railway companies operating buses. Points of particular importance that were brought out in discussion were the necessity of proper ventilation to take care of carbon monoxide gas, plenty of clear height, facilities for storage and handling of gasoline and oils, use of hoists rather than pits and general sanitary conditions.

It was decided to hold the next meeting in Cincinnati the latter part of March.

Unification of Car Design

THE new committee on unification of car design held its first meeting in New York on Jan. 8. Chairman H. H. Adams called the attention of the members to his letter outlining some fundamental car dimensions which should be considered in connection with the work of unification of design. The members present were: J. Lindall, G. L. Kippenberger, V. Willoughby, C. Gordon and J. W. Hulme.

Tabulations prepared in advance of the meeting were carefully discussed to determine the extent to which the dimensions of recent cars varied from those recommended by the 1922 committee. In order to obtain a proper starting basis for its work, the committee was generally agreed that those parts of the body which are most frequently replaced or repaired should be considered first. From this standpoint, therefore, it was decided to start with the size of the glass in the lower side sash and gradually build up uniform dimensions for other parts so as to fit as nearly as possible into the general dimensions adopted by the 1922 committee.

It was decided to limit the work this year very largely to the establishment of dimensions for glass, sash and side-post centers on city cars. It was considered important to study these basic dimensions thoroughly in order to command co-operation in adhering to them. This, it was felt, would lay a secure groundwork for a unification program.

After considerable discussion as to the most practicable method for fixing these fundamental dimensions it was decided to obtain from the car builders such data as would permit a comparison of all double-truck city surface cars built in 1923. It was further decided to send a tabulation containing this information to each railway property having new cars represented, with a request that it indicate the reasons for variations in the dimensions of its new cars from those recommended by the 1922 report.

To create additional interest and stimulate discussion at the annual convention, it was decided to prepare full-size models of car side framing with different types of sash and post construction, so as to illustrate the possibilities of the proposed uniform dimensions.

A discussion ensued of the savings which would result from greater uniformity in the design of many miscellaneous parts used in car body construction. Mr. Gordon was delegated to prepare a tentative draft of this subject for insertion in the annual report of the committee. Mr. Willoughby suggested that the co-operation of the storekeepers be obtained in order to determine just what savings in stocks of repair parts might be accomplished by the program proposed.

Executive Committee Claims Association

A MEETING of the executive committee of the Claims Association was held at association headquarters in New York on Jan. 10. Those in attendance were President W. H. Hyland, Gloversville; First Vice-President H. D. Briggs, Newark, N. J.; J. S. Kubu, Cleveland; G. T. Hellmuth, Chicago; H. O. Allison, New Brighton, Pa., and E. L. Lindemuth, Wilkes-Barre, Pa.

The committee discussed the recommendation made at the last convention of the appointment of a safety engineer to encourage and to co-operate with companies in electric railway safety work. The work of the various committees of the association was also considered, namely, the committees on accident prevention, claims department aspects of motor bus operation, employment, medical and surgical work, resolutions, subjects, and a uniform grade crossing law.

The executive committee learned with regret of the death of former President Cecil G. Rice, Pittsburgh, and a committee was appointed to draft suitable resolutions.

News of Other Associations

Tentative Program for Mid-West Meeting

HEADQUARTERS for the Springfield, Mo., meeting of the Mid-West Electric Railway Association, Jan. 17, will be the Colonial Hotel. The morning and afternoon business sessions, as well as the banquet that evening, will be held there.

The tentative program includes the following papers:

"Electric Railway Freight Traffic," by W. A. Clough, railway engineer General Electric Company, Chicago.

"Bus Operation and Regulation," by F. S. Welty, assistant general manager Omaha & Council Bluffs Street Railway.

"Shop Practice and Maintenance," by John S. Dean, railway engineer Westinghouse Electric & Manufacturing Company, East Pittsburgh.

"One-Man, Two-Man Cars and Train Operation," by D. L. Fennell, superintendent of transportation Kansas City Railways.

A luncheon will be given the members at the new power house of the Springfield Traction Company. From 4:30 to 6:30 an informal reception will be held.

At the evening banquet the following will be the addresses:

Address, Hon. John S. Farrington, Judge, Court of Appeals, Springfield, Mo.

"Public Utility Operation as Viewed by a Newspaper Man," by E. E. E. McJimsey, editor and manager Springfield *Republican*.

"Twenty-five Years Experience with Transportation Problems," by E. V. Williams.

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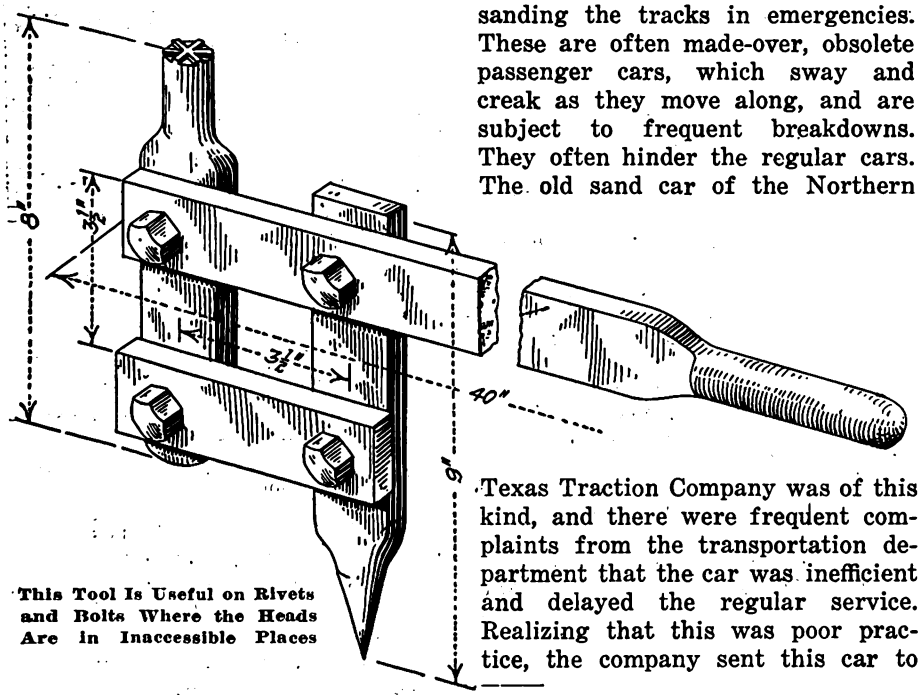
Maintenance of Equipment

"Holder On" for Truck Work

A HANDY tool has been developed at the shops of the Metropolitan West Side Elevated Railway, Chicago, for "holding on" to the head of a countersunk bolt to prevent it from turning when the nut is removed, and also for use as a "bucking" bar when riveting. The tool is especially efficient for holding bolts or rivets in narrow places, such as on the inside of a truck where the bolster swings. In the past, it was often necessary to cut off a bolt or its nut in order to remove it from the frame of the truck. This difficulty has largely been overcome by the use of the new tool.



This Tool Is Useful on Rivets and Bolts Where the Heads Are in Inaccessible Places

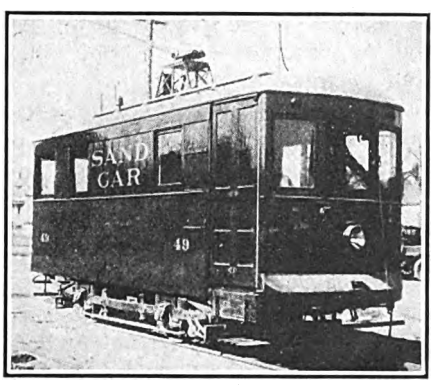
The tool is really an expanding "holder on" operated by a long lever, using some convenient adjacent portion of the truck as a brace. It is constructed of ⅜-in. x 1½-in. steel bar in the form of a pantograph. One side is upset to 1 in. diameter so as to press against the bolt or rivet head. Serrations are formed on the end of the bar to prevent the bolt from turning. The parallel bar is also upset to form a point on the opposite side from the serrated end. One side is extended to form a handle 40 in. long, giving a leverage of approximately 10 to 1. Four 1-in. bolts hold the four sides together and permit free motion.

In use, the serrated end is placed against the head of the rivet or bolt, and the pointed end placed against an adjacent portion of the truck. The handle is moved toward the pointed end, thus applying pressure to the head of the bolt or rivet.

Making the Sand Car Reliable*

NEARLY all street railways, even though their regular cars may be equipped with sanders, have service cars especially equipped for sanding the tracks in emergencies. These are often made-over, obsolete passenger cars, which sway and creak as they move along, and are subject to frequent breakdowns. They often hinder the regular cars. The old sand car of the Northern Texas Traction Company was of this kind, and there were frequent complaints from the transportation department that the car was inefficient and delayed the regular service. Realizing that this was poor practice, the company sent this car to the shop and rebuilt it from the ground up.

*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.



The Rebuilt Car Can Operate at the Same Speed as Passenger Cars

The G.E. 54 motors and the truck were thoroughly overhauled. In the reconstruction safety car control equipment was added and air brakes substituted for the old hand brakes. A Westinghouse M-28 brake valve with sanding features is used to operate the traps. The car door is manually operated rather than being pneumatic as on safety cars, because at times it is desirable to run the car with the door open. The air compressor, Westinghouse D-2, is inside the car body, as are also the air reservoirs. The compressor intake is on the roof, so that sand dust will not be taken into the compressor. The sand bins have a capacity of 3 cu.yd. Because of the method of reconstruction, the car now has somewhat the appearance of a Birney car, although in reality it is not.

Equipped in this way the sand car can operate on lines with safety cars without interfering with the regular service. The railway is pleased with the operation of the rebuilt car and the public also is pleased, because it can see that the desire of the company is to do everything possible to avoid accidents on account of slippery rails.

Special Tamping of Steel Ties

A SPECIAL method of insuring a bearing under the plates of steel ties was pictured and described in this paper, page 1005, issue of Dec. 15, 1923, as worked out by the Cleveland Railway. This consisted of having a space under the plates when pouring the concrete base, later filling in the space with a 1:3 slag screenings and cement mix and thoroughly tamping. Charles H. Clark, engineer maintenance of way, has now extended the experiment.

One 100-ft. stretch of track has been built, using creosoted sawdust instead of the slag and cement for tamping in under the tie plate. This material is said to compact like a board and to provide some resiliency. Another 200-ft. stretch has been tamped in under the tie plate with rock asphalt.

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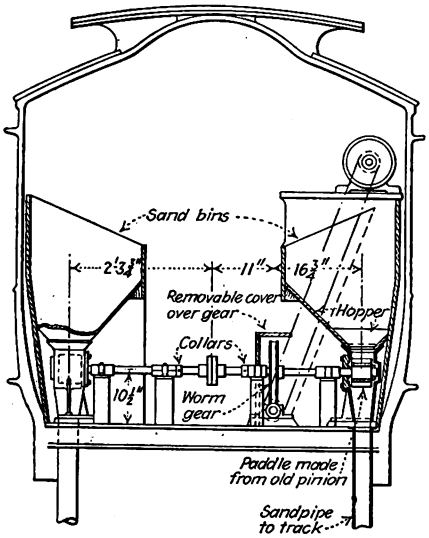
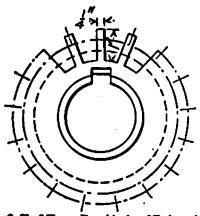
Motor-Driven Sand Box in Holyoke

ON ITS sand cars the Holyoke Street Railway is using a motor-driven sand box of the kind illustrated in the drawing below. It consists, briefly, of a 1¾-hp., 550-volt motor, which is mounted on top of one end of the sand bin and is belted to a shaft connected by worm gear with a shaft at right angles to the car. On each end of the latter shaft is a pinion which acts as an agitator for the sand in the hopper. This pinion is made up from a GE-67 fifteen-tooth pinion, but the teeth are cut out somewhat in the form of paddles, as shown, so that it will act more effectively as an agitator than in its original form.

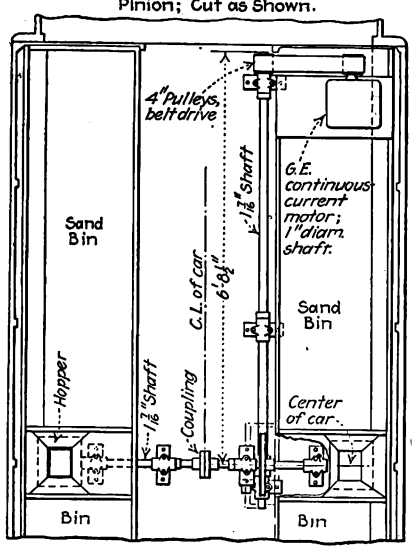
The shaft at right angles to the center line of the car is in two parts, connected by collars, so as to make its installation in and removal from the car more easy.

The use of a motor drive instead of axle drive has been found to have several advantages. One of these is that it is possible easily to stop the mechanism, and so the distribution of sand, when the car is passing over switches or any other part of the track where sand may not be desirable or needed. Another advantage of the motor drive is that it is possible to increase or decrease the rate of sanding without changing the speed of the car.





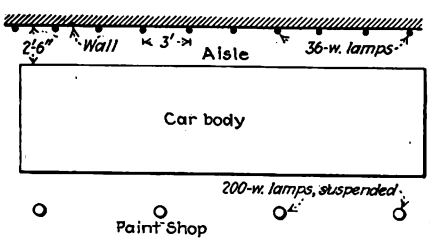
G.E. 67 – 3-pitch, 15-tooth Pinion; Cut as Shown.



Sand Cars in Holyoke Use Electric Drive for Distributing Sand

Improving Paint Shop Lighting at Bangor

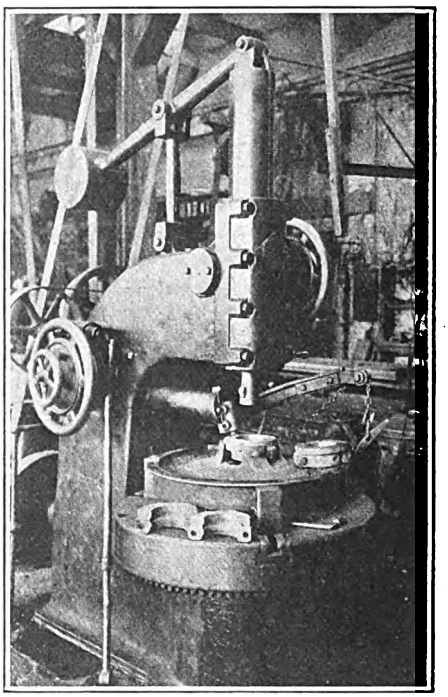
WITH an outlay of less than $50 the illumination of the paint shop of the Bangor Railway & Electric Company, Bangor, Me., was much improved by providing a circuit of ten 36-watt lamps spaced 36 in. apart horizontally on the wall side of the painting track to increase the intensity at the surface of the car body paneling. The lamps were hung in condulet fittings carried by a ½-in. section of rigid conduit attached to the wall at a height of 43 in. above the floor, all being operated in multiple on a 110-volt circuit and controlled by a snap switch convenient to the painters' working area. The aisle width between the car body and the wall is 30 in., and the wall further aids in the reflection of light by the use of enamel paint. On the opposite side of the car body illumination is provided by four 200-watt gas-filled lamps suspended from the roof structure with counterbalances, enabling these to be used at varying heights. The arrangement as a whole does away with the use of portable lamps and loose cords in the vicinity of the car body and painting aisles. H. B. Baldwin is superintendent of shops.



Arrangement of Lights in Bangor Paint Shop

Boring Mill Reduces Time for Finishing Axle Collars

A WHEEL boring machine is used for finishing and boring axle collars instead of a lathe in the shops of the Spokane United Railways, Spokane, Wash. The collars are cast in halves, and the edges of the halves are not machined but are simply bolted together with a piece of sheet fiber between them. They are then set up in a jig which is made of a discarded steel wheel as shown in the accompanying illustration.



Machining Axle Collars in a Boring Mill

The hub of the wheel is cut out and three set screws are provided for holding the collar in place. They are then faced off and bored in the boring mill. The operation requires an average of four minutes per collar, and this method reduces by one-half the labor cost as compared with the work if done with a lathe.

Joint Welding in El Paso

ALL joints in paved tracks are now being welded by the El Paso Electric Railway. This company has lately gone over to the standard angle bar, instead of the special joint previously used. In building new track four or five rails are joined and bolted and strung out alongside the excavation. They are turned bottom up and then on each side, and the angle bars are seam-welded to the rails at top and bottom, the nuts being spot-welded to the bolts. A

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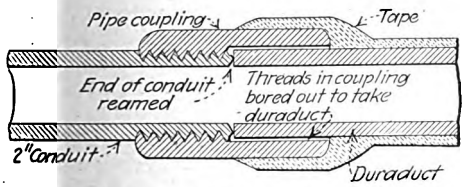
very strong joint results. So far not a single failure has been recorded, although several hundred joints are in service.

Simple Joint Between Conduit and Loom

WHEN control cables are run in loom under the car floor, it is necessary to protect them from mechanical injury where they run under trap-door openings.

The Chicago Surface Lines has used short lengths of aluminum conduit for this purpose, which necessitated some form of joint between the



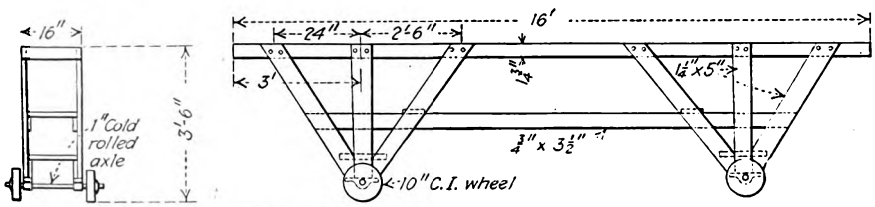
A Bored Out Pipe Coupling Is Used to Make Joint Between Loom and Conduit

ends of the conduit and the loom. The simple arrangement shown in the accompanying drawing was adopted, and is applicable whenever a joint between loom and conduit is required.

An ordinary pipe coupling is bored out for one-half of its length so as to allow the end of the loom to be pushed in with a snug fit. As both loom and conduit are securely fastened to the car floor there is no strain at the joint. A layer of tape is applied to the outside to make the connection weathertight.

Substantial Movable Painter's Scaffold

THE type of portable painter's scaffold shown in the accompanying sketch is used in the West Shops of the Chicago Surface Lines. With this arrangement the scaffold can be readily moved from car to car, and at the same time it provides a substantial structure which greatly reduces the possibility of accidents such as frequently occur when the ordinary plank and horse arrangement is used.



Design of Movable Painter's Scaffold Used in Chicago

Rack for Coupling Pins

TROUBLE has been experienced in Spokane, Wash., from the loss on cars of coupling pins that are used infrequently. To eliminate the cost resulting from this loss and avoid delays when a pin is required in emergency, a wood block with holes for two pins has been provided to keep them in proper place. This block, together with two drawbar pins, is installed in the front-end vestibule of each car.

This holder is conveniently located in view of the conductor, whose duty it is to see that there are pins in the holder before the car is taken out. Previous to the use of this block, coupler pins were chained to the drawbar, but for some unaccountable reason they seem to disappear. This particular improvement was the suggestion of one of the car repair men.

New Equipment Available

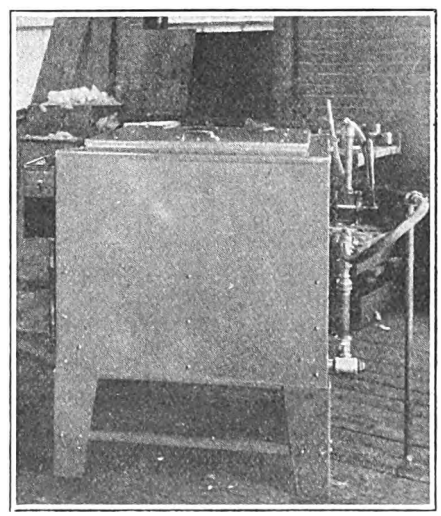
Machine for Oiling Waste

A MACHINE for the saturation of waste with oil to prepare it for use in journals, manufactured by Wyckoff, Inc., Joliet, Ill., has recently been installed in the Wilson Avenue shops of the Chicago Elevated Railroad. It is capable of saturating 240 lb. of waste every twenty-four hours with a content of 2 lb. of oil for each pound of dry waste used. It is stated that the saturation obtained is very uniform.

The outer containing tank shown in the illustration, which is insulated with asbestos, serves as a protection to the inner tank and contains electric heating coils, a heat-controlling device, the oil supply pump and the necessary piping. Openings are provided directly under the heating elements to admit sufficient air for circulation.

The lower portion of the inner tank is a reservoir for the oil, with a pipe connection to the pump through the bottom. Placed in the tank directly above the reservoir are three waste containers, which are made especially long and narrow to allow the heat to pass up and through the waste, insuring a dry condition before applying the oil. These containers are made of galvanized steel and wire cloth, and are hung from the upper edge of the tank. The thermostat by means of which the heating coils are controlled to give an even temperature is also placed in this chamber.

In operation the waste is placed in the containers and the heat is turned on. The waste is then allowed to dry for approximately one hour. At the end of this time the cover is raised and the oil pump started. Oil is sprayed over the waste by means of a hand hose until the containers are completely flooded. The cover is then closed and heat



This Waste Saturating Machine Has Electric Heat Thermostatically Controlled

is applied for approximately four hours. With the thermostatic control there is no chance of overheating the oil.

An auxiliary intake pipe is connected to the tank, so that to replenish the supply of oil a three-way valve may be opened and the new oil pumped in by means of the oil supply pump.

The tanks are made of No. 1 gage welded annealed steel. The oil storage capacity of the inner supply tank is 65 gal. The three waste containers will hold a total of 20 lb. of dry waste, or 60 lb. of saturated waste having a ratio of 2 lb. of oil to each pound of dry waste.

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The News of the Industry

Statement Awaited

Cincinnati Traction and Street Railway Companies Will Report on Settlement—Merger Negotiations

Assurance was given the street railway committee of the City Council of Cincinnati, Ohio, at its meeting on Jan. 4, that the Cincinnati Traction Company and the Cincinnati Street Railway would be in a position within the next fortnight to make a statement as to whether they can reach an agreement for the settlement of Cincinnati's traction problem. The purpose of the meeting was to consider the report of Mayor George P. Carrel's traction committee, presented on Dec. 24. The report recommended the merging of the interests of the Cincinnati Street Railway and the Cincinnati Traction Company, with a reduction of the combined capital stock from $39,000,000 to $25,000,000, together with other suggestions that would, in the opinion of the committee, result in a lower fare and better service.

Conclusion Probable Soon

Robert A. Taft and Samuel Assur, attorneys, represented the Cincinnati Street Railway and Walter A. Draper, vice-president of the Cincinnati Traction Company, represented his corporation. Mr. Draper said his company concurred in the fact contained in Mr. Taft's statement that the two companies were negotiating in the hopes of reaching an amicable settlement. He explained, however, that while his company might prefer some other method for reaching a settlement, nevertheless it was proceeding along the lines suggested by the street railway company.

When asked how long he thought it would take the companies to reach a conclusion as to whether they can come to an agreement, Mr. Taft replied that he felt certain within the next fifteen days. In this connection Mr. Taft also said that his company was preparing a report of operations for 1923 which would serve as a basis for figuring the earning capacity of the operating company. The street railway company in 1901 leased the Cincinnati electric railway system to the traction company for a period of forty-five years. Mr. Draper said that the report of his company would be ready in ten days, so the companies could resume their negotiations and make a definite statement to the Council in fifteen days. The Council committee then passed a resolution postponing the hearing until Jan. 21.

Attorney Taft submitted a statement on behalf of the committee of the Cincinnati Street Railway. He said that the representatives of the Cincinnati Street Railway had carefully studied the report of the special committee and that while they were not in accord with all the conclusions and recommendations made by the committee, they agreed that a serious crisis existed in the traction situation in Cincinnati, and that they were anxious to do their part in meeting it.

The statement called attention to certain fundamental facts in the problem. The Cincinnati Street Railway, with some 5,000 stockholders, mostly residents of the city of Cincinnati, was the owner of the tracks, poles, wires, cars and other street railway property in Cincinnati. The property had been leased with the knowledge of the city of Cincinnati to the Cincinnati Traction Company, and under that lease and the service-at-cost ordinance, the Cincinnati Street Railway was not the operating company and had no control whatever over the operation of the street cars, the fares charged or the increase of capital, so long as the traction company paid the rent and complied with the provisions of the lease. But because of the obligations entailed in its franchise, and the desire to assist in a solution of the present unsatisfactory situation, the statement went on to say that the directors of the Cincinnati Street Railway would be willing to recommend to the stockholders that it purchase the leasehold interest of the Cincinnati Traction Company and itself undertake the operation of the property, provided the purchase could be made on such terms as to permit the rendering of service to the public and the earning of a reasonable return on employed capital.

Corporate Structure Would Be Simplified

The result would mean the elimination of all but one company from the situation, the making possible a more economical operation, the giving of better service to the public and the construction of necessary additions and betterments to the system. The statement said that one thing was clear, namely, that if any improvement in the situation was to be made, the price paid must not be more than the fair value of the leasehold interest. Further, it must permit a reasonable fare to the car-riding public and it must permit repairs to be made to the entire property. Otherwise the very purpose of the purchase which the company asked to be made would fail of its accomplishment and neither the public nor the street railway would in any way be benefited thereby.

Transit Departure Suggested

Extension of New York City Rapid Transit Lines to New Jersey Discussed

As part of the New York Transit Commission's program to develop special facilities for the tremendous suburban traffic into New York City, Commissioner Harkness has had a number of informal discussions with D. A. Garber and his associates on the North Jersey Rapid Transit Commission, followed by one joint conference, also informal, of the two commissions.

In the discussions with Mr. Garber and his associates the suggestion has been made and considered that a long step in the direction of caring for the New Jersey traffic could be made if the present undeveloped capacity of the local tracks of the Interborough Subway were utilized. These tracks now terminate on the East Side Line at City Hall Park and on the West Side Line at South Ferry. The movement on them is generally one way, workward in the morning and homeward in the evening.

Plan a Logical One

With these facts in mind, it has been suggested that if the North Jersey Rapid Transit Commission should construct a loop system well back of the waterfront on the New Jersey side, with tunnel connections to Manhattan and the present local track terminals of Interborough lines, the Interborough service could be extended through these tunnels and the loop. By means of the loop the various trunk lines reaching the Jersey waterfront, whose terminals are now so badly congested, could deliver their commuting traffic at convenient interchange stations with ample facilities and the passengers would then be carried directly into Manhattan and into the parts of New York's transit system where they can be taken care of with the least interference with city traffic.

Mr. Harkness says that at the time of these discussions, and with the present lack of expert engineering advice at the command of the North Jersey Rapid Transit Commission, it has only been possible to give such suggestion a superficial examination, but that the suggestion does seem to offer possibilities that make it worthy of careful study. Even though the plan should prove feasible from engineering and operating standpoints, there are many legal and financial obstacles which would have to be overcome, but Mr. Harkness says that so far it does not appear that any such obstacles would be insurmountable. Such service would

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necessarily have to be predicated upon a substantial return to the operating company and indirectly, therefore, through the company, to the city of New York. In the discussions with Mr. Garber and his associates the point has clearly been made that the suggestion must be considered absolutely as a business proposition in which the balances of advantage must be carefully considered.

In the discussions with the members of the North Jersey Rapid Transit Commission it was also made clear that the New York Transit Commission could not commit itself as to the adoption of such a plan either by it or by the local authorities of the city. The members of the commission did, however, state that the plan seems to offer possibilities that make it worthy of careful and thorough study.

SUGGESTIONS MADE TO LEGISLATURE

As a step to this end the connection of the existing rapid transit lines in New York City with the transportation system in Northern New Jersey by tunnels under the Hudson River was suggested on Jan. 8 by the North Jersey Rapid Transit Commismission in a report to the New Jersey Legislature. The commission declared that this seemed the best method of relieving the present congestion in New Jersey suburban traffic and of preventing a congestion that might become intolerable. The report of the North Jersey Commission approved in its entirety the suggestion made by the Transit Commission of New York City. On the other hand, residents of Staten Island, New York City, are unalterably opposed to any extension of New York City lines out of the state while they are inadequately served.

In a letter to the New Jersey Chamber of Commerce, J. J. Mantell, operating vice-president of the Erie Railroad, states that company is willing to turn over its purely passenger lines to a rapid transit company to facilitate railway operation or to co-operate with the rapid transit company in the construction of a union station at Croxton yards, where passengers could be discharged from the trains and distributed by existing and proposed electric systems under the river.

Provision Made for Pension Plan for Interstate Employees

A service annuity plan that will provide pensions for employees retired on reaching certain ages has been put into effect by the Interstate Public Service Company, Indianapolis, operating the Indianapolis & Louisville traction line. The company now has about 1,145 employees in the 104 cities which it serves with light, power and railway service.

The company will make an annual contribution to finance the plan. Administration will be in charge of five persons, three to be appointed among the officers or employees, and the other two to be selected by the employees by direct ballot.

Co-operate for National Christmas

The electric railway companies in Washington co-operated with the electrical industry in giving the country its first national Christmas tree. In addition to helping in other ways, signs telling of the lighted tree were carried on the front of cars. Here is the way the Capital Traction Company sign read:

60-FT. XMAS TREE
2,500 Lamps Evenings
DEC. 24—JAN. 1
White House Ellipse

President Coolidge threw the switch which lighted the tree on Christmas eve. The idea of a national Christmas tree originated with and was carried through by the Society for Electrical Development.

Cincinnati Planning Commission Has Extensive Plans Under Consideration

Revised plans for the extension of the Cincinnati, Lawrenceburg & Aurora Electric Street Railroad from the present terminus at Anderson's Ferry to the central section of Cincinnati, Ohio, have been submitted to the City Planning Commission for approval. The route was changed to conform with the proposed freight and passenger terminals to be built by railroads entering Cincinnati.

The route will remain the same from Anderson's Ferry to Evans Street, as contemplated in the plans submitted to the Council a year ago. That is, the line will follow the "Big Four" Railroad's right-of-way from Anderson's Ferry to Evans Street. At Evans Street it will become an elevated structure, extending south over the Baltimore & Ohio Railroad to Second Street and thence along Second Street, from a point at approximately Mill Street, to Vine Street, thence north to Third Street.

The old plan provided a right-of-way from Evans Street over Sixth Street, Front Street and Third Street to Vine Street. Stanley Shaffer, receiver for the interurban company, said that the purpose of filing the revised plans was to indicate to the engineers of the Planning Commission that the proposed route will not interfere with the development of the freight and passenger terminals contemplated by the railroads.

As soon as the plans have been approved by the commission, Mr. Shaffer will seek consent of the City Council for a change in the right-of-way proposed in the original ordinance, which has been pending in the Council several months. It was indicated that as soon as the necessary consent has been obtained an effort will be made to interest capital in the proposed extension.

The railway operates from Anderson's Ferry to Aurora, Ind. Under the receiver the property has been greatly improved and the road is now meeting its operating costs.

More Indictments in Connection with Buffalo Dynamiting

John M. Parker, president of the Buffalo local of the Amalgamated, Clarence F. Conroy, business agent of the Buffalo union of the Amalgamated, and three other striking platform employees of the International Railway were indicted by the special January Federal Grand Jury on charges of conspiracy in connection with the dynamiting of the Buffalo-Niagara Falls train on Aug. 17, 1922, during the strike.

The indictment of Parker, Conroy and Martin McDonough, W. H. Smith and William L. Blandell resulted when new evidence in connection with the dynamiting outrage was presented to the Federal Grand Jury by William J. Donovan, United States attorney for the Western district of New York. It is reported that at least twenty-five others will be involved in the dynamiting conspiracy charges. Fourteen members of the union, including Robert C. Lacey, Buffalo, State Senator, were indicted about a year ago.

When they were arraigned before United States District Judge John R. Hazel all the prisoners entered pleas of not guilty.

The trial of those alleged to be involved in the dynamiting outrages during the strike is docketed to open in United States Court on Jan. 15. Federal District Judge George S. Morris of New Hampshire will preside at the trials.

The specific charge in the indictments against the union officers and members is conspiracy to violate Sec. 1 of the Sherman anti-trust law in that they are alleged to have planned forcefully to restrict interstate commerce. More than forty passengers were injured in the wreck which followed the dynamiting.

The government and private detectives for the International have been working on the case for almost two years. Rewards totaling $100,000 have been offered by the International Railway for information leading to the arrest and conviction of those responsible for the dynamiting outrages during the strike of 1922.

So far as the Amalgamated is concerned the strike of platform employees on the local and interurban divisions of the International is still in effect. The company declared an open shop, broke off all contact with the union and has been operating cars under the Mitten co-operative plan for two years with a great deal of success.

Incidentally the alleged connection of State Senator Lacey with the Buffalo dynamiting may have an important effect on the Democratic legislative program. From Albany comes the statement that should Mr. Lacey's presence be lost there in connection with the progress of the Buffalo case it would

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mean the loss to the Democrats of the majority of one they now have in the Senate and would block the administration's program in the upper house unless a special election were called and a Democrat elected in his place.

Negro Appointed Member of Illinois Commerce Commission

Edward H. Wright of Chicago was recently appointed by Governor Small a member of the Illinois Commerce Commission. Mr. Wright, a negro, is an attorney and has for several years been recognized as an influential political figure in the Second Ward of Chicago, which represents a very strong negro vote. He has been closely identified with the Thompson-Lundin-Small political group, and his appointment has been looked on by people of Chicago as a strong bid by Governor Small for the negro vote of Chicago and the State.

Mr. Wright succeeds Alexander J. Johnson, who was made insurance commissioner to replace Thomas Houston. The latter is reported to have resigned because of political interference in his department.

Mr. Wright has been closely associated with the Thompson régime in Chicago for eight years. He was assistant corporation counsel and was also retained for a time as a special attorney for the city. In this latter capacity he is reported to have received considerable sums from special appropriations which were paid as expert fees. This has been the subject of considerable discussion and controversy in Chicago.

Providence Employees Accept Five-Cent Increase

By a vote of 1,307 to 387, the employees of the United Electric Railways, Providence, R. I., have decided to accept the new wage and working agreement, giving the men an increase in wages of 5 cents an hour. The new agreement replaces that which expired on Oct. 31, 1923, and will continue in effect until Oct. 31, 1924. Besides the advance of 5 cents an hour it increases the time guaranteed "spare men" from six and a half to seven hours a day and approves some changes in working hours.

Under the new agreement conductors and motormen will be paid 56 cents an hour for the first three months of service, 58 cents for the next nine months, and 61 cents after the first year. Operators of one-man cars will receive 5 cents an hour in excess of the rate paid on two-man cars. Operators on snow plows, men in the freight and express departments and trainmen who are engaged on some specified special work will receive pay slightly in excess of the regular platform wages.

When the agreement under which the employees had been working expired on Oct. 31, it was decided between the officials of the two organizations that the men should continue under the old agreement until the new one should be drafted and accepted by both parties to the contract or definitely rejected by one of them.

The agreement drawn up by the union called for an increase of 19 cents an hour for platform men. The company refused to consider the demands and suggested that the entire matter be settled by arbitration. After about two weeks of a deadlock the company consented to meet the union representatives in conference, with the result that the entire matter has been terminated in conference.

Old Age Pension Plan for Ashland Employees

The Lake Superior District Power Company, Ashland, Wis., has announced a service annuity or old age pension plan which became effective Jan. 1, 1924. A year ago at Christmas time the company started its welfare plan by giving insurance polices to its employees. This Christmas these policies were renewed and increased in amount. Besides insuring the lives of its electric, gas and electric railway employees the company now insures independence in old age for its loyal employees.

Briefly, this plan provides for the retirement of men employees at the age of sixty-five and women employees at the age of sixty and for the retirement, under certain conditions, of men employees at sixty and women at fifty-five years of age. The amount of pension paid is in proportion to the length of time that the employee has been in the service of the company and the average salary during this period. The plan is administered by a board of five trustees, all of whom are officers or employees of the company.

Experts Employed to Help Solve Los Angeles Traffic Problems

The Los Angeles Traffic Commission, anxious to obtain relief from the traffic congestion there, has engaged experts and engineers to institute a survey and plan a traffic system for the metropolitan area—Los Angeles and environs.

The engineers engaged are Frederick Law Olmstead, Boston; Harland Bartholomew, St. Louis; C. H. Cheney, Los Angeles, and E. O. Mills, St. Louis; also Major R. F. Kelker, Jr., Chicago.

Major Kelker spoke at the Traffic Commission's last meeting in regard to mass transportation, with particular relation to the transporting of passengers by standard transit lines. He expressed the fear that it would be long before Los Angeles could afford to construct subways, which would cost up to $5,000,000 a mile. He recommended studies regarding the feasibility of using open cuts as a solution for outlying areas from 3 to 5 miles.

He stated that the favorable climate of Los Angeles made a facility of this kind available, whereas in many other localities such construction was not efficient. He further suggested that concrete elevated transit structures be carefully considered by Los Angeles authorities, although he refrained from any definite recommendation as he had been in the city only a few days and had not completed a thorough study of this phase of the traffic relief plans of the commission.

Henry E. Ehlers New Transit Director in Philadelphia

Henry E. Ehlers, assistant engineer of the Pennsylvania Public Service Commission, on Jan. 3 was appointed Director of the Department of City Transit of Philadelphia by Mayor-elect Kendrick. He succeeds in this capacity W. S. Twining.

In 1914 Mr. Ehlers went to Harrisburg as a draftsman in the engineering department of the Public Service Commission. He advanced rapidly, being appointed assistant engineer to the commission, and his ability was so conspicuous that W. D. B. Ainey, chairman of the Public Service Commission, indorsed Mr. Ehlers for appointment to the transit department.

Mr. Ehlers is thoroughly familiar with Philadelphia's transit problems, particularly from an engineering viewpoint. He is a former director and treasurer of the Engineers' Club of Philadelphia, a former president of the Engineers' Society of Pennsylvania and a member of the American Society of Mechanical Engineers. Mr. Ehlers was born in Philadelphia, forty-four years ago, and after his education at the Northeast Manual Training School and the engineering department of the University of Pennsylvania, he served for twelve years as professor of experimental engineering at the university and for two years was mechanical engineer of the New York Shipbuilding Company, part of which time he spent at sea.

In view of the fact that during the next four years the incumbent of the office of the Department of Transit will be responsible for the expenditure of millions of dollars in extension of transit development in the city of Philadelphia, the post is a very important one, over which Mayor Kendrick spent much time in consideration of the prospects.

The man who was considered along with Mr. Ehlers to fill the position was Solomon M. Swaab, engineer of the Keystone State Construction Company, who has been appointed as consulting engineer to the Mayor. This is an entirely new office, but it will permit Mr. Swaab to work with the transit director and at the same time be in a position to use his engineering skill in advising on other problems. Mr. Swaab has been connected in a responsible capacity with the construction of nearly every big public project in Philadelphia in the last twenty-five years. He was with the Philadelphia Rapid Transit Company in charge of the design of the city subway system and later on the construction of the Market Street subway.

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Bus a Traction Adjunct

President McCarter Says System of the Future Will Be a Combination of Cars and Buses Under One Management

The bus is not a substitute but is a valuable ally to the electric railways. The electric railway still is and will continue to be the main dependence of any system of local transportation.

These are opinions expressed on Jan. 8 by Thomas N. McCarter, president of the Public Service Railway of New Jersey. They were pronounced by him in a lecture under the Cyrus Fogg Brackett foundation to the students of the Green Engineering School of Princeton University.

Mr. McCarter said that in these days of organization, in these times when the social habits of the nation make co-operation a necessary part of an effort to provide for public welfare, there can be no greater folly than to leave the provision of adequate local transportation to the mercy of individual purveyors, interested only in the profits that they can make.

As Mr. McCarter sees it the development of the bus has brought into being another transportation facility, but it has not changed the requirements for transportation or altered the necessity for transportation systems that shall provide service for communities as a whole and play their due part in building up those communities in the way that shall provide the maximum of convenience and comfort for the people. Mr. McCarter said:

> The electric railway is still and will continue to be the main dependence in any transportation system. To injure it, to destroy it by competition, is to deprive the public of its most essential transportation facilities and leave no adequate substitute. The bus is not a substitute, it is an adjunct. It should not be made an enemy, but an ally. Electric railway and bus in co-ordination can furnish the people of this country with local transportation fitted to public needs and the transportation system of the future will be a combination of cars and buses under the same management, each occupying the field for which it is best suited.
>
> It is the present and not the future of the electric railway industry which gives the cause for concern. Local transportation, as I have defined it, will always be necessary in this country and can always be most efficiently and economically conducted through privately-owned transportation companies. And this being so, then eventually government and companies, public and operators will arrive at a *modus vivendi*, under which the "best possible service" shall be furnished at the lowest "possible cost."
>
> But, in the meantime, the most careful consideration of the public, the best efforts of those in charge of and those connected with the properties, the honest and unbiased assistance of the industry, are needed to restore it to a condition of economic stability and to put it in a position where it can attract from the thrifty people of the nation the capital it needs for its expansion and betterment.

Mr. McCarter argued that government or municipal ownership of electric railways is less satisfactory than private ownership. He said in this connection:

> We hear much of the municipally operated tramway system of Glasgow, and it is indeed an efficiently and economically operated property, but the part that it has played in community development is strikingly small in comparison with that taken by the privately-owned companies of America.
>
> Compare the service given to Glasgow and its suburbs with that given to Newark and its suburbs. The Glasgow system provides 200 miles of track to serve a population of 1,300,000, or a mile of track for each 6,500 people; Newark and its suburban communities have 215 miles of track to serve a population of 652,000—a mile for each 3,032 people.
>
> Private initiative, based upon hope of individual reward, if you like, has put at the command of American cities local transportation systems which have raised the opportunities for healthful and comfortable living to a high level. Municipal ownership and operation in the United Kingdom has been content to meet existing conditions. It has lacked initiative, and in consequence has contributed much less toward civic development.

Dorchester Tunnel Extension Plan Accepted by Boston Elevated

The directors of the Boston Elevated Railway have accepted Chapter 480 of the Acts of 1923, under the authority of which the Dorchester tunnel is to be extended to a point south of Columbia Road, thence, on private right-of-way, parallel to the tracks of the Old Colony Division of the New York, New Haven & Hartford Railroad to Harrison Street, and thence over the Shawmut branch of that railroad, to a transfer terminal in the vicinity of Peabody Square. Trains of surface cars will be operated over the remainder of the branch to the present railroad station in Mattapan.

The City Council promptly accepted the act and the board of trustees of the Elevated have for some time been urging the directors to do likewise. The directors, however, felt that, as $1,000,000 of new capital for cars and other equipment would be made necessary to carry out this enterprise, and no way of raising this capital has yet been found, careful consideration must be given the matter.

The directors, in announcing their decision to Chairman Jackson of the board of public trustees, said:

> In view of the financial situation of the company, the directors have been very reluctant to accept the act for the extension of rapid transit facilities in Dorchester. This extension will not only call for a substantial additional capital expenditure, but is also likely to result in operating losses.
>
> The directors understand that the present floating indebtedness of the company amounts to approximately $4,000,000, and that this amount is likely to be substantially increased in the future by reason of commitments for further capital expenditures. The directors know of no securities which the company is free and able to place at the present time for the purpose of raising new capital, except about $500,000 of additional bonds, although they understand that the trustees propose to ask the legislature for authority to issue something like $2,000,000 additional bonds against the premiums paid in on the stock of the West End Street Railway.
>
> While the directors, in view of all the circumstances, have voted to accept the act in question, they think it only fair to state that it is doubtful whether they will be willing to consent to any further extensions or additions involving capital expenditures, so far as their consent is necessary, unless some satisfactory method is found for providing the necessary money for such expenditures.

The annual report of the board of trustees to the Legislature shows that for the proper development of this system there will be required from $10,000,000 to $15,000,000 of new capital within a few years, and emphasizes the need for some action to permit of this financing.

Names of Buffalo Trial Staff Members Announced

H. G. Tulley, president of the International Railway, Buffalo, N. Y., announces that the new trial staff appointed by J. J. K. Caskie, general attorney in charge of negligence and litigated cases, will consist of the following members:

Raymond C. Vaughan, chief of trial counsel of the recently organized firm of Rann, Vaughan, Brown & Sturtevant. Mr. Vaughan is also the chief trial attorney for the New York Central Railroad in the Buffalo district.

Gordon Steele, of the firm of Botsford, Lytle, Mitchell & Albro.

Olin T. Nye, formerly of the firm of Penney, Killeen & Nye.

Selby G. Smith, of the firm of Kent, Means & Smith.

Frederic R. Twelvetrees, formerly associated with Penney, Killeen & Nye.

Hobert L. Himes.

Joseph J. Kelly and Robert E. Miller, of the firm of Kelly & Miller, formerly associated with Locke, Babcock, Spratt & Hollister.

The negligence cases in Niagara and adjoining counties will be tried by Clarence R. Runals of the firm of Cohn, Chormann & Franchot, Niagara Falls.

A similar system of handling negligence claims and litigated cases is in effect with the Mitten Management in Philadelphia.

Electrification Project in Texas to Proceed

Materials have been ordered and construction work will start at once on the electrification of the Missouri-Kansas-Texas Railway's line from Dallas to Denton, Tex., a distance of 47 miles. The electrification is to be done by the Dallas Railway and allied interests in fulfillment of a commitment made in 1917 when the local railway franchise in Dallas was granted to the Strickland-Hobson interests.

Electrification of the M.-K.-T. branch line has been held up for nearly a year on account of litigation brought by property owners on Fairmount Street, along which the Dallas Railway proposed to lay tracks for the new interurban line to enter the city. This litigation the company has won.

The Dallas-Denton line, or the electrified Katy, as it is now coming to be known, is regarded as a link in the proposed interurban line that will eventually connect Dallas and Wichita Falls. Funds had been raised and surveys of proposed routes completed for this line, when financial stringency of the war period made further financing impossible. Since that time the project has been permitted to remain dormant.

Richard Meriwether, vice-president and general manager of the Dallas Railway and president of the Texas Interurban Railway, is in charge of the electrification of the Dallas-Denton line.

The electrification project will cost about $1,250,000. It is expected that the work will be completed next fall.

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Hollywood Subway Sanctioned

California Commission Has Approved $3,800,000 Outlay by Pacific Electric Railway in Los Angeles

The Pacific Electric Railway, Los Angeles, announces it will begin work on its proposed Hollywood rapid transit subway, before the expiration of the sixty-day time limit affixed by the California State Railroad Commission in its order just issued. The plan calls for the construction to commence at Hill Street Terminal. The line will come to grade at Glendale Boulevard and First Street.

The commission granted a permit to the railway in the form of an order directing the company to commence its Hill Street terminal subway, making the order effective ten days from Dec. 13, the date of issuance. The commission orders work to start within sixty days and to be completed by March 1, 1925, unless an extension is granted for good cause, according to the text of the permit. It is anticipated construction will be completed within eighteen months.

The proposed subway is approximately 1 mile in length. It will cost about $3,000,000. The expenditure for the required right-of-way will represent an outlay of $800,000.

Futile efforts were made by the Los Angeles Traffic Commission, the railway and other civic bodies to have the terminal of the subway extended to Pershing Square, a city park, one block south of the railway company's Hill Street terminal. The idea was to establish at Pershing Square a central terminal from which other subway branches could ultimately radiate. The Railroad Commission studied the advisability of locating the terminal under Pershing Square rather than at the originally-proposed Hill Street terminal, but the board of engineers failed to agree as to the logical site. The chief engineer of the commission reported there was little hope of an agreement being reached and in order to avoid delay he recommended construction of the subway as originally planned. The Railroad Commission issued its order in the hope of relieving the present deplorable traffic conditions in Los Angeles.

The subway, when completed and in operation, will give the Hollywood district rapid transit and shorten the running time to the Glendale district and other points in adjacent San Fernando Valley sections that are served by the Pacific Electric interurban lines. The subway will relieve traffic congestion to a great extent in the busy sections of Los Angeles where Pacific Electric interurban and local trains operate through and out of the city on Sixth Street as well as Hill Street. Approximately 1.100 cars a day will be removed from Hill Street that serve the Hollywood district and 915 trains a day from Sixth Street, that operate between Los Angeles, Glendale and Burbank territory.

The Railroad Commission in issuing its permit pointed out that should the City Council and the Board of Public Utilities of Los Angeles withdraw their opposition to Pershing Square as a central subway terminal, the additional cost to the railway to extend its subway from the Hill Street terminal to the Square would be $1,160,000.

The Hollywood subway of the railway was ordered to be constructed by the Railroad Commission two years ago, when the commission authorized the Pacific Electric Railway to increase its rates. In fact the increase in fares between Los Angeles proper and Hollywood territory was made conditional on the construction of the subway to provide rapid transit to the various communities affected by the rate increase.

Ottawa Franchise Approved by Voters

The voters of the city of Ottawa, Ont., by a vote of two to one on Jan. 7 passed the new franchise agreement, whereby the Ottawa Electric Railway will charge a 5-cent fare for five years, with the Sunday and limited tickets discontinued.

In 1921 the property owners voted two to one against the purchase of the Ottawa Electric Railway. In 1922 the electors at large rejected service-at-cost and municipal ownership and voted for a contract along the lines of the present franchise.

In 1923 the company made two offers to the city—one of which was called "service-at-cost," but was in reality a partnership agreement, the other being an offer to sell. Both offers were rejected.

At the election just held an agreement such as the voters asked for in 1922 was put up to the people. Besides retaining and guaranteeing the 5-cent fare for five years the agreement binds the company to the construction of 17 miles of track and the purchase of forty-seven passenger cars at an outlay of $1,500,000.

Negotiations looking toward a settlement of the franchise question in Ottawa have been in progress since last August. On Aug. 10 the Mayor wrote to the company asking under what agreement it would undertake the Feustel improvements and extensions. The company submitted a proposal with certain changes which were summarized in the ELECTRIC RAILWAY JOURNAL, issue of Dec. 8, 1923.

The Ottawa company pointed out that under the old agreement the city had the right to buy the railway in August, 1923, but the city declined. The old agreement provided that the city might buy at the end of any five-year period after August, 1923, the price to be set by a board of arbitration. Under the new agreement the city still has the right to buy at stated periods and under the same terms.

Assessment Against Property Owners for City's Purchase of Railway Illegal

The full bench of the Supreme Court of Massachusetts has decided that an assessment made by the Mayor and City Council of Attleboro upon land of property owners in that city for the cost of purchasing the Norton, Taunton & Attleboro Street Railway was unwarranted and illegal, and that Lewis S. Chilson and other citizens of Attleboro are entitled to have the proceedings reviewed.

Under a special act of the Legislature of 1919 the city of Attleboro, in conjunction with Taunton, Norton and Mansfield, exercised an option under the statute and purchased the bonds and stocks of the railway. The share of the cost to Attleboro was $30,000.

Chief Justice Rugg, who wrote the opinion, says that it was in no sense an acquisition, under the power of eminent domain or by immediate purchase of the franchise, rights and properties of the railway under the authority conferred by Section 2 of the act. The corporate entity of the railway continues without interruption or alteration. The stockholders and creditors have changed. The corporation itself remains unchanged.

In its decision the court said in part:

> Subsequently the City Council of Attleboro laid an assessment upon the lands of the petitioners and others. The only authority for betterments was a clause that "In case the said cities and towns . . . shall purchase or take and operate the said street railway . . . a portion of the purchase price, not exceeding 50 per cent paid by any city or town, may be assessed upon the owners of estates in such city or town specially benefited thereby. . . ."
>
> The assessment of a substantial part of the cost of an investment by a municipality in stocks and bonds of a private corporation forms a noval basis for a betterment assessment. Such an investment partakes of a private business adventure. The corporation may sell its property to or consolidate with other companies under certain conditions. A receiver may sell all its property. In other ways it may be that financial reverses would wipe out the investment. The entire control of the street railway is left to the corporation and remains under the direction of its governing officers.

$362,998 Deficit Under Five-Cent Fare in Jersey in November

The Public Service Railway of New Jersey had a deficit of $362,998 for November, 1923, the second month of operation under the 5-cent fare, according to a report filed with the State Board of Public Utility Commissioners on Jan. 10. There was a deficit of $8,911 for November, 1922, under the 8-cent fare. It will be recalled that the company filed a petition for a 10-cent cash fare, but that the commission suggested operation at a 5-cent fare for an experimental period of four months.

The revenue from transportation was $1,754,246, compared to $2,036,601 in November, 1922. Total operating income was $79,692 against $416,024 in November, 1922. Operating expenses were $1,523,466 against $1,462,540 for the same month of 1922.

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Three Men Make Good Showing.—A record of 102,000 miles without a single accident was established during 1923 by three trainmen on the city and interurban systems of the Wisconsin Public Service Corporation, Green Bay. The men made no accident reports whatever and in addition to having clear records were honored with a number of "D" credits, given for avoiding near accidents.

Lease Approved.—The Public Utilities Commission has approved the lease by the Connecticut Company to the New York & Stamford Railroad of a track in Stamford, Conn., extending to the New York state line. The lease is for five years at $10,000 a year.

Mr. Nash Lecturing on Public Utility Economics.—L. R. Nash, manager of public relations Stone & Webster, Inc., Boston, Mass., has been conducting a university extension course in public utility economics before about 200 employees of the Boston Elevated Railway. The course is being repeated for members of the Stone & Webster organization and representatives of a number of affiliated banking houses. Mr. Nash plans to compile and publish all the lectures that are associated with the course.

Appeals Decision.—The United States Collector of Customs at Buffalo has taken an appeal to the United States Circuit Court of Appeals from the decision of Federal Judge John R. Hazel in Buffalo granting a permanent injunction to the International Railway in its action to have the customs department maintain inspectors on the Upper Steel Arch Bridge across the Niagara gorge at Niagara Falls Sundays and holidays so as to facilitate the transportation of passengers over the Park & River division of the International. The customs collector threatened to withdraw inspectors and close the bridges at Niagara Falls and Lewiston Sundays and holidays unless the railway paid the overtime wages of the Federal inspectors. The decision of Judge Hazel forces the customs department to provide inspectors at all times so as to keep the bridges between the American and Canadian sides open to the public.

Mayor Urges Railway Purchases.—Mayor Rolph of San Francisco, Cal., in his inaugural message has reiterated his stand in favor of the purchase by the city of the Market Street Railway properties and their amalgamation with the municipal lines.

Will Name Arterial Highways.—In order to speed up traffic, the Kansas City, Mo., Safety Council is preparing a list of a number of thoroughfares, to be known as arterial highways, where all crosstown traffic will have to come to a full stop before attempting to cross or enter such a highway. In order to test out this plan only a few of the most traveled thoroughfares running north and south will be named in the original ordinance. More may be added later if the plan proves a success.

Foreign News

English Railway Electrification Progresses

Plans are now being carried out actively for the electrification of large additional sections of the suburban railways in the vicinity of London, forming part of the Southern Railway. This company was formed about two years ago as one of the great amalgamations of British railways. It comprises the railway companies formerly known as the London & Southwestern, the London, Brighton & South Coast and the Southeastern & Chatham.

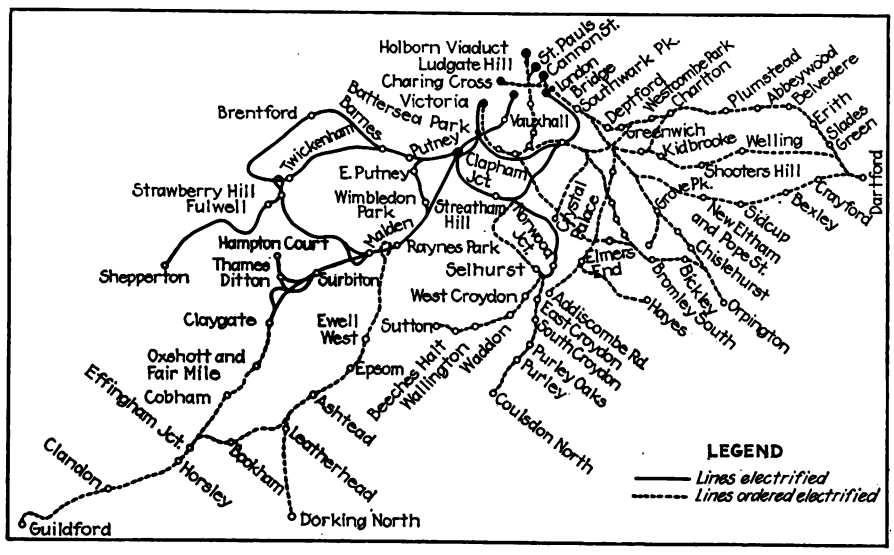
Each of these companies had electrification schemes for suburban lines in prospect, two of them for extensions, and the third, the Southeastern, for an initial installation. For the Southwestern section plans have been approved for the extension of the electrification to Guildford and Dorking. This work, along with that on the other sections, will cost about £5,000,000 and it is intended that it will be completed by the end of 1925. The arrangements will provide for carrying on the electrified lines 200,000,000 passengers per annum.

The London, Brighton & South Coast section is carrying on the conversion of more suburban lines, which will be electrified with an overhead contact line on the single-phase system, whereas the others will all be direct current with the third rail.

Work on the Southeastern conversion is only beginning, its lines hitherto having been operated exclusively by steam power.

Altogether the Southern Railway has at present 85 route-miles (248 miles of track) of electrified lines, which will be increased to 145 miles of route involving 358 miles of single track. The following estimates of the cost of electrification have been made public:

LONDON, BRIGHTON & SOUTH COAST SECTION	
Line equipment	£276,600
Motors and trailers	395,000
SOUTH EASTERN SECTION	
Conductors and rails	£786,000
Electric equipment of stock	730,000
Substations and d.c. feeders	720.000
Conductor rails and track bonding	515,000
Electric light and supply system	200,000
High-tension feeders	315,000
Repairs to stations	300,000
New car sheds	100,000
Repair and inspection shops	110,000
Signaling, permanent way, drainage, etc.	324,000
SOUTH WESTERN SECTION	
Extension to Guildford and Dorking	£840,000



Electrification Under Way or in Operation in Vicinity of London, England, on the Southern Railway

British Trackwork for Glasgow

Departing from the policy which has been pursued previously to give orders to the lowest bidders, Glasgow Town Council on Dec. 13 decided that a contract for special trackwork should be awarded to Hadfield, Ltd., Sheffield, for the sum of £9,794, although the tender received from the United States Steel Products Company was £8,568. The tramways committee had by a majority recommended that the United States company's tender should be accepted. It was contended that, especially in view of extensive unemployment, the work should be carried out in Britain.

Reversible Tramcar Staircase.—The Metropolitan Electric Tramway Company, London, is conducting experiments with a new reversible staircase for its double-deck cars. This is so constructed that the conductor can turn it round at each terminus, so that both front and rear staircases face the near side of the car. Tests show that an interchange of passengers can be made in half the time which would be taken in the case of an ordinary car.

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Financial and Corporate

Elevated Collateral Sold

Noteholders of the Chicago Lines Come Into Possession of Property Under Foreclosure

The common stock of the Chicago Elevated Railways' collateral trust, which controls the four elevated lines in Chicago, was bought at public sale on Jan. 5 by a committee representing holders of $14,000,000 of notes, which have been in default for several years, and for which the common stock was collateral.

The effect and possibilities of the sale have been set down as follows:

1. The Chicago elevated lines will be consolidated into a new corporation, controlling both ownership and operation, scaling down capitalization $34,700,000, from about $121,895,000 at present to $87,196,500, by wiping out the old Chicago Elevated Railways preferred and common shares. Those have a par value of about $40,000,000, but market value of only a small fraction of that.
2. Control will pass to the Commonwealth Edison Company interests as the largest stockholder. The new corporation will have $20,329,500 common stock at par value. Of that stock the Commonwealth Edison Company will receive a considerable part in satisfaction of bills for electric power.
3. Facilitation of unification of both elevated and surface lines if the city wishes to purchase both.

The noteholders' representative was the only bidder for the common stock of the Chicago Elevated Railways collateral trust.

Since the noteholders' reorganization plan was announced several months ago, groups of old preferred stockholders several times have attempted to block operation of the plan. The final litigation was disposed of recently. Circuit Judge Hugo M. Friend denied a petition for a receiver and refused to intervene in the sale of the common stock. Previously, another group of stockholders had obtained from Judge Friend an injunction against the sale, but the Illinois Appellate Court reversed the order and pronounced the sale legal.

TROUBLE TEN YEARS OLD

In reviewing the affairs of the elevated Lines the Chicago *Tribune* said that the financial difficulties of the roads date back nearly a decade. In 1914 the Chicago Elevated Railway collateral trust sold the $14,000,000 issue of notes and pledged its common stock as collateral. The notes were extended on maturity to July 1, 1919, but since that time they have been in default, both as to principal and interest.

When the elevated lines admitted inability to pay off this indebtedness, a noteholders' protective committee was formed, but the noteholders took no action until last year. Then they formulated a reorganization plan and obtained permission from the Illinois authorities for a consolidation.

The capitalization of the new consolidated corporation will consist of $46,704,000 underlying mortgage bonds, $1,600,000 of first lien and refunding mortgage bonds, $18,563,000 of adjustment debenture bonds and $20,329,500 of common stock. The underlying bonds will go to holders of the old underlying securities, while the rest of the new securities will be apportioned among holders of the old junior securities as set forth in the reorganization plan, made public last summer. The total capitalization of the new elevated corporation would be $87,196,500.

The property value of the constituent companies was set at $89,514,932 for rate making purposes by a valuation of the Illinois Public Utilities Commission on June 30, 1919.

Merger of Coast Companies in Jersey Proposed

Application has been made to the Board of Public Utility Commissioners of New Jersey in behalf of a syndicate composed mostly of men from the Central West to bring together under one management four traction companies, an electric light company and a water company in New Jersey. H. S. Clark, president of the Indiana Power Company and head of the group, said that the Eastern Power Company would be the parent body. The parent company would combine the Atlantic Coast Electric Light Company and the New Jersey Water & Light Company. The trolley lines to be merged are the Seashore Electric Railway, the West End & Long Branch Railway, the Seacoast Traction Company and the Asbury Park & Sea Girt Railroad. The organizers plan to refinance these concerns by issuing bonds to retire outstanding obligations of about $4,332,000 and to furnish about $500,000 new capital for expansion.

Five Months Operation Shows Deficit

The Interborough Rapid Transit Company, New York, N. Y., for November reports a balance of $220,277 after deducting the 4 per cent dividend on the Manhattan Elevated stock and all other charges except the sinking fund on the first mortgage 5 per cent bonds which does not become operative until July 1, 1926, but which must be deducted from the earnings of the system before arriving at the sum available for dividends on the Manhattan stock. The company for the five months ended Nov. 30, 1923, showed a deficit of $853,490. The company reports a total revenue of $22,919,307, from which was subtracted $16,097,103 for operating expenses, taxes and rentals paid the city and $1,275,270 for maintenance in excess of contractual provisions. Fixed charges amounted to $5,400,421.

Refunding Refused

Foreclosure and Reorganization of United Railways, St. Louis, May Follow Court Action

United States District Judge Faris of St. Louis on Jan. 2 denied the petition of Rolla Wells, receiver of the United Railways, for permission to issue $4,100,000 of receiver's certificates to retire a similar sum of general mortgage 4s and prevent the entire issue of $30,000,000 of general 4s from going to default.

FORECLOSURE AHEAD

The decision of the court virtually forces an immediate reorganization of the railway through foreclosure proceedings of bondholders. In denying the petition of the receiver Judge Faris overruled former Judge Henry Lamm, special master, who had recently recommended that issuance of the certificates be authorized. Mr. Lamm in his report held that a year's interval would give the company time in which to work out its differences with the city as to valuation and mill taxes and probably permit it to obtain suitable franchise extensions.

In touching on these points Judge Faris said:

> As to the question of a franchise—the people must ride or walk, and until aerial navigation is perfected they must use the streets. If there is a necessity for street cars, it is incumbent on the city to grant franchises. If the future demands a change in the mode of transportation the fact that, on existing streets, the company had a franchise for 100 years, will afford small consolation to stockholders or bondholders. They will be in the same position of the man who was fully and fashionally equipped sartorially, but had no known destination.

In reviewing the situation as to the $30,000,000 of general 4 per cent bonds soon to be in default, Judge Faris pointed out that no provision had been made for the $6,500,000 of St. Louis & Suburban bonds, the holders of which instituted foreclosure proceedings on Nov. 6. The Suburban bondholders have asked for a separate receivership and segregation of the Suburban property from the United Railways. The court said:

> It is difficult to see how foreclosure can be avoided inasmuch as the Suburban bonds are already in default.
>
> Foreclosure of the Suburban bonds might result in segregation of the Suburban system. Such segregation might be financially helpful to some interests, but it could not be helpful to the public.
>
> If incurable defaults are to happen, it is only fair to permit them to happen to all, so that the remedies can proceed on an even tenor.

Judge Faris added that he was not convinced that the company was in danger of great loss through early foreclosure and reorganization.

The court has since taken under consideration a plan to merge all foreclosure suits filed against the United Railways and it is expected he will set a special day on which to hear argument on that point.

A motion to consolidate the various suits was filed with the court on behalf of the company by former Judge Henry S. Priest, its counsel. He contended

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that this plan would facilitate all of the litigation and effect a financial saving for all concerned.

The only foreclosure so far filed affecting the issue of $30,000,000 general mortgage United Railways 4s was brought by an individual who holds $4,000 par value of the bonds.

Issues in default on which suits have not been filed are those of the Compton Heights line, $986,000, and the St. Louis Transit Company, $9,790,000.

Abandonment of Some Birmingham Lines Sought

Negotiations seeking the consent of the city authorities to the abandonment of a portion of the tracks of the Tidewater line and to the rerouting of the Tidewater cars, have been opened by the receivers of the Birmingham Railway, Light & Power Company with the City Commission of Birmingham, Ala. Solution of the problem of the Tidewater line, it is stated, must be reached before the reorganization of the company can be perfected.

If present negotiations are successful, it is stated by the receivers, the valuable portions of the Tidewater line, which is said to be losing money steadily, probably can be saved. Should the negotiations fail, the Tidewater line probably will be junked in the re-organization.

Surveys showing the plans for the Tidewater line are being prepared by the receivers and will be filed with the commission immediately. The matter was discussed at an informal conference with the commission several days ago and further conferences are expected to be held.

Suggestions have been made by the receivers that the Tidewater line be divided into two lines. This plan calls for junking that portion of the Tidewater line from Forty-first Street and Avenue C to the Terminal station at Fifth Avenue and Twenty-sixth Street, north. The proposal also suggests that the western end of the line stop at Nineteenth Street and Fifth Avenue, north.

Protest Over Oakland Reorganization

Louis H. Bien, the trustee in bankruptcy of the United Properties Company of California, holding all of the capital stock of Oakland Railways, and Frederick Olachewski, a stockholder of the San Francisco-Oakland Terminal Railways, have filed a petition with the California Railroad Commission for a rehearing of all matters connected with the application of the trustees for San Francisco-Oakland Terminal Railways for authority to transfer the properties of the San Francisco-Oakland Terminal Railways and subsidiary companies, and to issue securities, in carrying out the proposed reorganization plan recently authorized by the commission.

Railway Funds Wisely Invested

Public Trustees in Massachusetts Make $200,000 Profit, but Come in for Censure

An entirely new issue in electric railroad legislation has developed in Massachusetts in connection with the handling of funds by the board of public trustees of the Eastern Massachusetts Street Railway. It is a matter of record that for some time the trustees have invested the company's surplus cash in high class securities and that they have made a profit of about $200,000 for the railway by such investments.

Representative Richard D. Crockwell, in the Massachusetts Legislature, takes the view that a law must be enacted to make such handling of railway funds illegal on the ground that although it was profitable to the Eastern Massachusetts in this case, it might result in losses in other cases. Had there been losses instead of profit from the investments made by the Eastern Massachusetts Street Railway trustees the Commonwealth of Massachusetts would have been compelled to make up the deficit, as it is responsible for the acts of the trustees. An order has, therefore, been introduced in the Legislature to investigate the acts of the trustees. The trustees say:

All investments by the Eastern Massachusetts Street Railway have been made with the sanction and by direction of the entire membership of the board of public trustees. None of these investments was of a speculative nature.

Reports on these investments have been made in the annual returns to the Department of Public Utilities and included in each instance a detailed list of the securities held and they have been and are now public records.

When the public trustees assumed control of this road they received $3,500,000 of new cash under the readjustment plan from the sale of $2,500,000 bonds and $1,000,000 common stock paid for at par by assessments on Massachusetts Electric companies and Bay State stockholders.

This money could not be used advantageously at once and was invested in high grade bonds pending such use. From time to time as the need for this money arose these bonds have been sold. The securities purchased were of such high grade that they were always immediately salable at a price at least equal to that paid for them. The purpose of these purchases was not in any sense to secure a profit on the sale but merely to obtain an adequate return on these funds pending their investment in the property itself.

The public trustees set up a reserve for depreciation and in a similar manner invested these funds pending the necessity of applying the reserve.

During 1923 only $223,000 of such bonds were purchased and these only for the purpose of reinvestment of money received from the payment of bonds at maturity. During the year $375,000 of bonds previously acquired were exchanged for new issues of the same companies.

In 1923 the company was a consistent seller of these securities as the necessity for money arose to enable it to pay for new cars and other equipment. During the year bonds to the par value of $1,482,000 were sold.

The company has never owned a share of Sinclair Oil, American Telephone, American Agricultural Chemical or Armour Company stocks. It has held and does now own underlying bonds of some of these companies.

It has made relatively small investments in such standard investment stocks as Woolworth preferred, U. S. Steel preferred, Standard Oil of New Jersey preferred, First National of Boston, Bethlehem Steel preferred, and Electric Bond & Share preferred. The par value of these stocks so held is $215,000. The company has never sold a share of these preferred stocks since they were acquired. Woolworth preferred stock was called for redemption by that company.

It is true that by reason of these investments the public trustees have secured a return on funds temporarily idle larger than if such funds had been carried on deposit. It is also true that the company has sustained no loss through any of its investments.

$47,642 Surplus in Rochester for Year

For the first time since the adoption of the service-at-cost contract between the Rochester lines of the New York State Railways and the city of Rochester, operations of the trolley lines in the city for the year ended July 31, 1923, showed a surplus. As reported by Charles R. Barnes, commissioner of railways, the amount of the surplus was $47,642.

Revenues were stated as $5,287,892 and costs at $5,240,250. This is the third year of operation under the contract. Commissioner Barnes, in his report, said that there was little hope for a reduction in fare as the deficit of $180,367 that existed on July 31 must first be wiped out.

Barring an increase in wages granted on June 1 operating costs varied little from previous years.

More than 100,000,000 passengers were carried on the Rochester lines during the fiscal year. Revenue passengers per car-mile averaged 7.9. During the year an average of 208,011 revenue passengers were carried daily on the lines.

Extension Granted on Ohio Traction Bonds

An extension of ten months time has been granted by the Fifth-Third National Bank, Cincinnati, Ohio, to the Ohio Traction Company on notes in the sum of $600,000, executed by the company and held by the bank. According to officials of the Cincinnati Traction Company, the majority stock of which company is owned by the Ohio Traction Company, the notes represent the balance due on an original issue of $845,000, bearing interest at 7 per cent and, authorized in 1920 by William C. Culkins, then Director of Street Railroads for the city of Cincinnati. The proceeds of the sale of the bonds were used by the company for improvements and betterments to the electric railway system.

When the bond issue fell due on Jan. 1, 1923, the Cincinnati Traction Company paid off $245,000 of the issue, and being unable to pay the remaining $600,000, obtained an extension of nine months by the bank. When this expired on Oct. 1, 1923, the Ohio Traction Company, the parent company, gave notes for the $600,000, thus paying off the remainder of the bond issue. These notes fell due Jan. 2, 1924, and in view of the existing unsettled conditions in the traction situation the Ohio Traction Company requested and obtained the extension.

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$13,000,000 of Bonds in San Francisco Refunding Operation

Financing for the account of the Market Street Railway, San Francisco, Cal., has been arranged to the extent of $13,000,000, and bonds to that amount were offered publicly on Jan. 8 by a syndicate consisting of Dillon, Read & Company, Ladenburg, Thalmann & Company, New York; the Wells Fargo Bank & Union Trust Company, and the Anglo & London Paris National Bank, San Francisco. The bonds are a first mortgage issue, bearing 7 per cent interest, dated April 1, 1924, and due in 1940. They are priced at par.

The bonds are for refunding purposes, and their proceeds will be used entirely for discharging $4,269,000 of five-year 6 per cent collateral trust gold notes, due on April 1 next, and $9,239,550 of 5 per cent first consolidated mortgage gold bonds, due on Sept. 1 next.

Charles N. Black, president of the company, says:

> None of the company's franchises expires prior to 1929. Thereafter franchises covering the operations of various of the company's lines mature, from time to time, until 1952. Lines on which franchises have matured in the past have been acquired by the city at a fair and satisfactory price, and under the terms of the mortgage the proceeds of any sale of the mortgaged property are paid into the sinking fund for the retirement of additional bonds. It is estimated, taking into account the maturities of franchises, that the available income during the life of the bonds will in every year be more than twice the interest charges on the bonds then outstanding.

The bonds are callable as a whole or in part by lot at 107½ to April 1, 1926, and thereafter at prices decreasing ½ per cent each year to maturity.

Controversy at Montreal Followed by Changes in Organization

At a meeting of the Montreal Tramways & Power Company directors, held at Montreal, Que., on Jan. 7, E. A. Robert, president of the company since its inception about fourteen years ago, resigned from the board. William C. Finley, formerly vice-president, becomes president. The board was also added to by three members elected from the ranks of the shareholders who were recently in opposition to the administration, and one of them, Alcide E. Beauvais, was named vice-president. Other new directors are F. B. McCurdy and Dr. Noe Fournier.

The Montreal *Gazette* of Jan. 8 said:

> The recent turmoil that has occurred in Montreal Tramways & Power Company affairs could never have come about if the affairs of the company had not been shrouded in such complete secrecy. It is reasonable to suppose, therefore, and we have the assurance of an official of the company, that in future those details, of which the shareholders in particular, and the financial public in general, are entitled to know will be duly made public.

The resignation of Mr. Robert as president of Montreal Tramways & Power Company does not mean that he ceases to be president of the Montreal Tramways or of other companies controlled by the holding company.

Giving effect to the recent changes, the board now is composed as follows: William C. Finley, president; A. E. Beauvais, vice-president. Directors: George G. Foster, Lorne C. Webster, J. M. Wilson, F. B. McCurdy, N. Curry, Dr. Noe Fournier and J. M. McIntyre.

Auction Sales in New York.—At the public auction rooms of A. H. Muller & Sons there were sold on Jan. 9 eighty-three shares of Interborough Metropolitan Company, $5 lot, and $5,000 Austin Street Railway first mortgage 5 per cent bonds due 1936, 75 per cent.

New Jersey Interurban Takes Over Operation.—The former Northampton, Easton & Washington Traction Company, Phillipsburg, N. J., was sold under foreclosure in 1922, and with the taking over of operation by the New Jersey Interurban Company, Easton, Pa., on Nov. 1, 1923, the receiver was discharged. There is outstanding by the new company 2,000 shares of capital stock, without par value, $500,000 of second mortgage 5 per cent income bonds, due Jan. 1, 1950, and $100,000 of first mortgage 7 per cent bonds, due Jan. 1, 1950.

Suburban Line Fails to Pay Interest.—The Philadelphia Stock Exchange has been advised that the Frankford, Tacony & Holmesburg Street Railway, Philadelphia, made no provision for the payment of the coupon due Jan. 1, 1924, on its first mortgage thirty-year 5 per cent bonds, due 1940. For the five years previous to 1923 the company operated at a deficit after the payment of fixed charges. The bonds are outstanding to the amount of $400,000. They are followed by $500,000 of capital stock. The road is 17 miles long. It connects Frankford, Tacony, Holmesburg and Torresdale.

Bonds Secured by Real Estate Are Offered.—Dillon, Read & Company, New York, offered for subscription on Jan. 7 at 100 and accrued interest $2,500,000 of Philadelphia Rapid Transit Company real estate first mortgage 6 per cent gold bonds. The bonds are dated Jan. 1, 1924, and are due Jan. 1, 1944. The bonds are secured by a first mortgage on three modern car terminals of brick and concrete construction.

Committee Representing Bondholders Arranges to Advance Interest.—Holders of the general first mortgage 4 per cent bonds of the United Railways Company, St. Louis, have been notified that owing to the failure of the Federal Court to authorize the receiver to pay the Jan. 1, 1924, bond interest, the three committees representing bond holders have arranged to advance the funds needed to make the payment.

Notes Called for Redemption.—The Delta Light & Traction Company, Greenville, Miss., has called for redemption all of the outstanding 8 per cent serial gold notes dated Aug. 1, 1921, maturing on and after Feb. 1, 1924. They will be paid at 102 and interest at the office of the National City Bank of Chicago.

$335,000 of Common Stock Authorized.—The Public Service Commission of Indiana has authorized the Interstate Public Service Company, Indianapolis, Ind., to issue $335,000 of common stock at 75 in lieu of $280,000 of prior lien stock authorized by the commission last October to be issued at 90.

$672,000 of Bonds Authorized.—The Public Service Commission of Indiana has authorized the Indiana Service Corporation, Fort Wayne, to issue $672,000 of 5 per cent bonds at not less than 80 and interest and to use the proceeds to reimburse the treasury for additions and improvements.

$230,000 of Car Trust Certificates Offered.—The Fidelity & Columbia Trust Company, Louisville, Ky., is participating in a syndicate which is offering at 100 and interest $230,000 of Louisville Railway car trust 6 per cent gold certificates, Series "B." The certificates are dated Jan. 1, 1924, and are due semi-annually to Jan. 1, 1934. The railway unconditionally guarantees the payment of principal and dividend warrants by indorsement on each certificate.

$4,907,600 Fixed as Value of Halifax Property.—The Public Utilities Board has placed a valuation of $4,907,600 on the property of the Nova Scotia Tramways & Power Company, Halifax, N. S. The rates to be charged consumers will be such as to give the company 8 per cent on this. The valuation includes, says the board's report, a fair value of such physical assets and such undertakings as a going concern of this kind has, as of Oct. 1, 1921, including reasonable and proper allowances for organization and legal expenses and going value. The company is reported to have outstanding $2,250,000 of first 5's, $1,500,000 of general 7's, $2,078,800 of 6 per cent preferred and $2,510,000 of common.

Increase in Surplus Earnings.—For the twelve months ended Nov. 30, 1923, the gross earnings of the United Light & Railways Company and subsidiary companies, Grand Rapids, Mich., was $12,566,555, against $11,648,359 for the same period ended Nov. 30, 1922. The surplus earnings available for depreciation, debt discount and common stock dividends was $1,298,791. For the twelve months ended Nov. 30, 1922, the surplus earnings amounted to $1,059,739.

Approval of Sale of Jennings Line Sought.—The Missouri Public Service Commission will hold a public hearing soon at St. Louis on the application of Wayne J. Stedlin to dismantle and sell for junk the St. Louis & Jennings Railroad to Joseph Greenspon's Sons Company, St. Louis. The railway extended from the end of the Bellefontaine division of the United Railways System in St. Louis, at Robin and Florissant Avenues, to Jennings, Mo., with a branch line on Helen Avenue. It went into bankruptcy several years ago. Mr. Stedlin informed the commission that he sold the property for the value of the second-hand material it contained and requested approval of the sale.

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Traffic and Transportation

Experimental Operation Planned

One-Man Cars to Be Run on Probation at Berkeley—No Further Action in Oakland

For a period of six months one-man cars are to be run on probation on Dwight Way and Ashby Avenue, Berkeley, Cal. If at the end of that time the operation of the cars meets with general approval it is likely that all objections will be withdrawn to their use on minor lines.

W. R. Alberger, general manager of the San Francisco-Oakland Terminal Railways, has accepted the terms of the agreement and has promised that the safety cars will be operated in strict accord with the recommendations of the State Railroad Commission. Two of these recommendations were that flagmen be stationed at Adeline Street and Ashby Avenue and at San Pablo Avenue and Dwight Way and that the hours of duty of the flagmen be increased.

This new arrangement rescinds an ordinance passed many months ago by which one-man cars were prohibited from operating on any of the streets of Berkeley. There was only one dissenting voice in the Council to the new arrangement.

The action of the Council followed an indorsement of the one-man cars made by J. N. Edy, city manager, who previously had conducted an exhaustive investigation.

There is no change in the one-man car situation in Oakland, sister city to Berkeley, where the Mayor and one or two members of the City Council have been warring on the cars. Many threats of police action have been made, but the cars, to the number of about fifty, continue to be operated unmolested.

Applications for permission to run bus lines in outlying sections of Oakland are on file with the City Council. The San Francisco-Oakland Terminal Railways is one of the companies seeking such rights, and the Peerless Stage Company the other.

Mayor Davie and Commissioner Moorehead favor the stage company on the ground that to grant the application of the railway will be favoring a traction monopoly. Commissioners Carter, Baccus and Colbourn, however, have refused to take sides with the Mayor. In fact Mr. Carter has openly espoused the cause of the railway and Mr. Colbourn has voted with him on one or two occasions. Mr. Baccus remains neutral.

The lone city-owned bus, the Rosalie, continues to run on various Oakland streets, but no action has been taken by the city to increase the number of municipal buses, although Commissioner Moorehead has asserted that he has a fund available for the purchase of additional vehicles. It is likely that in the spring there will be a referendum on the bus question.

Higher Fares in Toledo on Jan. 13

Fares at Toledo will be raised by the Community Traction Company to straight 7 cents with a 1-cent transfer charge on Jan. 13. With the fare stabilizing fund down to $57,000 and $300,000 as the minimum at which to raise fares the company officials have determined to recoup the fund according to the provisions of the Milner service-at-cost ordinance.

Recent wage increases and a larger maintenance appropriation for 1923 were largely responsible for the depletion of the fare stabilizing fund. Car riding has been greatly affected in the last two or three years through the use of privately-owned automobiles. In addition the operation of jitneys is estimated to have taken about $750,000 in revenue away from the railway since the Milner plan has been in operation.

It is estimated that the advance in fare will increase receipts more than $5,000 a month. It will, however, affect only car riders who had been educated to use tokens, sold at six for 40 cents. The number of users of tokens has totaled about 30 per cent of all the riders.

In a statement explaining the general situation to the citizens of Toledo, President Adams declared:

> We wish to assure the citizens of Toledo that every effort will be made in the coming year to operate the property with the utmost economy. Much can be accomplished if we can secure the co-operation of the car riders and the other citizens of Toledo.

At present conferences are being held attended by officials of the Community Traction Company, the Toledo Edison Company, and the street railway commissioner's office looking toward agreement on a lower power rate.

Seven-Cent Fare Tariff Filed for Akron

The Northern Ohio Traction & Light Company, Akron, has filed with the Ohio Public Utilities Commission a rate to become effective in Akron on Feb. 1 which calls for a straight fare of 7 cents, with universal transfers or four tickets for 25 cents. This rate is only tentative and was filed with the commission to comply with the laws of Ohio. The company's Akron franchise expires on Feb. 1.

Fare Hearing Opened

First Session Held at Atlanta on Jan. 3 on Appeal of Local Company for Increase

The opening hearing on the Georgia Railway & Power Company's petition for increased fares resolved itself into a sharp tilt between the railway and the jitney interests. The railway was represented by Preston S. Arkwright, president, and H. M. Atkinson, chairman of the board of directors. The jitney interests were represented by former Mayor James L. Key and Sam Schlesinger, president of the Atlanta Jitney Bus Association.

The hearing was held on the evening of Jan 3 at the Council chamber in the City Hall. It was presided over by Alderman J. R. Bachman, chairman of the special committee of the City Council handling the power company's petition. He opened the meeting by announcing that the Council had taken up the proposition of the company and had appointed a special committee to audit the books. He then called for a discussion of the proposed rate changes.

Former Mayor Key opened the discussion for the jitney men by declaring that the proposed changes would mean $3,000,000 a year additional revenue for the railway and that he did not believe the company needed any such amount to continue in operation. The jitney, he said, gave the public a faster service than the railway and rendered a necessary public service. Mr. Key declared that it would be an outrage to take the jitney driver's business away from him. He was sharply called to order by Chairman Bachman for insinuating that the committee was acting unfairly.

President Schlesinger of the Atlanta Jitney Bus Association was the second speaker for the evening. He declared that the demand for jitney service was greater than the supply. There are 105 jitneys in his association. Mr. Schlesinger said that the railway had lines on more streets, comparatively, than any company in any other city with which he was familiar, and that if jitneys were excluded from streets on which the street cars were operated, the jitneys would be unable to approach the business section of the city, and might as well prepare to go out of business.

J. R. Smith, of the real estate firm of Smith & Rankin, defended the power company from a new angle when he declared that the proposed Highland Avenue extension of the railway would increase property value in that section by $3,500,000. Jitney lines, he pointed out, do not increase property values. Property owners, by supporting the street railway in its efforts to make money and build necessary extension, could get all of their money back many times over in the increase of value of their holdings.

Guy W. Hamebaugh, a local insurance man, suggested a 5-cent fare for short hauls, a 10-cent fare for long hauls and the elimination of transfers.

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Under such a system, he declared, both the railway and the jitney could live and flourish.

A second hearing will be held after the Council has completed its audit of the company's books.

The petition of the company, after setting forth that it was unable to continue to give adequate service or to take care of necessary improvements, under present conditions, contains several suggestions for relief, approval of which is asked of the Mayor and General Council.

COMPANY WANTED TEN-CENT FARE

The company asks approval of: 10-cent cash car fares, tickets to be sold for 6⅔ cents as at present; 2-cent charge for transfers; elimination of jitneys from streets on which street cars are operated; reasonable revision of its operating routes in the interest of better service; elimination of unnecessary car stops and relief to the extent necessary from gross income tax and assessments in street paving projects.

The company, in its petition, also says it will agree to try any reasonable plan that may be advanced.

Council has no authority to grant an increase in fares, or in any way to grant revisions in the operation of the various lines. This power rests entirely with the Georgia Public Service Commission. The city can, however, grant the request that jitneys be eliminated from competition with street cars and grant relief from gross income tax and paving assessments.

"Owl" Cars for New Year's Frolickers.—So that no one would miss the New Year in and the old year out in Denver, the Denver Tramway ran an extra "Owl" car on every line where it does not operate all-night service, thus making it possible for those who were not participators in the automobile jamboree to linger a while longer and still get home with ease, comfort and safety.

Condition Placed on Operation of One-Man Cars.—The Johnstown Traction Company, Johnstown, Pa., has secured permission to operate one-man cars over grade crossings "provided the company places a watchman at the crossings," according to a decision handed down by the Public Service Commission. The railway appealed to the commission for approval of the waiver of a general order relating to the operation of cars crossing at grade over steam railroads. With two-man cars the conductor is required to "flag" the motorman to proceed. The traction company sought to eliminate the "flagging" with one-man cars, allowing the operator to remain on the car.

Will Work Uniform Fare Collection System.—E. M. Walker, president of the Schenectady Railway, recently announced that a movement was being undertaken to work out a uniform fare collection system. At the present time part of the cars are operated on the pay-enter plan, while on others the patron pays when he leaves the car. So as to prevent confusion in boarding the right car the Schenectady Railway has adopted the system of painting large yellow strips along the center of the interurban coach roofs to distinguish them from the city cars. It is said that the resemblance of some of the Albany service cars and the "submarine" type cars used on city lines causes confusion when seen at a distance. Many of the old interurban cars now used in rush-hour city service are taken for Albany or Troy coaches. According to General Manager Lynch, the system will enable the passengers to identify the cars right away. It is said that the Fonda, Johnstown & Gloversville Railroad will mark its cars in the same way.

Order Does Not Apply to Suburban Trains.—The Missouri Public Service Commission has modified a recent order requiring railroads and interurban lines to furnish drinking cups on all trains operated in Missouri so that this edict will not apply strictly to suburban trains. The modification was made at the request of the St. Louis & San Francisco Railway which sought to be relieved of the necessity of furnishing cups for the suburban trains operated between Pacific, Mo., and St. Louis. The commission stated that the original order was not intended to apply to suburban trains.

Ordinance Effective Shortly.—The jitney ordinance passed by the City Commission of Mobile, Ala., on Dec. 27 and referred to in the ELECTRIC RAILWAY JOURNAL of Jan. 5, becomes effective Jan. 15. Its provisions practically eliminate jitneys from the streets of Mobile. Only three jitney buses had been operating in the city of Mobile and they were losing money but it was found that they took about $2,500 a month away from the Mobile Light & Railroad Company.

Bus Lines Included in Merger.—The Northern Indiana Railway, operating in South Bend, Ind., has absorbed the Lee bus lines and will make them a part of the transportation system by running them into districts built up during the last three years of industrial expansion. The bus lines to Cassopolis and Dowagiac, Mich., were included in the merger.

Will Apply for Six-Cent Rate.—The Binghamton Railway, Binghamton, N. Y., will make application to the Common Council on Jan. 15 for the right to charge a 6-cent fare within the city limits during the year 1924. This privilege has been granted the company for the past three years. Company officials have presented figures each year for the past three years which they claim show that if a 5-cent fare were charged the company would have to suspend operation of its cars.

Exhibit Shows Accidents.—As a further step in Salt Lake City's safety first campaign, an exhibit of miniature vehicles showing how accidents happen was recently placed in the window of the Utah Power & Light Company. The display showed an intersection of a busy street, with two automobiles colliding and street cars striking a pedestrian, an automobile and an ice wagon. At one side of the miniature vehicles a graveyard was depicted with tombstones bearing among other inscriptions the following: "Gasoline and Moonshine Don't Mix," "Speed Hound," "Reckless Driving," etc. The city recently began its safety first campaign by arranging for the blowing of whistles at 3:30 o'clock each school afternoon, to warn automobile drivers that schools are being dismissed.

Special Ticket Rates.—The Cedar Rapids & Iowa City Railway & Light Company, Cedar Rapids, Ia., has started the sale of special round trip rates on all its service from 5.30 p.m. to midnight. The round trip ticket for use between these hours can be bought for the prices that are ordinarily charged for a one-way fare.

Higher Fares in Effect.—Fares were recently increased on the lines of the United Electric Railways, Providence, R. I., by reducing the number of tokens to be sold for 50 cents from ten to nine. According to President Potter the new tariff will yield an additional net revenue estimated at $422,500, an amount sufficient to offset the estimated operating deficit of $412,495 for 1924. The present tariff schedule was filed on Nov. 22 and became effective on Nov. 24, and the thirty days required by law ended on Dec. 24. The company's application for increased rates has been referred to previously in the Electric Railway Journal.

One-Man Cars Exclusively in Oklahoma City.—The one-man car has come into general use in Oklahoma City. All the lines there are so equipped exclusively. The change to one-man operation has come about gradually. It was made effective on the last lines in the city on Christmas Day. The last remaining lines to be changed over were the Capitol, the Capitol Hill and the Culberson lines.

9,974 Cars of Livestock Handled in Eleven Months.—A statistical report covering both inbound and outbound business handled by the Belt Railroad & Stock Yards Company, made public by C. C. Holstein, traffic manager of the company, shows plainly the steady growth of the interurban as a freight carrier. The report covers the eleven months ended Nov. 30, last. It reveals a total of 9,974 car loads of livestock handled by all the large interurbans that serve the Indianapolis market. During the eleven months period ended Nov. 30, the number of cars of live stock transported by the principal interurbans to Indianapolis was distributed as follows: Terre Haute, Indianapolis & Eastern, 5,529; Indianapolis & Cincinnati, 1,409; Union Traction Company of Indiana, 1,541; Interstate Public Service Company, 706, a total of 9,185 cars.

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Personal Items

Operating Staff Promotions

Roy R. Hadsell Made General Superintendent at Rochester—B. C. Amesbury Promoted

Roy R. Hadsell, for the past six years superintendent of the Rochester lines of the New York State Railways, has been promoted to general superintendent of the company's lines in that city and vicinity. The company's interurban lines from Rochester will now be under Mr. Hadsell's supervision.

B. C. Amesbury, assistant superintendent of city lines under Mr. Hadsell, succeeds to the post vacated by his chief. Both officials have served in virtually all departments of the railway system. The appointments were announced Jan. 4 by James F. Hamilton, president of the company.

R. R. Hadsell

Mr. Hadsell became identified with the International Railway at Buffalo in 1900 as a conductor. He remained with that company in various capacities until 1903, when he left Buffalo to enter the service of the Schenectady Railway as chief inspector. Here he stayed until 1913, when he resigned to become superintendent of the Troy division of the United Traction Company of Troy, N. Y. It was in February, 1917, that he resigned from that company to become assistant superintendent of the New York State Railways at Rochester. In the fall of 1918 he was appointed superintendent of the Rochester lines, succeeding E. E. Strong, resigned.

Mr. Amesbury, the new superintendent at Rochester, has been an employee of the New York State Railways for more than thirty years, beginning his railway career as a driver of horse cars in Rochester. In his early days with the company he served as a motorman and inspector, and in 1900 became general foreman of construction of the Rochester & Sodus Bay Railway, which was then under construction. When the road was opened for operation in the fall of that year he was appointed roadmaster of the company, and continued in that position until 1906. He was then made superintendent and held that position until the consolidation of the Rochester Railway, Rochester & Eastern Rapid Railway, Rochester & Sodus Bay Railway and other properties into the New York State Railways. When the consolidation took place he was appointed division superintendent at Rochester, in which capacity he continued up to 1918, when he was made assistant superintendent.

E. A. Robert, president of the Montreal Tramways & Power Company, Montreal, Que., since its inception about fourteen years ago, has resigned from the board. The company controls the Montreal Tramways, of which Mr. Robert continues as head.

William C. Finley, formerly vice-president of the Montreal Tramways & Power Company, Montreal, Que., has been elected president of the company, to succeed E. A. Robert.

Robert J. Fleming, formerly general manager of the Toronto Railway, Toronto, Ont., has been elected president to succeed the late Sir William Mackenzie. The company is being liquidated as a result of the purchase of the property by the city.

Howard Ansley has been appointed manager of the securities department of the Tennessee Electric Power Company, Chattanooga, Tenn. He is a well-known employee of the Nashville Railway & Light Company, going to that concern in 1913 in the lighting and sales department. He has been employed by that company since that time.

Elmer Oswold, formerly transit man in the engineering department of the New York State Railways, has recently accepted a position as assistant engineer with the Schenectady Railway. He first became identified with the New York State Railways in 1919 as material clerk in the track office and two years later he was given a position in the engineering department as rodman.

M. H. Frank, formerly in charge of the electric railway, light and power and gas properties of the Eastern Wisconsin Electric Company at Fond du Lac, Wis., has been named to succeed B. W. Arnold as manager of the electric railway department of the company. Mr. Arnold, as noted previously in the ELECTRIC RAILWAY JOURNAL, has joined the forces of the Chicago, North Shore & Milwaukee Railroad.

R. C. Larkin has been appointed superintendent of interurban divisions of the International Railway, Buffalo, it was announced on Jan. 1 by Herbert G. Tulley, president of the company. Mr. Larkin will have supervision over the Buffalo-Niagara Falls high-speed line, Buffalo & Lockport, Lockport & Olcott and Buffalo & Lancaster divisions, in addition to the Park & River route along the Canadian gorge. Mr. Larkin was formerly with the Philadelphia Rapid Transit Company for several years as operating manager of the Folsom division, an interurban section of the P. R. T. Mr. Larkin will make his headquarters in the Niagara Falls terminal. This is a new position created by President Tulley.

G. O. Nicolai General Manager at Terre Haute

G. O. Nicolai, whose appointment as general manager of the Terre Haute division of the Terre Haute, Indianapolis & Eastern Traction Company, was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Jan. 5, has been in the employ of the company for more than twenty years. He has risen to the managership of the property by promotions through various positions, beginning as a clerk in the purchasing department in March, 1903. He was later transferred to the light and power department, shortly after becoming chief clerk. He then advanced to the position of commercial agent, to be followed by a still greater promotion, that of superintendent of the light and power department, and has occupied that position up to the present time. His present appointment became effective on Jan. 1. Mr. Nicolai was born in August, 1883. He was educated in the Terre Haute public, high and commercial schools.

G. O. Nicolai

In a statement he said that there would be no great change made in the policy, the only change being to fill the position he was leaving. Mr. Nicolai succeeds as manager of the company Edwin M. Walker, who recently became president of the Schenectady Railway.

Alcide E. Beauvais has been elected an additional vice-president of the Montreal Tramways & Power Company, Montreal, Que. He is a member of the Montreal Stock Exchange house of Fortier, Beauvais & Company.

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Messrs. Enright, Metzger and Ryan in New Posts

Joseph M. Enright, superintendent of way and structures of the Community Traction Company, Toledo, has been appointed to the Toledo Edison Company with the title of assistant to Vice-President B. C. Adams. In his new position it is understood that he will have charge of the Toledo, Ottawa Beach & Northern Railway and do considerable public relations work directly under Mr. Adams. He will also be connected with a number of other Doherty properties at Toledo under the new arrangement. Mr. Enright began his railway career as a driver of horse cars in Toledo thirty-five years ago. He was at one time superintendent of transportation, holding this post directly after the starting of the service-at-cost plan.

General Superintendent J. Frank Johnson will assume the duties for the time being that Mr. Enright had in the Community Traction Company.

R. S. Metzger, with the Doherty properties at Toledo for a number of years, and in charge of the Toledo, Ottawa Beach & Northern line, has been named assistant claims attorney for the Community Traction Company.

James Ryan has been transferred to the Toledo Edison Company to handle claims of the other Doherty properties at Toledo. He has been handling claims for the railway for years. All the changes were effective with the New Year.

C. S. Mitchell Vice-President of Philadelphia Company

Curtis S. Mitchell has been made vice-president and controller of the Philadelphia Company and affiliated companies, among them the Pittsburgh Railways, with headquarters in the Central Office Building, Pittsburgh. In addition to handling the responsibilities of controller he will perform such other duties as may be assigned by the president.

Mr. Mitchell entered the auditing department of the United Traction Company of Pittsburgh in August, 1897. Two years later control of the road was purchased by the Philadelphia Company, which in 1902 acquired all the surface railways in Pittsburgh. At that time Mr. Mitchell was appointed auditor of the combined property and continued in that position until 1912, when he became controller of the company. Mr. Mitchell has been very active in American Electric Railway Association affairs, at one time holding the position of third vice-president and at another president of the Accountants' Association.

J. J. Connors has been appointed safety supervisor of the Nashville Railway & Light Company, Nashville, Tenn. He was formerly carhouse foreman with that company.

A. V. Little has been named superintendent of the Southern Cambria Railway, operating in Ebensburg, Conemaugh, South Fork, Brookdale and Mineral Point, Pa.

E. B. Moore, general manager of the Monongahela Power & Railway Company, Fairmont, W. Va., has resigned. Mr. Moore has been with the traction company as general manager since 1915, joining the company after serving as chief engineer for the Consolidation Coal Company.

Obituary

Cecil G. Rice

Cecil G. Rice, superintendent of the claims department of the Pittsburgh Railways and former manager of the associated bureaus of that company, died on Jan. 3. Mr. Rice succumbed to pneumonia after an illness of about six weeks.

Mr. Rice had done noted claims work in the electric railway field. He reorganized that department of the Pittsburgh Railways into bureaus of clerical, inspection, medical, adjustment, and litigation. At the head of each bureau is a chief, and over all the bureaus Mr. Rice exercised an uncanny knowledge of human beings in an antagonistic mood and bent upon winning a fat fortune for a bruise. This knowledge was a mixture of psychology, law and finance, with a generous share of honest liking of the other fellow, which made the enemy a friend once he stepped inside Mr. Rice's private office. Mr. Rice's work really was nothing but making enemies into friends. His humor and his sense of fair play, too, disarmed any "principal" (never called the "claimant" by the Pittsburgh Railways) for a grouch can't survive near humor and justice. Cartoons of the absurdity of litigation are scattered about the office, attesting to Mr. Rice's humor, and the Code of Ethics and Policies formulated and published by Mr. Rice emphasizes the fixed principle of dealing with justice to all concerned. The plan of the claims department, which is based upon psychological principles, was described in the ELECTRIC RAILWAY JOURNAL, issues of July 24 and Sept. 11, 1915.

Mr. Rice had contributed frequently to the ELECTRIC RAILWAY JOURNAL, and gave the benefit of his constructive ideas to this paper in an interview which appeared in the issue of July 22, 1922, page 113. He had had considerable newspaper experience as city editor of the Parkersburg (Pa.) *Daily News*, and on the staff of a Pittsburgh paper. This work in Pittsburgh led to his appointment to do special work for the city. In 1907 he became associated with J. D. Callery, president of the Pittsburgh Railways, as his private secretary, and later was made general agent of the company in charge of the employment bureau. From 1908 to 1909 he was credit manager of the Colonial Trust Company, Pittsburgh, but returned to the Pittsburgh traction system as head of the claims department. He was in charge of the same work for the Duquesne Light Company and the Beaver Valley Traction Company. In 1915 Mr. Rice was appointed assistant to the president, continuing in charge of the claims work as manager of the associated bureaus. In 1921-1922 he was president of the American Electric Railway Claims Association.

A. W. Damon

Alonzo Willard Damon, vice-president and director of the Springfield Street Railway and a trustee of the New England Security & Investment Company, died in Springfield, Mass., on Jan. 7, at the age of seventy-six years. On leaving school Mr. Damon became a clerk for the Washington Insurance Company in Boston. He subsequently filled important positions for this and other companies, and in 1895 became president of the Springfield Fire & Marine Insurance Company, an office that he filled with marked ability until his death. He was also a director of the Third National Bank, Springfield. His service on the board of the Springfield Street Railway reached back many years, and his counsel was recognized as of great value.

Walter R. Dame, widely known in New England as a corporation lawyer and promoter of electric railway and other utilities in central Massachusetts and Vermont, died recently at Daytona, Fla., at the age of sixty-three.

Charles R. Dougherty, for the past three years working in the financial interests of the General Electric Company on the Pacific coast, died recently at his home in Pasadena, Cal., at the age of fifty-one. Mr. Dougherty began his business career when seventeen years of age with the Thomson-Houston Electric Company in Philadelphia, in a clerical capacity. In 1894 he was made auditor of the Philadelphia District of the General Electric Company. In 1913 he was transferred to Schenectady as a general assistant to the comptroller of the company.

John T. Murphy, superintendent of the Chicago Heights Street Railway for the past eighteen years, was killed recently in an automobile accident. He had devoted his entire life to street railway work. including construction and operation. During his residence in the city of Chicago Heights he had become one of its prominent citizens. When the city of Chicago Heights adopted the commission form of government, Mr. Murphy was elected a commissioner, serving two years, and retiring from this office only a few months prior to his death. Robert Johnson has succeeded him in the capacity of superintendent of the Chicago Heights Street Railway.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Ticket Sales Increase

Manufacturer Reports 35 per Cent Increase in Output for the Year Just Ended

Sales of the Globe Ticket Company, Philadelphia, Pa., in 1923 were 35 per cent greater than in 1922. Moreover, the company reports the outlook for 1924 to be exceedingly bright. It has as usual been planning ahead, and is prepared to meet any demands that may be made upon its facilities. In fact, the birth of the new year was very appropriately celebrated on Jan. 1 by the company with a reception held in its factory on North Twelfth Street. The occasion marked the formal opening of the new section of the plant, which, with the completion of some alterations to be made in the older section, will more than triple the size of the factory.

The normal capacity of the Globe plant is about 25,000,000 to 30,000,000 tickets a day. Under pressure this output can be increased to more than 40,000,000 daily. The tickets produced include every known form of ticket or check, from the familiar trolley ticket and transfer to the elaborate dining-room check used in fashionable hotels, restaurants and clubs. The sales of the company are not confined to this country. Nearly every country in the world where movies are shown or trolleys are operated makes use of Globe tickets and transfers.

In addition to the Philadelphia plant, a complete unit is maintained in Los Angeles to serve the Far West, and a similar unit in New York City handles the work for the Metropolitan area.

Lumber Production Increased 20 per Cent Last Year

Lumber production during 1923 of the mills reporting to the National Lumber Manufacturers' Association showed an increase of 15 per cent over the production in 1922. This figure is based on actual reports for fifty-one weeks and an estimate for the last week of the year. In 1922 the lumber cut by 13,163 mills, representing about 90 per cent of the total for the country, was 31,426,922,000 ft., according to the United States Forest Service. The lumber production of the country in 1923 is estimated at over 38,000,000,000 b.ft.

The greatest increase in production is in the Pacific Northwest, a gain of about 20 per cent over the preceding year being reported by the mills of the West Coast Lumbermen's Association. The Southern Pine Association reports a similar increase. There were also notable increases in production in other regions, the Northern Pine Manufacturers' Association stating that the lumber cut in 1923 would probably exceed that cut in 1922 by about 14½ per cent. The Western Pine Manufacturers' Association and the Hardware Manufacturers' Association also report large increases.

Cement Prices Relatively Low Despite Large Demands

During a period of extraordinary demand throughout almost the entire year just ended, cement production and shipments exceeded all former records. At the same time manufacturers' stocks were maintained to such an extent that in the latter part of the year portland cement available at the mills was about 30 per cent in excess of that on hand at the same time the year before. In the first eleven months of 1923 production of portland cement amounted to approximately 127,000,000 bbl. This was an increase of 12,000,000 bbl., or about 20 per cent, over the production during the entire year of 1922. The accompanying table, based upon the reports of the United States Geological Survey, shows the production of portland cement since 1916:

	Production
1923*	126,969,000
1922	114,790,000
1921	98,342,049
1920	100,023,245
1919	80,777,935
1918	71,081,663
1917	92,814,202
1916	91,521,198

*Eleven months.

It is felt by cement manufacturers that prices have been and are still relatively low. Reports of the Bureau of Labor show that cement prices never reached the peak of other commodity prices and are still below the average of the building material group. There has been a slight decline in the prices of portland cement during the latter part of 1923, although it has not yet reached the low level of the early part of 1922.

Construction of Houston Line in Near Future

According to information received from the company, the Houston, Beaumont & Orange Interurban Line, Houston, Tex., is just about ready to start construction. The line has 110 miles of right-of-way ready to be surveyed. The bonds for this road have been sold to Thayer & Son of Washington, D. C. The officers of the company are George Collier, president; J. C. Simmons, secretary, and Ed Kennedy, general manager.

Half-Million-Dollar Order for Equipment

The General Electric Company has received an order amounting to $500,000 for complete electrical equipment of fifty new all-steel high-speed interurban electric passenger cars to be used by the Pacific Electric Railway on its Pasadena line.

Block Signals Purchased for Use in Davenport

Sixteen automatic block signals have been purchased by the Tri-City Railway for installation in Davenport. They are of the Nachod automatic type, and will be installed on passing sidings on single-track lines. Eight blocks just installed on the Northwest Davenport and Rockingham lines were used recently for the first time. The others will be installed and placed in operation within the next thirty days. These automatic signals replace old manual signals.

Soft Coal Production Decreases

The weekly tonnage of bituminous coal production during December, 1923, was considerably lower than at any other time during the year. The lowest week was that ending Dec. 29, when only 6,684,000 tons were mined. In only one week during the month did the amount exceed 10,000,000 tons, whereas during the first three quarters of the year it averaged more than that amount.

In every week of October and November, the week ended Nov. 17 excepted, the bituminous production was over 10,000,000 tons.

No comparison with soft coal production in 1922 is worth anything on account of the strike that year. The average for 1923, however, compares well with that of previous years in spite of low production during December. In 1923 the weekly tonnage did not average more than 8,000,000 tons, in 1920 slightly more than 10,000,000 tons, in 1919 about 8,800,000 and in 1913, which may be taken as the criterion of normal production, it was 9,200,000 tons.

Metal, Coal and Material Prices

Metals—New York	Jan. 8, 1924
Copper, electrolytic, cents per lb.	12.75
Copper wire base, cents per lb.	15.50
Lead, cents per lb.	7.90
Zinc, cents per lb.	6.87
Tin, Straits, cents per lb.	48 00
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.675
Somerset mine run, Boston, net tons	2.125
Pittsburgh mine run, Pittsburgh, net tons	2.00
Franklin, Ill., screenings, Chicago, net tons	2.075
Central, Ill., screenings, Chicago, net tons	1.75
Kansas screenings, Kansas City, net tons	2.00
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.65
Weatherproof wire base, N. Y., cents per lb.	17.50
Cement, Chicago net prices, without bags	$2 10
Linseed oil (5-bbl. lots), N. Y., per gal.	$0.94
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	11 50
Turpentine, (bbl. lots), N. Y., per gal.	$1.04

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Rolling Stock

Madison Railways, Madison, Wis., has been authorized to procure twelve more one-man cars, some of which may be added during the next few months.

Schenectady Railway has placed an order with the J. G. Brill Company for ten steel passenger cars. It is the plan of the company with these cars to develop one district of the city, furnishing increased service with modern lightweight equipment. A separate account of expense and earnings will be kept for this line so as to find out definitely what would be the effect of furnishing similar service on other lines in the system. The detailed specifications of the cars follow:

Date order was placed	Dec. 29, 1923
Date of delivery	March 15-31, 1924
Type of car	Passenger motor
Seating capacity	44
Total weight	32,500 lb.
Length over all	41 ft. 4½ in.
Truck wheelbase	5 ft. 4 in.
Width over all	8 ft. 5⅝ in.
Height, rail to trolley base	10 ft. 3 in.
Body	Steel
Interior trim	Cherry
Headlining	Agasote
Roof	Arch
Air brakes	G.E. CP-27B
Axles	A.S.T.M. Spec. A 20-21
Car signal system	Consolidated Buzzer
Car trimmings	Bronze
Control	K-35 double end
Curtain fixtures, Curtain Supply or National Lock Washer	
Curtain material	Pantasote
Destination signs	Hunter
Door operating mechanism, G.E. Safety Car Devices Company	
Fenders	H. B. Life guards
Hand brakes	Brill
Heater equipment	Consolidated
Headlights	Golden Glow SM 95
Motors	Four G.E. 265
Seats	Brill Winner
Seating material	Wood slats
Step treads	Feralun
Trolley catchers	Earll
Trolley base	Simplex
Ventilators	Brill
Wheels	27 in. rolled steel
Lighting fixtures, Compensating Type, 5 to the car in center	

Track and Line

Northern Texas Traction Company, Fort Worth, Tex., has announced that the completion of the Sycamore Heights line in Fort Worth will require a few weeks, and it is expected that service will be started on this line early in 1924. This extension is a part of the improvement program now being carried out by the company.

Aroostook Valley Railroad, Presque Isle, Me., has petitioned the Maine Public Utilities Commission asking for an extension of its lines from Sweden station, in the township of New Sweden, through parts of the townships of New Sweden, Stockholm, Township 17 and Saint Agatha, covering a distance of 27 miles.

Wisconsin Railway, Light & Power Company, Winona, Minn., is planning a large and costly program of track improvement extension and removal in 1924 in La Crosse, Wis. In an ordinance recently approved by the Common Council authority is given to commence this work.

Southern Cambria Railway, Johnstown, Pa., will lay 90 tons of 80-lb. T-rail on its line in Conemaugh as soon as the weather permits. It is also planned to lay new rails through Ebensburg borough.

San Antonio Public Service Company, San Antonio, Tex., will spend $1,500,000 on betterments and extensions in 1924 to be raised partly by sale of preferred stock and partly by the sale of bonds in the East.

Los Angeles Railway during 1923 built 10.32 single track miles of extensions and rebuilt 14.35 single track miles. At present the track department is rebuilding Flower Street between Pico and Washington with new ballast ties and paving.

Dallas Southwest Construction Company, organized several years ago for the purpose of constructing an interurban line from Dallas northwest to Irving and southwest to Cleburne, through its president, E. I. Turner, has filed application for an extension of its franchise. The petition filed with the City Commission of Dallas, Tex., represented that approximately $80,000 had been spent in preliminary construction, building of dump, bridge construction, etc., and asked that the grant be extended to Dec. 31, 1924. Mr. Turner told the City Commission that he had been forced to cease work on his project on account of the war, and had not been able to finance it since that time. He now has interested some northern capital and an English syndicate, and believes that construction work will be well advanced within a year.

Power Houses, Shops and Buildings

Hartford & Springfield Street Railway, Warehouse Point, Conn., beginning Feb. 1 will get its power from the Northern Connecticut Light & Power Company. The necessary connections are now being made, and as a result a force of a dozen or more engineers and firemen in the railway company's employ will be released.

Illinois Power & Light Corporation, Chicago, Ill., is planning a new $45,000 depot for Granite City, Ill. Ground for the new station has been purchased and work on the structure will begin soon. The depot will be built at Twentieth and G Streets and will be used for local and interurban passenger, freight and express business. There will also be room for the offices of the local railway department and lighting division.

Waterbury, Conn.—Partial plans have been sent out for figures relative to the proposed new car house to be erected at Waterbury, Conn., for the Connecticut Company. These plans refer only to the building for sand and salt storage. The paint shop plans will be the next to be submitted for figures. All plans are being prepared by the company's engineers in New Haven.

Trade Notes

Mitchell-Rand Manufacturing Company, New York, N. Y., gave its annual dinner and theater party for the sales department on Dec. 29, 1923. Previous to the dinner, which took place at the Building Trades Club, the regular monthly meeting of the salesmen was held at the offices of the company, 18 Vesey Street. After the dinner the officers of the company, salesmen and their guests attended a performance of "Stepping Stones" at the Globe Theater.

Westinghouse Electric International Company, New York, N. Y., announces the appointment of R. F. Hamilton as its manager for the west coast of South America. Mr. Hamilton, who succeeds R. A. Wrench, will leave for Santiago on Jan. 5, to take up the duties of his new office. Mr. Hamilton has spent the last four years in Madrid, Spain, as consulting engineer to the Sociedad Espanola de Construccion Naval and its affiliated companies. He is a member of the American Institute of Electrical Engineers. Mr. Hamilton went to the Westinghouse Electric & Manufacturing Company in 1912.

Sanford Riley Stoker Company, Worcester, Mass., announces that it no longer has any interest, financial or otherwise, in the Ground Coal Engineering Corporation or its successor, Universal Engineers, Inc. The Sanford Riley company will continue in the pulverized coal business on its own account and will announce from time to time the apparatus that it will manufacture and sell.

J. W. McIver has been appointed to the position of advertising and publicity manager of the Edison Lamp Works of the General Electric Company at Harrison to succeed T. J. McManis, newly made assistant to the manager of the publicity department of the entire company.

New Advertising Literature

General Electric Company, Schenectady, N. Y., is issuing, for the convenience and reference of electric railway master mechanics, a loose-leaf booklet entitled "Engineering Data for Car Equipment Maintenance." This booklet is individually prepared for each master mechanic and contains maintenance data and helpful information relating to the particular car equipments operated by his company. The data consists of various diagrams of electrical connections, etc., which would be of service in tracing trouble, together with instruction books and leaflets giving detailed information of value in car equipment maintenance.

United States Department of Commerce, Washington, D. C., has issued a fifty-page pamphlet entitled "Helping the Exporter—A Service Story Step by Step."

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New York, January 19, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 63
Number 3

Massachusetts Senate Acts Ill-Advisedly

THE action of the Massachusetts Senate in requesting the department of Public Utilities to rescind its recent decision authorizing a general increase in commutation rates on the railroads in the Boston metropolitan area marks a dangerous and deplorable step in legislative interference with the regulation of public utilities. At this writing it seems likely that concurrent action by the House will fail, in which case the commission will not be obliged to deal with the anomalous situation involved in the senatorial outgiving.

The whole theory of regulation by an expert tribunal, however, is concerned in such an act as the Massachusetts upper chamber performed. Advocates of the measure contended that as the department is a creature of the Legislature, which has not the time (sic) to investigate rate problems, the creating body has the privilege of setting aside the judgment of the board! On this theory bills have been annually introduced in an attempt to secure legislative action upon questions within the commission's jurisdiction, but these measures generally die a well-deserved death. If the findings of the commission, made after thorough and expert inquiry, are to be made the sport of politics, the outlook for fair regulation is gloomy indeed. But it is believed that gestures of the kind noted in this instance will not be generally indorsed by public opinion.

How Much Does This "Economy" Cost the Railway?

IN THE shop of an Eastern electric railway operating more than 100 cars there is no wheel press. The work of wheel replacement is done in a city some miles away at the repair shop of a large steam railroad. It is claimed by the traction company that the work done for it at the railroad shop is entirely satisfactory, and that the cost, including freight charges back and forth, is less than it would be if the work were done in the railway's own repair shops. The method adopted therefore results in some direct economy.

One wonders, however, if the railway is not really out of pocket in the end when all factors are carefully considered, because there are several extra expenses which follow indirectly. In the first place it is necessary to keep on hand a larger number of wheels and axles than would be required if there were a wheel press in the railway shop. Among the 100 cars there are naturally various types, and the same kind of wheels cannot be used under all of them. As considerable time elapses before a worn set of wheels can be restored to service, the company must have sufficient wheels and axles of each size so that necessary replacements can be made. This involves a sizable investment.

Because there are no facilities for pressing the wheels off and on the axles it is necessary to have the sets all made up. These sets of wheels and axles require much space for storage. They cannot be stacked in the same way that loose wheels and axles are commonly stored. As a matter of fact one entire track in the railway repair shop is devoted to the storage of wheels and axles. Thus the capacity of the shop is decreased to the extent of at least two cars.

Experience on this property with various wheels has shown that the flange of one wheel of a pair will often wear thin, while the flange of the other wheel on the same axle remains in perfect condition. Under such circumstances the logical thing to do would be to remove the worn wheel and put on a single wheel of the same diameter. This the company cannot do because it has no wheel press. Instead the whole axle and both wheels must be shipped several miles to the repair shop of the steam railroad. The same procedure is necessary in case of any slight defect which may happen to one wheel while its mate remains undamaged.

One cannot but wonder how much real economy there is in this practice.

How Far Should Standardization Go?

A STRANGER in a Southern city that is famed for the excellence of its coffee dropped in for breakfast one morning at one of a chain of nationally known restaurants. To his surprise and disappointment the coffee was exactly the same as that served by these same restaurants in New York and Chicago. Standardization had been carried to a point where the advantages of a particular local situation had been utterly wasted.

On the other hand, an instance can be cited where one department of a large industrial organization was in immediate need of several hundred brooms. Another department, on account of an unusual train of circumstances, chanced to have in stock a considerable surplus of brooms. But because these excess brooms were wire wrapped instead of being wrapped with twine they were unacceptable to the first-mentioned department and a new requisition was put through. In this case standardization would have accomplished real economy.

Somewhere in between these two cases lies the answer to the question of standardization. Certain it is not necessary to have the cars on all the electric railways built according to the same design and painted the same color. Yet experience has shown that operating conditions are so similar in many places that standard rails, motors, trucks, etc., give entire satisfaction. Important savings in maintenance expense, as well as in original cost, are thereby effected. Various committees of the American Electric Railway Engineering Association have devoted much careful thought to the question of standardization and have agreed upon many important

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specifications. In some cases the railways have shown a gratifying willingness to accept such specifications. In other cases progress has been slower.

Just how far standardization should go is a question that cannot be answered offhand. But in view of the care used in drawing up the specifications already adopted railway men should go slow in disregarding them. The extension of the process to cover other subjects will naturally be slow. As the need for further standardization develops steps will doubtless be taken to meet it. But the real object must be kept always in mind—to save money for the railways by reducing the number of varieties which manufacturers have to supply and railways have to keep in stock.

The committees have, in general, wisely refrained from going into such great detail that their specifications were impractical. When non-essential items are included in the specifications the whole object of standardization is defeated. If the manufacturer is forced by specifications to meet requirements that are really unnecessary or make more extensive tests than there is genuine need for, increased cost, rather than economy, will be the result.

The Way to Save May Be to Spend

HIGH cost of building construction in recent years has caused many railways to postpone the erection of needed additions to their repair shops. It is often a mistake, however, for a railway to be too economical in this respect. Proper maintenance of equipment is one of the prime requisites for successful operation. Any saving which prevents such proper maintenance of rolling stock quite likely will prove bad business.

As an example of the wastefulness of a policy which neglects to provide suitable repair shops, the case of a railway in the Middle Atlantic States may be cited. This company has three buildings in which maintenance work is done. There is the main repair shop, a large carhouse located some 2 miles from the shop, and a paint shop about 4 miles away. Regular inspections and minor repairs are done at the carhouse. For major repairs a car must be sent to the shop. Unfortunately, when a repair job is undertaken, it is not always possible to tell just how serious it is going to be. It has been found, on the one hand, that cars are sometimes sent to the main shop for trivial ailments, occasioning considerable waste mileage, and on the other hand, that repairs undertaken at the carhouse frequently develop into jobs too big to be handled there, resulting in serious loss of time before the car is received at the main shop and real repairs got under way.

The disadvantage of having the paint shop 4 miles away from the mechanical repair shop is obvious. For general overhauling a car is sent first to the mechanical shop, where it is stripped of its equipment. It is then towed 4 miles to the paint shop, where the paint and varnish are removed. Often it happens that after this has been done, some structural weakness is uncovered that was unknown while the old paint remained on the car. In that case it is necessary to notify the mechanical shop and have a carpenter or mechanic with his tools sent over to the paint shop to make the necessary repairs. If the job is more serious than can be done by a single man, the car may have to be hauled all the way back to the other shop, fixed up, and returned to the paint shop. After the painting is done the car must be towed back to the mechanical shop where the equipment is replaced. The extra expense of so much dead mileage is an important item, and the value of the time wasted, though difficult to estimate, nevertheless amounts to something on the company's balance sheet.

In this particular case the railway owns sufficient property adjoining the carhouse to erect there a new shop in which all repairs and painting could be done. This very thing has been talked of for years, but has been postponed because the railway has wished to economize. It appears, however, in this instance at least, that the way to save money would be to spend money.

Tax Reduction Prospects in New York State

NEW YORK taxpayers were agreeably surprised by Governor Smith's recommendation at the opening of the Legislature that the state personal income tax be reduced by 25 per cent. They were pleased to discover that the Governor believed the state's financial condition justified a reduction in taxation at this time, and it is certainly to be hoped that a reduction will be accomplished. However, it is by no means obvious that the income tax is the place to cut.

The tax system of the State of New York is quite unlike that of the federal government. Whereas, the income tax is the strong right arm of the federal treasury, it is merely a weak little finger in the state system. The main resource of state and local finances is real estate. The Davenport committee has reported to the Legislature that real estate is heavily burdened, and has urged that the state give it some relief by refraining from imposing any tax upon it. In view of the strained finances of many of the municipalities, it may soon be necessary to go even further than this and perhaps increase, instead of decrease, the income tax, the yield of which is shared with the municipalities in order to ease the local real estate taxes.

Moreover, it should not be forgotten that the most acute problem in taxation in New York State is the public utilities tax, especially that on electric railways. The Davenport committee suggested a utility tax based on the elements of both gross and net income, to replace the present series of state taxes and be articulated with the special franchise tax as long as that exists.

It may be noted that lower taxes on real estate will mean lower taxes on the "special franchises" of public utilities, and that a full state treasury may encourage the State Tax Commission to adopt a more reasonable attitude in valuing these special franchises. The loss of the recent proposal for a constitutional amendment to permit a thoroughgoing reform of the public utility tax law should not be made an excuse for refusing to grant such a measure of relief as can be immediately supplied.

The proposal to cut the income tax, rather than the state "direct tax" on real estate, is plainly dictated by political rather than financial considerations. A scheme which would enable each income tax payer to strike off 25 per cent of his bill and consider the saving a personal present from the Governor has very strong political attractions. Every one appreciates the Governor's thoughtfulness in suggesting it, but, critically examined, it proves to be amateurish finance. It is to be hoped that Governor Smith will be satisfied with having in the East displaced Secretary Mellon on the first page for a day, and not urge the proposal further.

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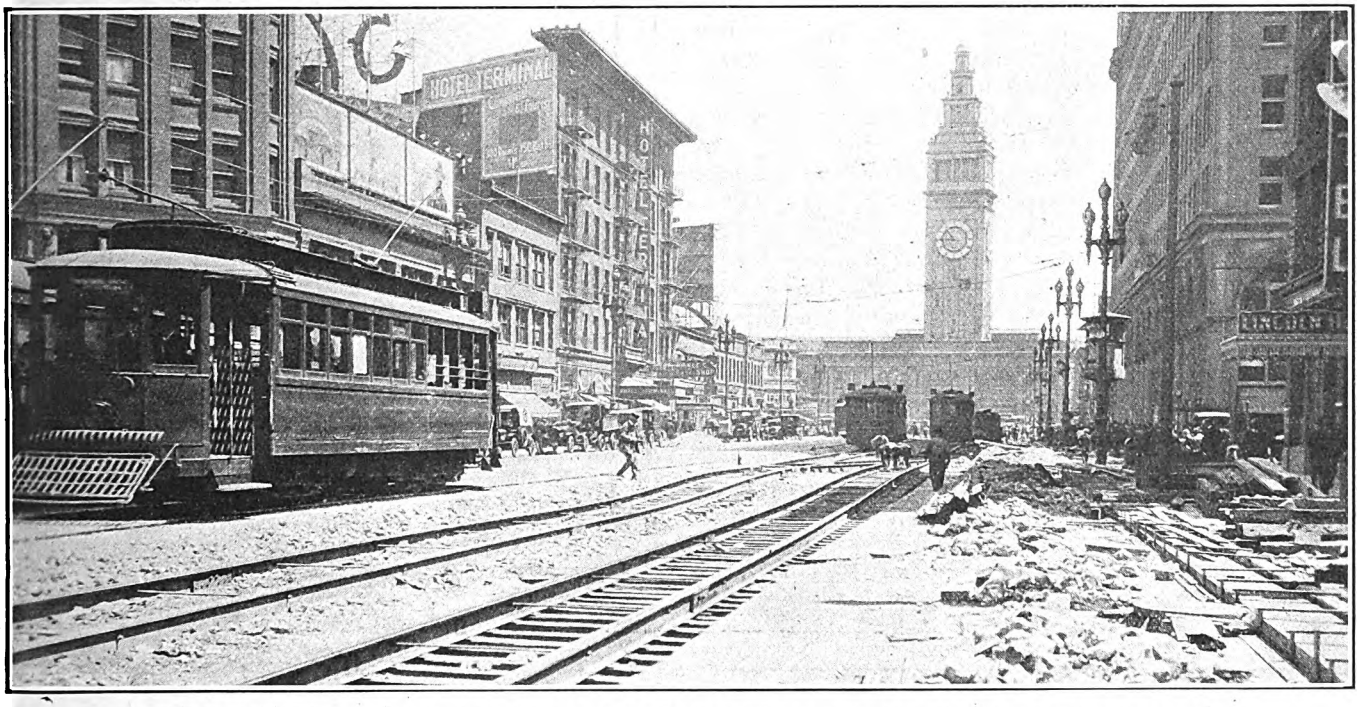
Machinery Speeds Up Trackwork

By W. D. Chamberlin
Principal Assistant Engineer Market Street Railway

The Presence of Four Parallel Tracks on Market Street, San Francisco, Simplified the Problems of a Big Reconstruction Job and also Facilitated Rapid Progress Without Interruption to Traffic—Grades Were Raised as Much as 18 In. in Some Cases to Compensate for Ground Settling



The Reconstruction Work Included a Distance of 17,760 Ft. of Single Track from the Ferry to McAllister Street

IN VIEW of the fact that Market Street, San Francisco, is badly congested with traffic, both railway and vehicular, the record recently made of reconstructing 5,500 ft. of single track and paving in twenty-five days is considered particularly good. This was only part of a larger job, however, as the reconstruction included altogether 17,760 ft. of single track from the ferry to McAllister Street. Work was commenced in May and completed in December of last year.

Market Street, the main business thoroughfare of San Francisco, is 120 ft. wide and has four parallel tracks, the two outer tracks from the ferry to Sutter Street (4,580 ft. of single track) being jointly owned and operated by the city and the railway. From Sutter Street to McAllister Street there are 8,600 ft. of single track, owned and operated by the city alone. The railway owns the two inner tracks all the way from the ferry to McAllister Street. The recent reconstruction job included the four tracks from the ferry to Sutter Street and the inner tracks from Sutter to McAllister Street.

From the ferry to Third Street, about 12,300 ft. of single track was reconstructed at night. Between 11:30 p.m. and 6:30 a.m. all passenger cars were operated on the outer tracks, leaving the inner tracks free from traffic during those hours. This was accomplished by installing temporary crossovers at several points along the line to allow the cars from the inner tracks to cross over to the outer tracks and back again. Each day, at 6:30 a.m., the new track was connected to the old so that cars operated on the new track during the day and up to 11:30 p.m.

The average force was about seventy men, not including the concrete gang. The whole night job was handled by this force with the use of a number of labor-saving machines and equipment. The equipment in use consisted of flat-bottom work cars, power-controlled dump cars, a 5-ton crane car, a 7-ton derrick car with a 3,000-lb. drop hammer, pneumatic concrete breakers and tie tampers, an electric bond brazing outfit, a 13-cu.ft. concrete mixer outfit, a special tool for cutting asphalt along the 2-ft. strip, an oxyacetylene outfit and a special crane for loading earth into flat cars.

As the headway was twenty-one seconds between cars during the morning rush hours, it was possible from Third Street to McAllister Street to operate all cars on the outer tracks days and nights, except during the rush hours from 3:30 p.m. to 7 p.m. This enabled work to continue night and day on the inside track construction.

After crossovers had been placed at McAllister Street and at Third Street, the work of reconstructing that section was started on Nov. 12 and the last concrete was laid on Dec. 7. Thus, in twenty-five days, 5,500 ft. of single track was entirely reconstructed and paved, with the exception of one or two blocks of asphalt surface. Although the job was speeded up, it was first class in every way, no hasty or careless work being

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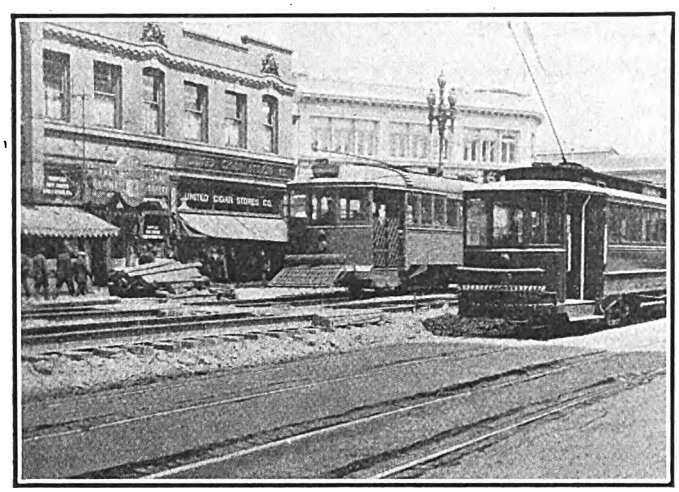
allowed. The average force on this job, not including the concrete gang, was about 120 men per twenty-four-hour day, divided into one shift of about fifty and another of seventy men.

The same equipment was used as on the preceding night job, with the addition of an asphalt scoop for loading old sheet asphalt into cars. First the asphalt in the track was torn up and loaded in cars with the scoop. Then a cut 1½ in. deep was made in the asphalt 2 ft. outside of the rails with the special asphalt cutter, which was attached to a car and run at a speed of 300 ft. per minute. After the asphalt had been removed, the 3,000-lb. drop hammer pounded the concrete base, this being followed by three Ingersoll-Rand pneumatic concrete breakers, each operated by two men. By this means the concrete base was broken into sizes small enough to be shoveled into cars. All this work was done during the day, with the exception of the hammer, which operated at night. The night force followed the concrete breakers, pulled up the old rails, ties and some remaining concrete with the 5-ton crane car, after which several carloads of refuse material were hauled each night to the dump, 3 miles distant, where they were unloaded or spread with the car unloader. All old rails were cut with oxyacetylene torches.

Before the day crew arrived each morning, the trench had been partly excavated. The day crew then finished the excavation and laid new track until 3 o'clock each afternoon. At that hour the old and new rails were connected so cars could operate until 7 p.m. All rails were laid with the derrick car, an average of about 275 ft. of single track being laid each day. This work was then followed by the tamping gang with six to eight Ingersoll-Rand pneumatic tampers and the bond brazing outfit. These in turn were followed by men with Vixen files, filing all joints, and then by the concrete

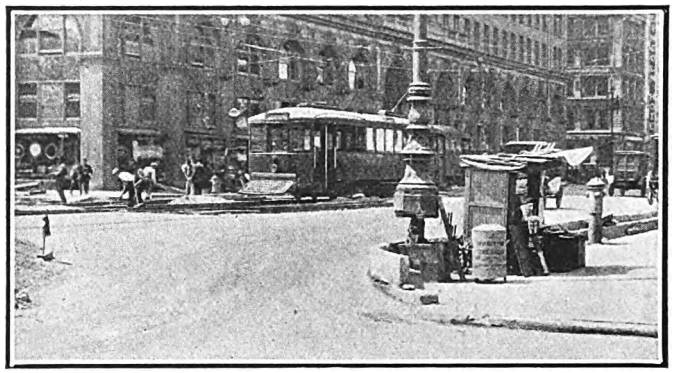


It Was Necessary to Raise the Street Grade as Much as 18 In. at Some Points

mixer outfit placing concrete base and stringer. The Topeka wearing surface was placed by a contractor.

All concrete on the 5,500 ft. of single track was cut with three pneumatic breakers in eighteen days, about 39,000 sq.ft. being broken up. All old track and paving was removed and new rails laid in twenty days. The tamping required twenty days. All new concrete was placed in nineteen days, about 54,000 sq.ft. being laid. The Topeka surface, 54,000 sq.ft. in extent, was laid in three and one-half days.

The old track consisted of 9-in., 141-lb. rails on redwood ties, spaced on 2-ft. centers, and 9 in. of crushed rock ballast. The paving was sheet asphalt with header blocks along the rails, all on a 6-in. concrete base with a concrete stringer under the rails and blocks. The reason for reconstruction was that the rail, which had



Where the Roadway Was Elevated a Retaining Curb Was Used to Keep Water Off the Sidewalks

been laid in 1909, was badly worn. In fourteen years ⅛ in. of the rail head had been worn off.

On the new track the trench was excavated 18 in. deep, about 3 in. of the old ballast being removed and replaced with new. Rails designed by the engineering department of the Market Street Railway, of 9-in., 121-lb. section, were laid on 6-in. x 8-in. redwood ties, spaced on 2-ft. centers, the rail joints being the standard 36-in. plate with twelve 1-in. bolts and three concealed brazed bonds. The paving was 2½ in. of Topeka on a 6-in. concrete base and stringer. There are no header blocks along the rails, the Topeka being laid from rail to rail. Header blocks were not used because there is very little vehicular travel along the inside tracks.

An important phase of the work was the raising of the grade of the new track in some places as much as 18 in. above the previous level. This is shown in an accompanying illustration. The continual sinking of lower Market Street, described in the ELECTRIC RAILWAY JOURNAL for Dec. 23, 1922, necessitates the raising of the track grade from time to time.

As this job was in the heart of the shopping district, with foot crossings far apart, thousands of pedestrians crossed the open work all along this line, thus greatly interfering at times with the speed of the workmen.

The record made is largely due to the machinery and equipment used, a well-organized and efficient force of men and a thorough co-operation between the various departments, including the city police traffic squad. It is expected that the cost per foot of track will exceed by only a small amount the cost of similar construction on other streets with normal traffic conditions.

Section Numbers of Trains Are Carried on Dash

WHEN several cars operate as different sections of a train on the single-track lines of the York Railways it is customary to mark each of the sections with a green marker bearing a white cross, except the last section, which carries a small sign reading "Last Car." This system of designation has been found by the company to be more convenient than the use of green and white flags, as is customary on steam railroads and many interurban electric railways.

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Getting Best Results with Heater Control Equipment

How to Install, Inspect, Test and Maintain Mercury Thermostat Equipment in Order to Get Best Operating Results and Minimize the Maintenance Expense — This Gives the Methods Recommended as Best by One Manufacturer as Result of Experience on Many Properties

*By L. P. Hynes**

IN ORDER to insure the maximum net saving from the use of thermostats for controlling the temperature of electrically heated cars, it is very important that these devices be properly installed and maintained.

A thermostat control equipment consists of two units, a mercury thermostat and a magnetic switch. The proper location of these two units relative to the rest of the heater equipment is shown diagrammatically in Fig. 1. The actual location of these devices in the car is also important. The box containing the magnetic switch should preferably be mounted overhead on a vertical wall of the car vestibule adjacent to the heater switch fuse box, as this simplifies the connections and reduces the wiring to a minimum. It is not a good plan to mount the magnetic switch under a seat on the floor of the car where inspection is difficult. If it is absolutely impossible to mount it in the position recommended, the next best location is in a weatherproof box suspended underneath the car.

The best place for mounting the thermostat is at a point in the car body about 5 ft. above the floor and where it will not receive direct drafts from any source. Ordinarily, it should be placed near the longitudinal center of the car, except on cars having center doors. With a center door the best location is approximately at the midpoint in either portion of the car.

Having determined the best location for the magnetic switch and the thermostat, the wiring should then be done according to the diagram usually supplied by the manufacturer. The proper size of wire for carrying the heater load will correspond to the amperage of the heaters and will vary with different sizes of cars. The size of wire for connecting to the mercury thermostat, however, can always be No. 14 stranded N.E.C. rubber-covered wire. The thermostat should not be attached until the remainder of the installation has been completed and thoroughly tested out. This test can be made as follows:

Inasmuch as the two wires leading to the thermostat are open at that point, ready for connection to the thermostat, the magnetic switch should close the circuit and turn heat current on the heaters. By touching the two wires together the magnetic switch should open and cut off current to the heaters. These wires should be separated and touched together several times to test out the operation of the magnetic switch, before attaching the thermostat in place on the car walls.

It may sometimes happen that when the thermostat is removed from its packing the mercury column may have become separated in shipment. It can be rejoined by turning the thermostat upside down and tapping it firmly on either the palm of the hand or on a block of wood. With the column thus rejoined, it should be turned back to its normal position with the bulb at the bottom and again tapped to bring the column back to its normal place. With the mercury once in its proper place and the thermometer mounted, the mercury will never separate under any amount of jar in service. It can only be separated when under jar in a horizontal position.

If the thermostat is of the visible type so that the position of the mercury can be seen at a glance, the above procedure will be necessary only when it is seen that separation has occurred. But if the thermostat is of the non-visible type, the thermometer should always be tapped as indicated above in order to make sure that the mercury is properly joined and the thermometer in working condition.

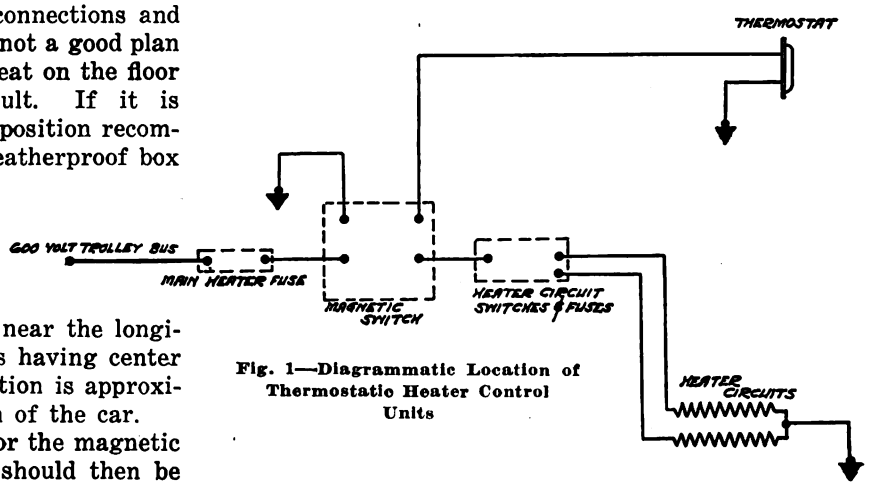

Fig. 1—Diagrammatic Location of Thermostatic Heater Control Units

It is very important to make particularly good connections in attaching the wiring to the thermostat, on account of the extremely low voltage of this circuit. This is one common cause of trouble. The connection should be made by means of substantial through terminals or by soldering. It will not do simply to twist the wires together, as slight corrosion is likely to occur later and interrupt a proper contact. If the connections are properly made, there should be very little trouble in keeping the thermostat control operating.

The magnetic switch box should be locked or sealed to prevent its being opened by unauthorized persons, and the thermostat should be inspected as a part of the regular daily inspection of the car in order to see that it has not been stolen, damaged or disconnected.

*Formerly chief engineer Consolidated Car Heating Company, Albany, N. Y.

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In case any damage to the thermostat is discovered, it should be taken off and replaced with another, as the repair of thermostats is a bench job, to be handled with proper tools and test equipment. Furthermore, this work should be done only by a thoroughly experienced and competent man who understands the principle and operation of a mercury thermostat.

Directions for the testing and repairing of mercury thermostats will be given later in this article.

A mercury thermostat control equipment is a thor-

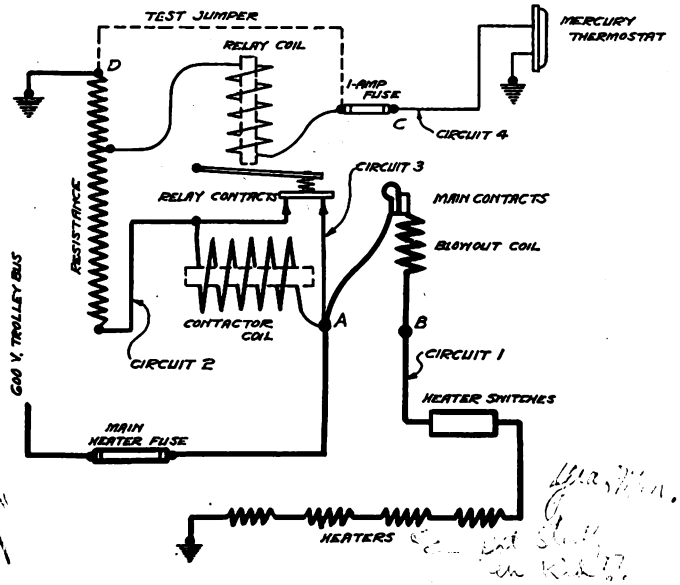

Fig. 2—Diagram Showing the Four Circuits of a Thermostat Control

oughly reliable device when properly handled, but it must be realized that a temperature change of 1 degree Fahrenheit possesses but a small amount of actual power to do work. This small amount of energy must be multiplied sufficiently to operate a reliable and substantial circuit breaker, capable of handling the full heater load under all conditions. This has been well worked out and it is simply a matter of giving reasonable and proper care in order to secure good operating results.

It must be remembered, too, that a mercury thermostat is a glass tube, and no matter how much it is safeguarded and cushioned it must be handled with the same general care that is required for electric lamp bulbs or for meters, gages and other high-class instruments. It is a thoroughly practical device, but it cannot be abused.

General Inspection and Operating Tests

At the beginning of each heating season the entire equipment should be given a careful inspection and test. In order to do this properly it is necessary for the inspector carefully to study the circuits and understand fully the function of each. Different makes of equipment have somewhat different internal connections, and while some general principles apply in all cases, the inspector should be thoroughly familiar with all the details of the particular installation of which he is in charge.

A mercury thermostat control equipment is always divided into at least four general circuits, as follows:

1. The first is the main heater load circuit, which includes the main contacts of the contactor, the blowout coil, heater switches, fuses and the heaters themselves.
2. The second distinct circuit is the operating circuit of the contactor, which includes the magnet coil and a series resistance which cuts down the voltage on the coil to a proper amount.
3. The third distinct circuit is a shunt circuit around the coil of the contactor and includes the contacts of the relay. When these contacts are closed, the contactor coil is short circuited and thus de-energized. In some designs this closes the heater circuits, while in others it opens the heater circuits, so that it is necessary to understand the normal functioning of the relay.
4. The fourth distinct circuit is the relay coil and the thermostat circuit. This starts near the ground end of the series resistance circuit. It includes the coil of the relay, the 1-amp. thermostat fuse, the mercury thermostat, then goes to ground. As this shunt circuit is around a small portion of the series resistance, a small low voltage current flows through it whenever the thermostat makes contact. Current flowing through this circuit operates the relay which controls the contactor and thus opens the heater circuit.

Fig. 2 clearly shows these four circuits for a standard Consolidated equipment. Having these circuits clearly in mind, the operation of the equipment is easily understood.

How Control Functions

When the car temperature is lower than the thermostat setting, the column of mercury is below the upper contact and no current can flow to ground through the fourth circuit. Hence the relay coil is not energized and the relay contacts are kept closed by gravity and firm spring pressure. Current still flows in the second circuit, but as the relay contacts are closed, the contactor coil is short circuited, hence not energized, and the main contacts are closed by a heavy spring.

As a result current flows in the first circuit to the heaters. As soon as the heaters raise the car temperature sufficiently, the mercury column touches the upper contact and current flows to ground through the fourth circuit. This energizes the relay coil and the relay contacts open the shunt circuit (3). Current will now flow through the contactor coil, which will open the main contacts and cut off current from the heaters. When the car temperature falls enough to cause the mercury column to leave the upper contact,

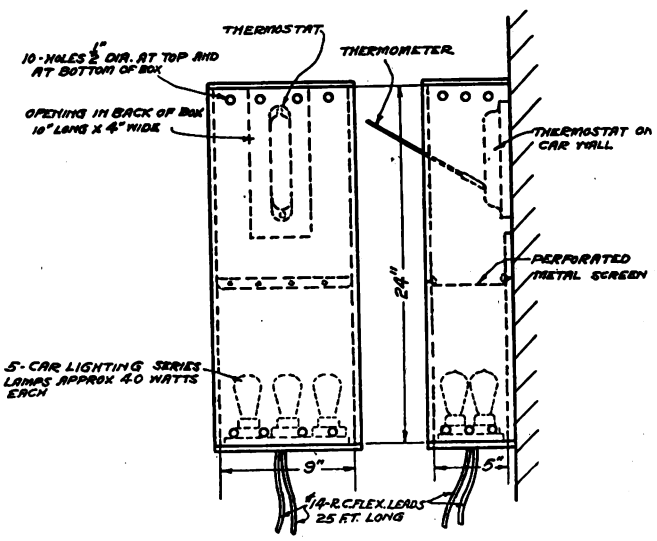

Fig. 3—Box for Testing Thermostats

this will open circuit (4), de-energize the relay coil, close shunt circuit (3) around the contactor coil, de-energize this and allow the main contacts in circuit (1) to reclose, thus restoring current to the heaters.

Having the functions of these circuits clearly in

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mind, an electrical test of the main switch panel is very simple.

How to Test Out Circuits

Remove the fuse in order to disconnect the thermostat entirely. Apply a test jumper from the live fuse clip to ground terminal *D*, as shown by dotted line in Fig. 2. This should cause the relay contacts and the main contactor contacts to open. Remove the jumper and both contacts should close. If the operation is

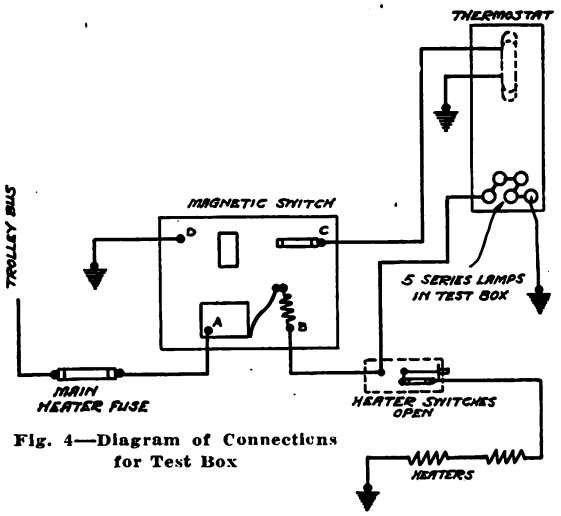

Fig. 4—Diagram of Connections for Test Box

satisfactory, throw in the heater switches and note the action of the contactor under full load by repeating the tests. If satisfactory, test the fuse for circuit and replace, making sure it fits well in the clips to insure good contact. Examine all connections and inspect the contactor tips. These should have a gap of about $\frac{3}{16}$ in. when open and should wipe in closing. The armature must pivot freely to insure snappy action. The relay contacts are of substantial size and of metallized carbon, which insures against relay trouble. The contact gap should be $\frac{1}{8}$ in.

If any of the above tests are not satisfactory, it will be an easy matter to locate the trouble and remedy it.

Local tests of parts of the various circuits can easily be made with a magneto, but the mercury thermostat itself must never be rung through, as the high voltage will damage the mercury column.

Having tested the main switch, the mercury thermostat should be tested. This requires more care and can only be done under proper temperature conditions. The only way to test the thermostat is actually to raise and lower the temperature surrounding it, so that normal variations in air temperature are produced. It is difficult to make tests by artificially lowering the temperature, so that this test should be made when the weather is considerably colder than the temperature for which the thermostat is set. The thermostat can then be easily tested by means of a test box as shown in Fig. 3.

This is simply a light wooden box about 3 ft. high by 2 ft. square, set up in a room free from strong drafts. A bank of lamps can be used at the bottom of the box for heating, but one or two perforated metal screens should be placed above the lamps in order to diffuse the air current so that it will produce a uniform temperature in the upper part of the box where the thermostat is mounted. A few holes should be bored in the bottom compartment containing the lamps and also in the top of the box, to allow a gentle circulation of air up through the box and out. A standard thermometer known to be correct should be inserted through a hole in the top of the box, so that its bulb is close to the bulb of the thermostat under test. The thermostat should then be connected to a regular magnetic switch, properly connected to control the current on the bank of lamps in lieu of the car heaters. The connections for this test box are shown in Fig. 4.

When the current is first thrown on a test box of this kind, it will take a few minutes for the temperature to become equalized. The test of the thermostat should therefore not be made until after the thermostat has been automatically cutting the current on and off the lamps a number of times. After this, a test will disclose the true range of temperatures between which the thermostat operates.

While this test does not exactly duplicate car conditions and hence does not give exactly the same temperature ranges, it will show temperatures near enough to determine definitely whether the thermostat is operating properly. The car temperature for which the thermostat is set and marked should be about half way between the upper and lower temperature limits indicated in this test.

If the thermostat does not operate properly, it should be loosened from the wall and the connections examined. It may be that poor connections have been made, but if no trouble is discovered here the thermostat should be entirely disconnected and a test of the equipment made by touching together the two wires. When these are put together, the main switch should be opened and the lamps in the test box should go out. When they are separated the main switch should close and the lamps in the test box should light. If this does not occur, there is some fault in the wiring between the main switch and the thermostat or between the thermostat and ground, and before making any further thermostat tests it is essential that proper operation be secured by touching these wires together.

If this test indicates that everything else is all right, it is certain that the trouble is in the thermostat itself. This should now either be replaced with another thermostat known to be in good condition or the thermostat cover may be removed for examination.

Perhaps the mercury column will be found separated. If so, it is a very simple matter to rejoin it, as already told. If the column runs freely back and forth, the thermostat is absolutely all right and should be reapplied, as it will give just as good service as a new one. If the mercury column does not run freely, it is very likely the vacuum has been destroyed through the tube being cracked or spoiled by improper connection on high voltage and a new tube is necessary.

If the column has been rejoined properly, the circuit wires should be connected to the thermostat while the cover is removed, and by blowing on the bulb or warming it gradually by any other means the column can be raised until it touches the upper contact. This should cause an operation of the switch. If it does not, the thermostat should be removed for a careful bench test and a new one applied and tested. If the equipment is sent out in proper condition no trouble need be anticipated during the entire season unless some external cause, such as tampering, interferes with it.

Contrary to a general impression, separation of mercury does not happen in service unless something is wrong with the installation which allows a high voltage to pass through the mercury, or the tube has become

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cracked so as to allow air to get into it. Under proper conditions neither jar nor normal service will separate a mercury column. A mercury thermostat must have a perfect vacuum for proper operation.

Thermostat repairs should be made by a man who is a good mechanic on fine work. The tube should be carefully examined to determine if there are any cracks which destroy the vacuum. If the tube is cracked it cannot be repaired. On the other hand, the trouble may simply be due to a broken connection. It will be noticed that where the platinum contact comes out of the glass tube, the tube has been banded with fine copper wire which is soldered into a ring to which is soldered the flexible lead wire. If this lead wire has become detached it can easily be resoldered with a small hot iron, the soldering being done quickly to avoid heating of the tube. If it is done properly, the heat will not crack the tube.

A thermostat should never be tested for circuit with a bank of lamps, with a magneto or with a dry battery. The lamps give too much voltage and current, the magneto gives too much voltage and the dry battery, while of low voltage, gives too much current. In any case the mercury column will be damaged. The only proper way to test a thermostat is by connection to the proper terminals of a standard magnetic switch such as would be used on a car, or to a special test set furnished by the manufacturer of mercury thermostat equipments. Bare thermometer tubes can be tested by standing the bulb in a cup of water with a standard test thermometer. Warmer or cooler water should be slowly added and constantly stirred until contact is made or broken. Thermostats mounted in cases should be fastened to an upright board and tested with the box described in Figs. 3 and 4.

Hot Asphalt Filler Prevents Pavement Bulging*

ON THE city lines of the Northern Texas Traction Company, Fort Worth, a large amount of the track is paved with creosoted wood block headers. In the past, during the dry spell, the creosote sometimes has evaporated from the wood blocks, leaving them entirely dry. When it rained the block would swell and bulge upward, making the pavement uneven and dangerous.

After some study the company overcame this trouble by the following treatment:

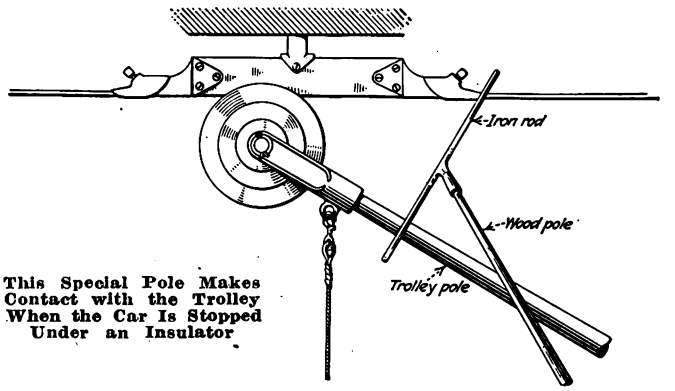
As soon as a creosoted block shows signs of drying out, the paving gang blows out by compressed air all dirt between the blocks. The cracks between the blocks are then filled with hot asphalt and the surface is covered with the same material. On top of this is spread chat or finely ground rock.

Such treatment of the wood block headers has completely waterproofed them and has eliminated the trouble due to swelling of the blocks. Moreover, it gives a smooth finish to the header paving and has resulted in a large saving in the maintenance cost.

*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.

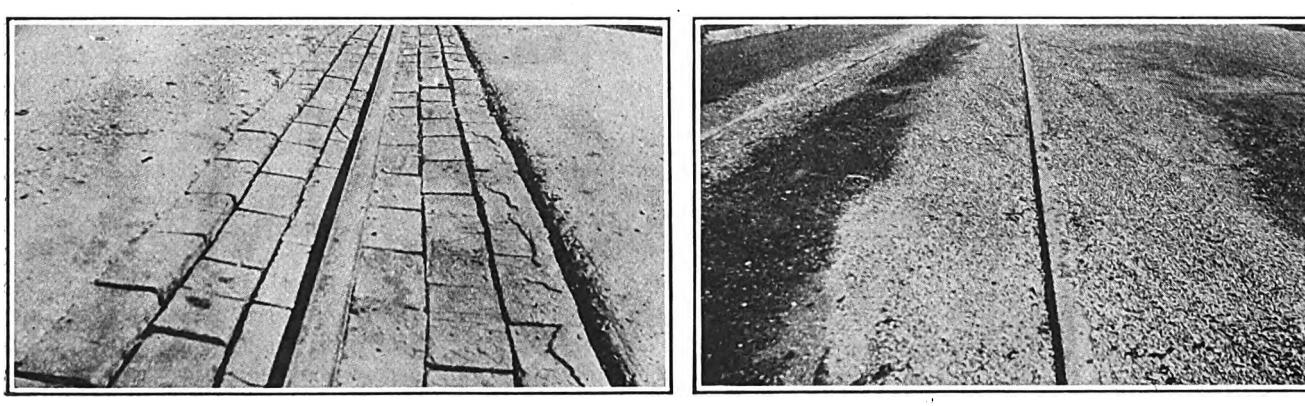
T-Pole Furnishes Current to Stalled Cars

SECTION insulators are often placed at the entrance to terminals, shops and carhouses. Cars habitually enter such structures at low speed and not infrequently stop with the trolley wheel resting on the section insulator. If another car is near at hand, the stalled car can be pushed beyond the dead line. But there may be no other car handy, and it may be impossible to establish connection between the trolley pole and a live portion of the overhead wire, as the pole will strike against the wall if an attempt is made to raise it and get contact with the wire at some other point.



This Special Pole Makes Contact with the Trolley When the Car Is Stopped Under an Insulator

As the result of numerous such experiences at its Newark terminal, the Public Service Railway has equipped each track with a specially designed pole. It has a long wooden handle with an iron crosspiece securely fastened to the upper end. When a car becomes stalled on a section insulator at the entrance to the terminal it is only necessary for the conductor to alight from his car, and by means of the crosspiece on the T-pole re-establish connection between his trolley pole and the overhead wire. The simplicity of this apparatus makes it inexpensive and much time has been saved.



Dirt Is Blown Out Between Pavement Blocks and Asphalt Applied to Waterproof Them. The Top Surface Receives a Covering of Chat After Asphalting

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Paving Troubles Along the Rail

Various Causes of Failure of Bond Between Paving and Rail Under Traffic Are Discussed and a Method Is Suggested for Permitting Rail Movement While Preserving the Bond and Strengthening the Paving Edge

By W. S. Godwin
W. S. Godwin Company, Inc., Baltimore, Md.

RESPONSIBILITY for railway paving construction and maintenance is, in the majority of cases, fixed by the franchise under which the railway operates. Regardless, however, of who is to pay the bill, common sense and economy would dictate a character of track and paving construction designed to meet the strain of present and future traffic.

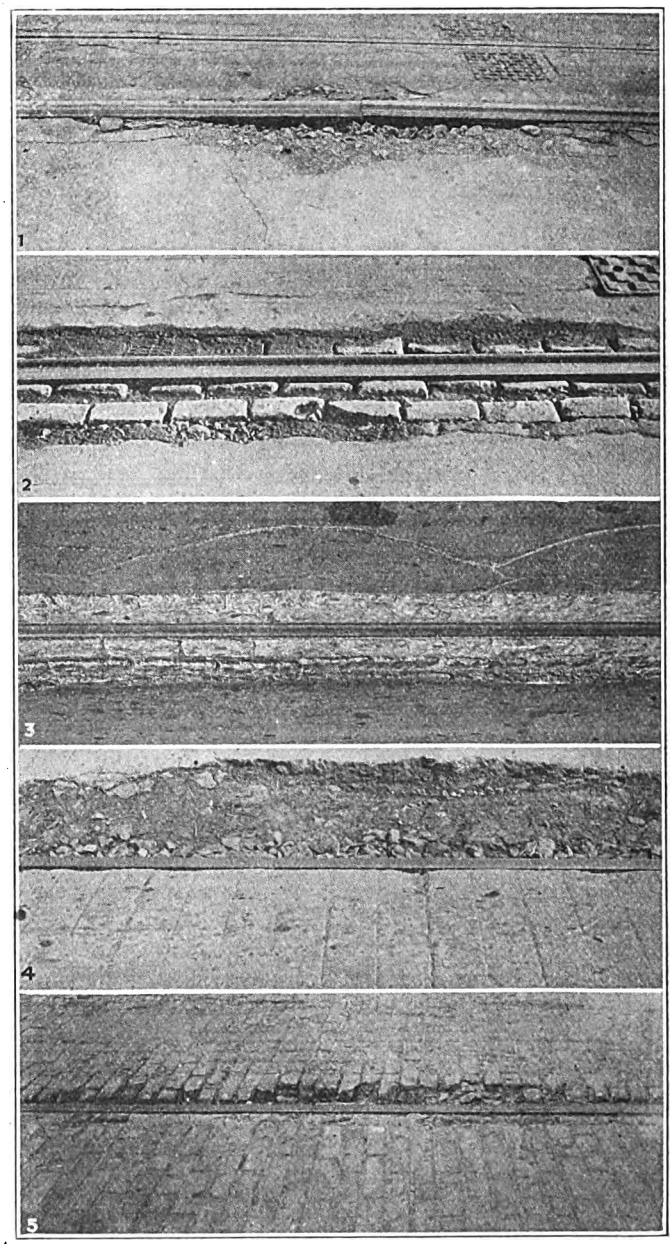
There are certain adverse conditions affecting paving in contact with rails which must be met and overcome. Of these, one of the most important is the rail movement. Some movement of the rails under traffic is not only unavoidable, but, from the standpoint of a large percentage of the railway engineers, a desirable condition. Nevertheless, it marks the beginning of paving trouble. Rail movement, no matter how slight, breaks the bond between the rail and any kind of paving or liners which may be used. The break soon widens to an open crack. The necessary side support to the paving is destroyed; seepage occurs and disintegration of paving and base starts. The amount of rail movement affects the speed with which the paving disintegrates. It is always more rapid at loose joints, and at crossings and switches, where there is a heavier car impact and weaker paving, due to the corners.

Tests and service have proved conclusively that failures occur first at the edges and corners of any paving slab. In wood cross-tie construction, with no concrete below the ties, there is an edge on each side of each rail. These edges break down under highway traffic and this structural weakness of paving is intensified if the concrete is made sufficiently thin to accommodate block liners. Seepage of surface water between the rail and the paving weakens the sub-base, which allows the ballast and cross-ties to settle. Freezing and thawing of seepage water also cause disintegration by heaving the paving surface and base.

An additional difficulty arises from the use of several kinds of material. The different materials appearing at the surface of street railway paving are steel, granite, concrete, brick, wood and asphalt. Each wears at a different rate, with a resulting break in the smooth continuity of the paving surface. As soon as the weaker wears below the stronger there is a drop and the impact of highway traffic quickly forms low places or ruts. It is not unusual to see three or four materials in the same railway area—brick, steel, granite and asphalt.

The most efficient, economical and durable type of street railway paving, then, is paving which will permit rail movement, paving which possesses permanent edge strength and rigidity, which prevents seepage, and in which the different kinds of material have been kept to the very minimum.

In designing the proper type of street railway paving, railway requirements must be met as well as traffic needs. Track structures should be designed and built to withstand the maximum car loads, plus a liberal amount for safety. The majority of engineers advocate resilient tracks for one or more of the following reasons: Economy in upkeep of rolling stock; minimum noise from car traffic; material increase in life of rail.



No. 1. Disintegration of asphalt against resilient rails.
No. 2. Granite block liners dislocated by rail motion and frost action.
No. 3. Surface cracks indicating similar breaks in concrete base caused by highway traffic. Asphalt along second row of liners raised by loose blocks.
No. 4. Concrete paving disintegrated by seepage resulting in frost action through the flangeway.
No. 5. Brick paving loosened by rail movement and broken down by highway traffic.

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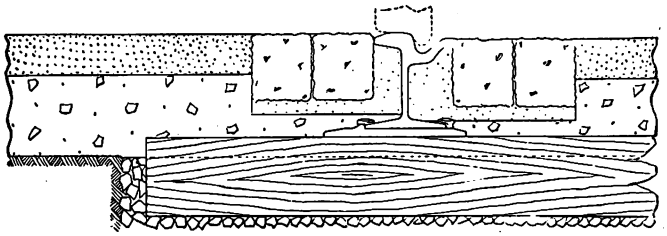
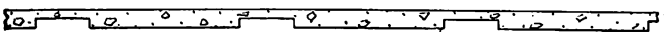
The ideal track structure appears to be one with a continuous and uniform bearing. The bearing should have a uniform and controlled resiliency.

Asphalt paving immediately against the rail has been used to a small extent in nearly every section of the country, only to be promptly discontinued. At this time not more than 2 per cent of the paved track mileage has asphalt against the rail. This character of paving is plastic in high temperature and brittle at normal and low temperatures. Rail movement and contraction of the asphalt in cold weather open a crack along the rail which is gradually enlarged by chipping away caused by the moving rails and highway traffic. In warm weather, traffic mashes unsupported asphalt into ruts.

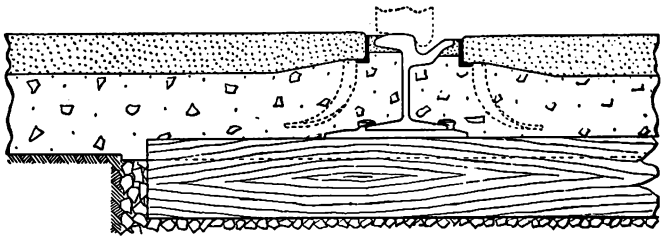
Because of these conditions, asphalt against the rails is not a durable paving construction. The customary practice of paving contractors of adding 5 per cent to their bids whenever a maintenance guarantee is required on this class of paving provides an interesting



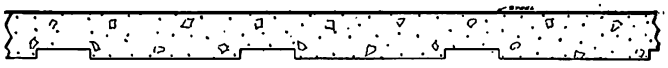
Usual Granite Block Liner Construction Showing Shallowness of Concrete Between the Tie and Liners



Longitudinal Section of Concrete Between Granite Liners and Ties Adjacent to Rails



Method Recommended by Mr. Godwin for Obtaining a Strong Shoulder Adjacent to Rail



Longitudinal Section of Concrete and Steel Paving Guard Between Asphalt and Tie, Adjacent to Rail

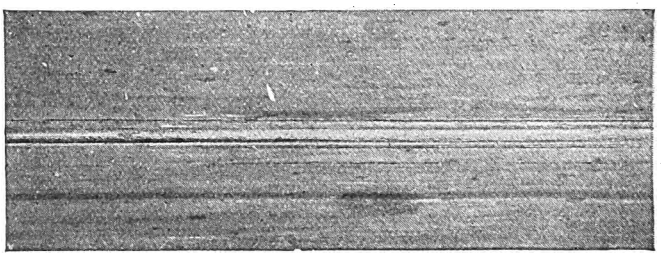
sidelight on its upkeep cost. Two course paving—concrete base, with a surfacing of asphalt or other material—requires a base sufficiently strong to carry the weight of highway traffic irrespective of the surface material, which is only intended to take the wear. The base must be as strong at its edges as elsewhere. The surface or wearing material should have a smooth continuity of surface to prevent impact and a rigid side support to prevent chipping of brittle paving and flowing of asphaltic materials. In one course paving, cement concrete takes the wear and the load direct.

Many millions of yards of 6-in. concrete base are successfully carrying the present loads in streets without tracks. When this same base is adjacent to the rails it usually fails, and it is a wonder it does not fail oftener when it is known that the edge of a slab is considerably weaker than those portions away from the edge. Block or brick liners along the rails still further weaken the edge, as it is necessary to have less concrete to accommodate these blocks and the sand cushion.

When liners of granite, brick and concrete are used between the rail and asphalt paving to form the necessary "rigid" side support for the asphalt, they defeat their own purpose. Both the car and highway traffic loosen them, as the liners themselves have no rigid support on either side, and there is not sufficient concrete between the tie and the bottom of the block to support them. If they are not loosened by the moving rail or motor truck, frost action lifts them and disintegrates the concrete below them, allowing them to drop. Some railway engineers claim that liners can be removed and replaced, for rail repairs, cheaper than any other material along the rails. This may be true, but the initial saving on the original paving, and the additional saving on the upkeep cost of properly protected edges will be many times the occasional cost of repairs to the modern track.

Monolithic Base and Paving Desirable

Combining the paving and track structures to function in unison should be the definite aim of both municipal and railway engineers. As it is not usually desirable or practical for any great length of time to have rigid rails, it is only proper to provide for this movement of the rail by making the paving independent of the rail. A scheme for doing this has been developed by the W. S. Godwin Company, Inc., by using a rigid strip of steel set securely in the paving, as illustrated in an accompanying drawing. This steel paving guard then be-



Asphalt Paving Protected from Rail Movements by Steel Paving Guards

comes a part of the paving. Asphaltic waterproofing material used between the rail head and the steel guard should be sufficiently flexible to allow rail movement and also prevent seepage and its resulting damage.

Through the use of the steel guard, the number of different materials on the paving surface is held down to the very minimum. Two only—steel and any surfacing material—are represented in this character of construction. The smooth continuity of paving thus secured materially lessens the destructive damage of highway traffic shocks. The rigid, permanent side support for the paving along the rails prevents flowing, cracking of the asphaltic surfacing and chipping of the rigid surfacing.

The final step in the development of an enduring paving construction is to overcome the weakness of the paving edge. The logical remedy for weak edges is to strengthen them until they will support any highway traffic without fracture. This condition is recognized by highway engineers, who are now increasing the thickness of the paving slab in addition to reinforcing the edge with steel. If the edges adjacent to the rails are strengthened in the same way and rigid side support provided for the surface of the paving, the edges will not disintegrate. The asphalt paving, or any other paving material, being spaced away from the rail and the edge protected, cannot be chipped or shoved under by

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car or highway traffic. If wood cross-ties are used (with concrete below the ties) the concrete between the rails should be an independent slab, thus allowing for the rail or tie movement.

If the rails and surface paving rest on the same concrete slab, its strength should be sufficient to withstand the electric car and motor truck traffic at all points. The customary thickness for concrete base between the top of the ties and the surfacing material, using the usual 7-in. rail, is not sufficiently strong. Standard sheet asphalt allows only 4 in. of concrete, brick allows 3 in., while with granite blocks there is only 1 in. concrete base under the liners to support traffic at a point where the shock and stress reaches its maximum severity. In many cases this is found insufficient and the paving gives way.

Car Inspection and Testing in Berlin

A Number of Simple Methods Are Described by Which, with a Voltmeter and Battery, It Is Possible to Test the Electrical Equipment of a Car for Short and Open Circuits and Other Faults and Failures

By E. Kindler
Chief Engineer Berlin Street Railway System, Berlin, Germany

FREQUENTLY the maintenance of the electrical apparatus, the motors and the connections on street railway cars is imperfect because members of the shop force are not sufficiently familiar with the physical and electrical details. Some of the workmen regard the connections as a maze of wires and consequently are helpless in case of a fault. In order that the men will understand thoroughly the methods of testing and the reasons for their use, the Berlin Street Railways conducts a regular shopmen's course in which the mechanical and electrical details of its cars are explained in a popular manner with the assistance of special models.

The regular testing and inspection practice which is explained in this course is based on the standard method for street railways of the Verband Deutscher Elektrotechniker. The methods are standardized, and in general are applicable to any electric railway. In the following paragraphs some of the more important methods, as worked out in Berlin, are described:

Anticipating Failures by Resistance Measurements and Insulation Tests

In the regular inspection program for the cars, resistance measurements are made every four weeks on the motors, resistors, electric brakes, etc. These individual measurements are entered on cards for each car so that they can be compared with the previously determined resistance of the part. Spaces are provided for four separate tests, and as the card is printed on both sides, the record can be continued on it for thirty-two weeks. Any change in the resistances is evident, so that its cause can be investigated and removed, thus forestalling possibility of failure on the road.

Electrical Faults

Electrical faults likely to occur in the apparatus and cables include insulation trouble, breaks, shorts, wrong connections, loose contacts and motor faults. In the lightning arresters shorts or grounds may be present. On motors there may be, in addition, insulation troubles, burnt-out coils, shorts in the winding, shorts in the commutator, etc.

All these faults may have a more or less serious effect on the operation of the car in general or the motors particularly, hence it is very desirable to locate the trouble when it is developing.

Resistance measurements are made by means of a specially designed apparatus, called the "resistance key," which gives the resistance directly in ohms over a range from 0 to 20. The connections are shown in an accompanying figure. The resistance R_1 is measured between the two testing points and its value is directly indicated. The apparatus is used for checking resistances in the car at regular intervals, and also for exact determination of a fault.

The modus operandi of these tests is described in the following: Cables, terminals and controller fingers are all designated by letters, such as,

T for the cable from the trolley to the controllers.

R for the cables from the controllers to the resistances.

A_1, AA_1 for the armature cables of motor No. 1.

F_1, E_1 for the field cables of motor No. 1.

A_2, AA_2 for the armature cables of motor No. 2.

F_2, E_2 for the field cables of motor No. 2.

G for the ground cable.

As all cables, with the exception of the lightning arrester cables, lead to the controllers, all measurements may be made from there as follows:

The trolley pole is first lowered from the trolley wire and the light circuit fuses are taken out. After the controller casing is opened the controller fingers, which represent the ends of the cables, are accessible. From here the resistances of the resistor steps are measured on the R fingers. R_{1-2}, R_{2-3}, etc., and the measurements are checked with the tabulated standard values. Then the armatures are measured on the fingers A and AA of the reversing drum, and the field coils on the fingers F and E. As the resistance of the carbon brushes is not negligible, the measurements taken of the armature resistance will not check exactly, so that it is desirable to measure the armature resistance also on the commutator. It should also be remembered that hot armatures, just coming out of service, will show a higher resistance than if they were cool. The principal point to determine, however, is that the measurements are about the same for both armatures and not higher than from 8 to 10 per cent above the standard value. On motors with commutating poles, the auxiliary fields are measured with the main fields. When the resistance of field coils on the pole pieces is taken, it will be noticed that the pointer on the meter moves very sluggishly and does not indicate the real value until after

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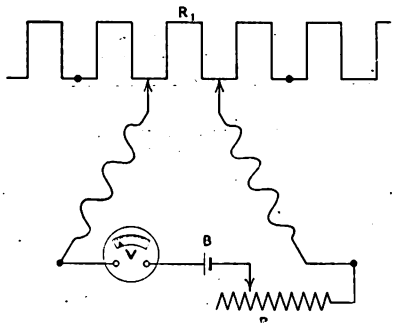
a certain time. This is due to a very pronounced induced counter emf. in the coils, which, however, soon disappears. The resistance of the field coils should be the same for both motors.

To measure the resistance of the cables between the trolley base and the *T* finger on the controller, one of the lead wires of the meter must be extended to reach to the trolley base. The greater resistance of this lead can be compensated for by changing the resistance shown in the diagram as R_2 so that the pointer comes to zero. If now a measurement is made the current will flow from the trolley base, through choke coil, circuit breaker, hand switch and fuse to the *T* finger. The remaining measurement is from trolley to lightning arrester, from lightning arrester to *G* and from *G* to motor casing and controller frame. All these latter measurements should give 0 ohms.



Connections for Testing with Ohmmeter

Of course these measurements must be made from both of the controllers and must give values that correspond very closely.

It should be mentioned that on the second controller the armature cables are reversed to give opposite motion, so that cable A_1 is on terminal AA_2, and AA_1 is on A_2. The same holds true for the second motor.

Faults and How They May Be Found with the Ohmmeter

Breaks.—The first kind of fault to be considered is a break or open circuit. There are two kinds which should be distinguished. One is where the circuit is completely open and the other where the open circuit occurs only at certain controller positions. Complete interruption may mean a break in the line from trolley to *T* finger, so that the car does not start from either controller, provided the break is between the trolley and the point where the wiring branches from the main circuit to the controllers, but it is in only one controller if the break is between the junction point mentioned and the dead controller. A complete break may also be due to loose cable terminals or a loose ground connection.

A partial open circuit will occur if a resistor grid is broken or some of the motor connections are open.

Breaks may be located quickly as follows:

First, it should be determined whether the fault is apparent when the car is started from both controllers. If the car does not start on points 1 or 2, the controller should not be turned further with the current on, because there will be a sudden start on later points on the controller and the motors may be damaged. If the fault is observed from one controller only, the trouble lies either in that controller or in its connections. If the car does not start from either controller the fault is not in the controllers but in the resistances, motors, connections or switches.

After the trolley is pulled down to disconnect the car, one of the controllers should be turned to point 1, and the values of the resistances between the following fingers should be determined: T-R_1, R_1-R_2, R_2-A_2, A_1-E_1, E_1-A_2, A_2-E_2, etc. If the pointer of the meter does not move when the meter is connected between A_1 and E_1, it shows there is a fault in the motor, and measurements should be made of armature and field, to localize the fault.

An open circuit may also be indicated when the car starts with a sudden jerk, as that may mean that one of the *R* cables is broken. This can be located by measuring the individual steps on the controller. In that case it will be found that some two consecutive steps will not give any indication on the voltmeter. Thus if cable R_3 is faulty R_1-R_2 will indicate, R_2-R_3 and R_3-R_4 will not, but R_2-R_4 will. This shows that the grid resistors are all right, but cable R_3 is broken. If R_2-R_4 does not indicate, it means that the grid is broken, or else cable R_4 is also faulty.

Short Circuits of Lines.—There are several causes of short circuits. Two cables which should be insulated from each other may become metallically connected, possibly through chafing on the brake rigging. A cable may become grounded, or resistors or motors may develop internal grounds. The results of shorts in the case of any cross-connection between the *T* line and the *G* line are that a heavy current will pass through the car wiring, burning out the fuse or opening the automatic breaker. The same will happen if the motor cables from motor No. 1 are grounded, or if the second motor has cable shorts, which will give the motor No. 1 full voltage on the fifth controller position. A cross-connection between two resistor cables will cause a more or less jerky start of the car on the first position of the controller.

Any kind of a short-circuit is hard to locate, because it shows itself at so many places. If, for example, it is in one of the controllers, it will show itself also in the resistors, in the other controller, on the motors, etc.

A short circuit may be located by testing with the ohmmeter as described. If there is, for example, a connection between two resistance cables, say between R_3 and R_4, it will be found by the ohmmeter showing no resistance between these points. If the connection is between R_3 and R_5 the resistances R_1-R_2, R_2-R_3, R_5-R_6, R_6-R_7 will be normal but R_3-R_4 and R_4-R_5 will be low and R_3-R_5 will be zero—in fact, every time there is an *R* short circuit the sum of the resistances will be smaller than the nominal value proportionally to the number of bridged resistances.

Wrong Connections.—Wrong connections may occur if motors, resistors and controllers are wired in a way differing from the approved connection diagram.

If measurements of both controllers show a fault in only one, the trouble is in that section of the wiring, but if the fault is found in both controllers it means a wrong connection of the motors or resistors. Thus if the direction of rotation of the two motors is opposite, the car will not start, and a large arc will occur in the controller on starting. If the individual motors are tested, the wrong connection can easily be found. The tester can then determine whether the fault is caused by a wrongly connected armature or field, or whether it lies in the controller or the motor.

If the wrong connection is in the resistor, say by an exchange of R_1 with R_2, the car will start with a sudden jerk on point No. 1. Or if R_3 and R_4 are reversed, the car will start with a sudden jerk on point No. 3. A test with the ohmmeter in this case will quickly disclose the point of trouble.

Loose Contacts.—If current passes through a loose connection, its magnitude is changed constantly, due to the vibrations of the car during its run. This may

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cause very detrimental current surges in the motors. Such loose contacts can also easily cause arcing, with subsequent complete open circuit, a ground or cable fire. Poor joints, such, for example, as negligently soldered terminals, are responsible for these same troubles in minor degree. With the ohmmeter such loose contacts show themselves in too high resistance readings or vibrations of the pointer.

Internal Motor Troubles.—These can be measured and located without opening up the motor. Field coil troubles may be diagnosed as to whether they are in the upper or lower half by opening the field coil connection between the upper and lower halves of the motor and then measuring the resistance of half of the field circuit. Thus, the measurements may show as follows:

	Nominal	Measured	Diagnosis
Four coils	0.74	1.2	Fault in lower coils
Two upper coils	0.37	0.38	
Two lower coils	0.37	0.82	

If the brushes spark the trouble may be from faulty brush-holders, wrong brush position, improper brushes, or faulty armature or field coils. If one field coil is wrongly connected, it may cause the motor to have three poles of the same polarity and one of the opposite polarity. This will result in a very high current at medium load of the car, with burning out of fuses or coils.

Summary of Faults

Breaks.—The car does not start at all, or, if an *R* cable is broken, with a jerk when the controller handle is turned.

Short Circuit.—If *T* and *G* cables are cross-connected, an arc is formed when the trolley voltage is put on the system. If one of the motors is shorted, the other one will get full voltage on the fifth step of controller. If *R* cables or resistors are cross-connected, there is a jerky start on the first point of the controller.

Wrong Connection.—On motors, this means an opposite direction of rotation; on resistors, it means jerks on any one of the controller steps.

Loose Connections or Loose Contacts.—Are followed by current surges, arcing, cable fires.

Motor Troubles—Are caused by faulty field coils, brushes, commutator segment connections or coil connections.

Insulation Tests

The electric current has the tendency to return to its source at the power station. If it follows its prescribed path, it is forced to produce work. But it tries also to find its way back to ground along unintended paths. If the insulation of the cables is in good condition no appreciable stray currents will occur on the car. But if the insulation is impaired by dirty or salt water or carbon, metal or other dust, the stray current may be increased, particularly where the insulation is weakened. Then more current will follow, causing sparks, arcs, and finally fire. It is therefore necessary to test at intervals the insulation of the car equipment. Preferably this test should be made just after the cars have come to the carhouse after a rain.

These insulation tests are made with a voltmeter bearing an ohm scale for a voltage of 550. Before the test is started, all ground connections on controllers, motor casings and light circuits must be opened. The voltmeter is then connected in between trolley wire and trolley pole and one of the controllers is moved to a running position. In the "off" position the instrument should read not lower than 600,000 ohms, and with the controller on a running position, not lower than 50,000 ohms (after a rain). If a fault is found in the insulation the equipment of the car must be gone over in sections.

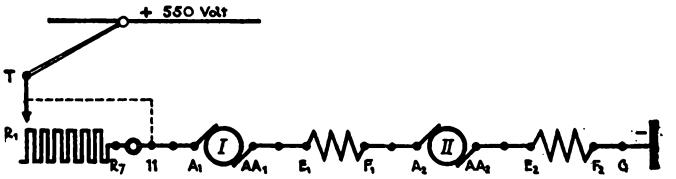
After such a complete insulation measurement, care should be taken to reconnect the grounding cables properly.

Faults on the Light Circuit

The usual causes of light-circuit faults may be enumerated as follows:

Loose connection on switches, fuses, plugs or sockets; open circuit on the switch, or at the contacts of the sockets, or at the branch point of the main cable, or at the ground connection, or in the light circuit itself.

If one or several of the lamps in a series do not burn, a metallic connection exists between some of the wires, or in the wires of the power circuit or with some grounded metal part on the car. In such a case the remaining lamps will get over-voltage and their filaments as well as the light fuses will soon burn out. Faulty light sockets, as where the center contact



One Testing Lead Is Connected to the "T" Finger and the Second to Other Points in the Circuit

spring comes in touch with the outer metal thread, or where there has been a collapse of the filament wires within one lamp, may have the same result.

To Localize the Fault.—The voltmeter should be connected between trolley wire and pole after all lamps have been removed and the main power switch opened. Then one lamp after another should be inserted, beginning at the positive pole, and the instrument observed until the critical point is reached. The total insulation during this procedure should be at least 200,000 ohms.

Grounding Tests

All metal parts of the car should be grounded. This means, chiefly, in German cars, the controller casings, vestibule roofs, grab handles, car steps, rain troughs and main frame members of the car. The ground connections for the motors, light circuit and the controller casings should be at easily accessible points, so these grounds may be readily tested. This test can be made with a lamp bank or with a magneto.

Information for Passengers

THE Boston Elevated Railway has recently introduced two new methods for supplying its patrons with information desired by them. It has given public notice that if a person calls "Information, Back Bay 1800" on the telephone at any time, day and night, he can obtain any information desired about car or train service.

In addition, an information booth has been installed at Park Street subway, where detailed information is available, and where attendants are on duty to answer questions pertaining to the service. From 7 a.m. to 11 p.m. inquiries average approximately 1,800 daily and have been as high as 170 in a single hour.

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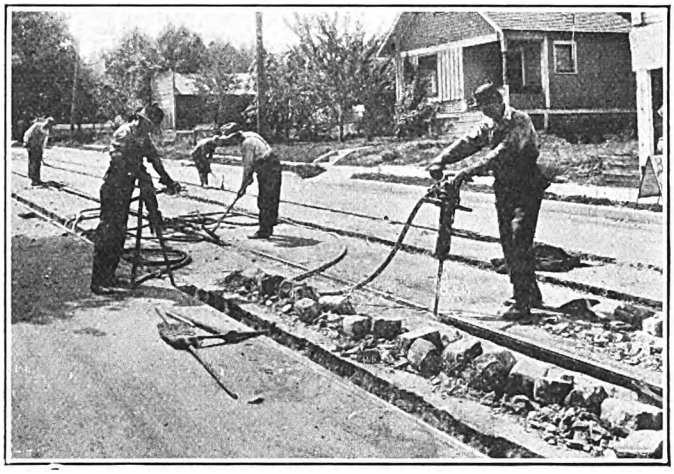
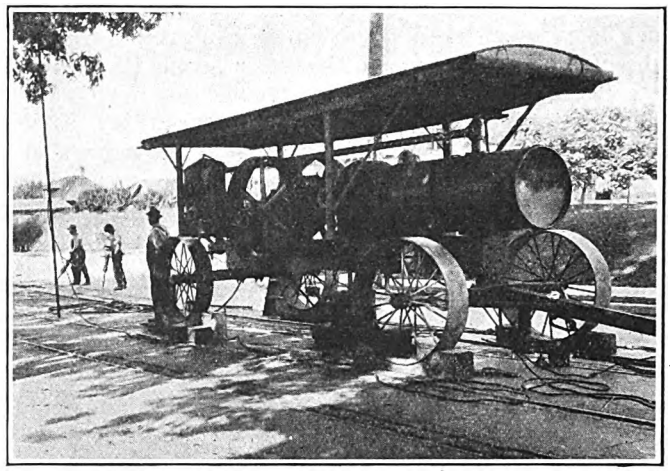




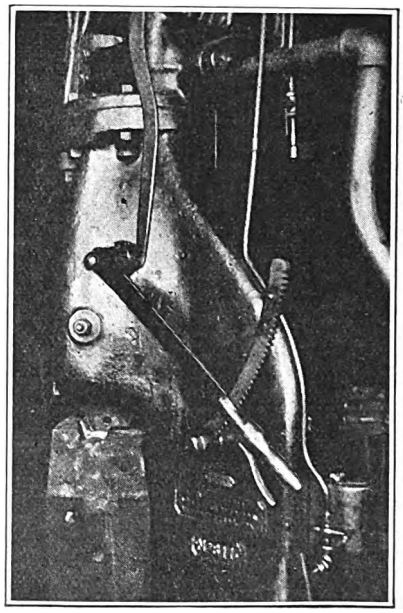
Removing 7-In., 70-Lb. Rail from Pavement by Channeling with Compressed Air Drills. At Right, Type of Air Compressor Used by the Track Department, Spokane United Railways

Track Rehabilitation in Spokane*

The Methods Employed Include Revamping of Joint Plates and Some Special Trackwork Manufacture —Reduced Costs Result of New Practices

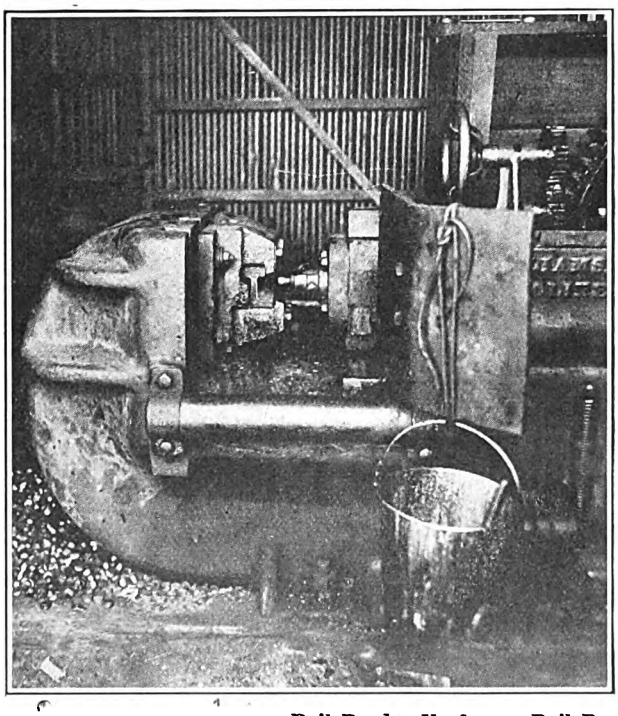
THE Spokane City Railway and the lines in Spokane of the Washington Water Power Company were consolidated on July 1, 1922. Such a step naturally meant a pooling of the equipment and stock, and the inventory showed that the consolidated company had a large amount of rail to dispose of. There was also a considerable amount of outlying track to be rebuilt and a large amount of rail to be sold as relayers. As this rail had no angle plate, the company decided to re-form a supply of angle plates which it had on hand to fit this rail. A powerful air hammer in the shops of the company made this possible. Dies for this hammer were manufactured for the three different types of 56-lb. to 60-lb. rail, used on the outlying lines in Spokane.

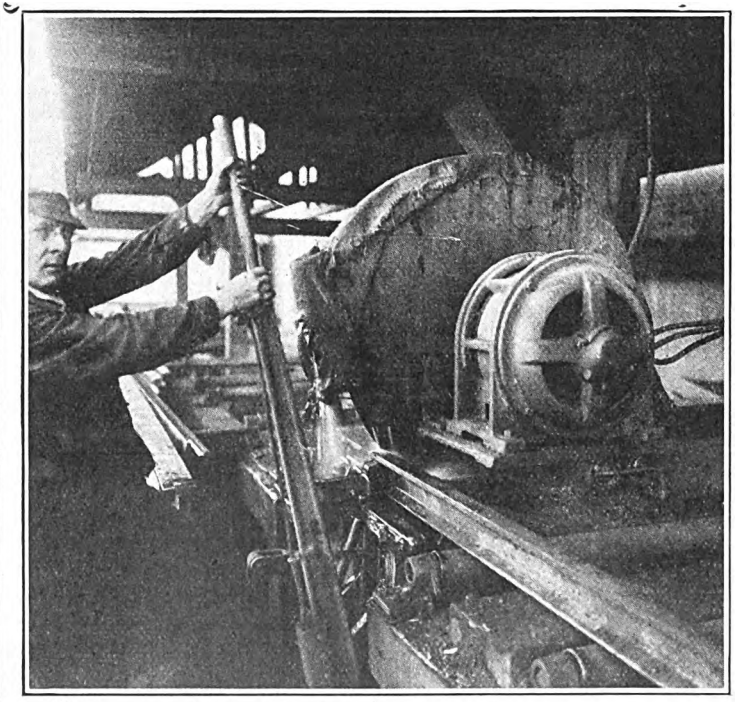
As shown in the illustration of this hammer, it hits the plate only on the edges, spreading it but not lengthening it perceptibly. The plates before going to the hammer are heated in a Fagot forge, and it is found that the revamped joints set up perfectly with proper clearance between plates and



Air Hammer Re-Forming Angle Plates

*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.





Rail Bender Used as a Rail Punch. At Right, Friction Saw for Cutting Rail

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rail web. The hammer has also been used to reclaim worn angle plates.

Two other accompanying illustrations show the method of taking up old track by cutting channels in the concrete pavement with heavy-duty direct-current No. 25 Ingersoll paving breakers. They are supplied with air from the portable air compressor, mounted on a special body and broad-tired wheels.

For its heavy-duty frogs, switches, mates and crossings, solid manganese is used. The company, however, makes up some of its lighter special trackwork. For this use rail is cut with a Ryerson friction saw, shown in another of the illustrations. This saw is driven by a 52-hp. alternating-current motor, and since its installation in August, 1922, shortly after the consolidation, it has been used to cut off the ends of more than 1,000 tons of rail, including 56-lb., 60-lb. and 7-in., 70-lb. rail. It has also done a great amount of cutting for the machine shop.

Adjoining this saw is a Williams & White rail bender, which has also been so fitted up that it can be employed as a rail punch. Its use in the latter service is shown in the engraving. The company figures that its cost for recutting and punching both ends of a rail averages $1.05 per gross ton.

Other equipment used extensively by the track department consists of an Indianapolis electric welder, an Atlas rail grinder, and an oxweld acetylene cutting equipment.

The Readers' Forum

Purchasing, Not Manufacturing, Needs Attention

CLAREMONT STREET RAILWAY
CLAREMONT, N. H., Dec. 26, 1923.

To the Editors:

In a recent issue (Nov. 17) you published an editorial entitled "An Opportunity to Expedite Standardization of Car Parts."

It is not the manufacturing end, but the purchasing end, that needs the adjustment. The opportunity is at hand for all properties, either large or small, to standardize car parts by simply using a little common sense —car shop dope—when buying new parts.

The writer has known of properties to have three different kinds of equipment under one type of car, thereby having to carry just three times as many supply parts as would be necessary were all cars equipped with the same equipment. When buying supply parts, such as bell cords, hangers, window latches, strap hangers, register mechanism fittings, grab handles, castings, journal boxes, turnbuckles, and all other repair parts, a careful survey of the results obtained from each type of part should be made and one type chosen as the standard for the system. When buying new cars, the parts which are chosen as standard should be put in the specifications and used as far as possible.

Another great fault that should be rectified is the buying of repair parts from several different sources. The writer has found during nineteen years of carhouse superintending that many times repair parts bought from one manufacturer are not the same as those turned out, of a like kind, from another manufacturer, or even from the maker of the original parts, thereby causing loss of time in the shop by having to machine the new parts to correspond to the original.

It should be the rule of the purchasing department of all systems to secure supply parts from the original maker of the equipment used.

W. G. HARRIS,
Master Mechanic.

Lightning Arrester and Choke Coil Experience

THE INDIANA, COLUMBUS & EASTERN TRACTION COMPANY
SPRINGFIELD, OHIO, Dec. 28, 1923.

To the Editors:

I have been reading with much interest the excellent article on lightning arresters by R. T. Wagner in the ELECTRIC RAILWAY JOURNAL for Nov. 24, page 911.

On many of the points made, I agree with the author, and especially do I concur in his statement that the d.c. aluminum arrester is the only solution where severe conditions are met. Many years of more or less unsatisfactory experience with the various types of arresters that preceded the aluminum arrester have convinced me of the truth of his statement. I would even go further and say that I would under no condition consider the purchase of any other than the electrolytic arrester for 600-volt d.c. circuits for electric railway work.

The author mentions several types of gap arresters as being satisfactory under some conditions. It is true that a considerable degree of protection can be obtained with a gap-type arrester if used in connection with a choke coil of adequate dimensions, and with a minimum length of gap. In the writer's experience, it was found possible to reduce the gap to 0.010 in. if given frequent cleaning and inspection, but as the author points out, the jumping of even this small gap by a lightning discharge sets up severe strains in the insulation and has been the cause of numerous cases of grounds.

There is one point, however, on which I must take issue with the author. I refer to the dimensions he gives for choke coil, namely, ten or twelve turns of conductor wound on a 6-in. core. A choke coil of these dimensions is, in my estimation, entirely inadequate for this purpose.

The function of a choke coil in connection with a lightning arrester is to supply an impedance in the circuit so that when a surge of high frequency and steep wave front (as in a lightning discharge) approaches the apparatus to be protected, the impedance will reflect it back to some extent. At this point let me quote a prominent arrester engineer:

> Even though an arrester is floating on the line, choke coils give increased protection in that they reflect a part of the surge back on the line where it is dissipated as heat, and that part which passes through the coil is reduced in voltage and steepness of wave front. It assists the arrester to function because it provides a higher voltage to ground just ahead of the choke coil and increases the discharge of the arrester.

Granting the above to be true, it is evident that the greater the impedance of the choke coil, the more effective it will be in assisting the arrester to function.

As in every other kind of design there are limiting conditions, and considerations other than simply to obtain the maximum impedance must be considered. We are limited as to the space that may be occupied by a choke coil on an electric car; also the fact that a cable of sufficient capacity to carry the maximum cur-

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rent used by the car tends to make the weight and cost of a very large choke coil prohibitive.

There are a few simple rules laid down by engineers who have made choke coils a special study that should be kept constantly in mind in deciding on the size and shape of these coils in order that no single feature be given too much consideration at the expense of the others; which statement only tends to prove that "every design is a compromise."

1. Choke coils for use with lightning arresters should have only one layer of cable. If made with two or more layers the distributed electrostatic capacity as between the different layers will be sufficient at the very high frequency of a lightning discharge to neutralize the reactance and make the coil of no effect.

2. To get the maximum effect from a given length of cable, the length of coil should equal its diameter.

3. The value of the self-inductance of a coil varies as follows: (a) As the square of the number of turns; (b) as the square of the diameter of coil; (c) inversely as the length of coil.

As a complete example, the dimensions that I would use for a choke coil for a 45-ton interurban car equipped with four 100-hp. motors are as follows: Twenty turns of No. 0000 B. & S. stranded cable, wound on a 10-in. wooden core and supported by metal brackets at the ends.

This would make a coil about 16½ in. long and 11⅝ in. outside diameter. This coil, in my estimation, is of sufficient size to give adequate protection, and at the same time is not so bulky as to be objectionable. A coil of this kind can be mounted on the roof of car, or in baggage compartment, and be connected in ahead of the lights, compressor, etc., and thus give protection to all the car auxiliaries as well as to the controller and motors.

F. J. FOOTE,
Superintendent Motive Power and Equipment.

Further Light on Air Tank Testing

NEW YORK, Jan. 11, 1924.

To the Editors:

With reference to your editorial on the subject "Making Air Tanks Safe at Reasonable Cost" in the Dec. 15 issue, I am of the opinion that the method of testing tanks mentioned therein is open to serious danger. If tanks are tested by setting up the safety valve and applying air pressure there is a chance for an explosion, which may be disastrous. Even when tanks are tested by hydraulic pressure one of the requirements to assure safety is to be certain that the top of the tank is vented while being filled with water, so as to prevent entrapping any air which would remain in the tank while pressure is applied.

It is also my opinion that the use of welded seams in air tanks is open to objection. The difficulty with this construction, particularly when the longitudinal seam is welded, is the uncertain element of care in the workmanship. Although tests of welded seams have shown them to be amply strong, the danger in welding comparatively thin material lies not so much in the seam itself as in the metal of the sheet adjacent to the weld.

The personal factor in this process causes the greatest concern when an attempt is made to apply a definite efficiency factor to a seam of this kind. The boiler code committee of the A.S.M.E. has not been inclined to look with favor on tanks of this construction. It would not be a particular hardship on the railways if tanks with welded seams were eliminated from consideration by electric railways. With forge welded, brazed and seamless construction available, there is ample source of supply without using the autogenous weld.

"ENGINEER."

How Plan to Publish Railway Bus Matter in "Journal" Is Viewed

IN THE first issue of the new year the ELECTRIC RAILWAY JOURNAL announced editorially that it would in the future publish in its own columns matter pertaining to the operation of buses by electric railways, departing from the previous policy of depending entirely on *Bus Transportation* for this service to the railway field. Following are letters from a few leading railway executives who were asked to express their view on this change in policy:

CHICAGO RAPID TRANSIT COMPANY

CHICAGO, ILL., Jan. 15, 1924.

To the Editors:

In the issue of the ELECTRIC RAILWAY JOURNAL published on Jan. 5, 1924, I note from the editorial on page 3 that the JOURNAL will hereafter record the extent and kind of bus service undertaken by the railways. I also note from page 5 of the same issue a summary of the bus methods of 121 electric railway companies, this latter being the first comprehensive article dealing with the matter of bus operation by electric railways. I believe that your policy as announced by the editorial referred to is correct. I think that you should make electric railway bus operation a feature of the JOURNAL from now on.

Apparently, the number of companies co-ordinating bus transportation as an auxiliary to their railway systems is increasing fast and it is quite proper that the industry should be informed in your columns of the progress made.

BRITTON I. BUDD,
President.

STEVENS & WOOD, INC.

NEW YORK, Jan. 16, 1924.

To the Editors:

It was with much pleasure that I read the article in the Jan. 5 issue of the ELECTRIC RAILWAY JOURNAL, noting the broadening of the scope of the JOURNAL'S activities in the bus field.

Motor bus operation has become such an integral part of city and urban transportation problems and such a vital necessity in most communities as a supplement to electric railway service that up-to-date, reliable information on this subject is just as necessary to the electric railway man as information on any of the other subjects covered by the JOURNAL in the past.

Electric railway men are accustomed to look to the JOURNAL for the latest news in regard to the progress in this field, which has been so thoroughly and reliably covered by this one magazine until the advent of the bus, since which time, however, it has been necessary for street railway operators to supplement the JOURNAL'S service by one or more of the bus magazines, at considerable inconvenience.

The JOURNAL having, as I understand it, adopted the

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policy of covering the bus field, as far as it affects electric railway operations, has filled a long-felt want. I extend my congratulations on your progressiveness.

R. P. STEVENS.

THE UNITED RAILWAYS & ELECTRIC COMPANY OF BALTIMORE

BALTIMORE, MD., Jan. 15, 1924.

To the Editors:

I note with pleasure your editorial of Jan. 5, to the effect that the JOURNAL hereafter will give attention to the railway operation of buses.

It has been interesting to note the gradual realization of the fact among street railway operators that street railways, of necessity having practically a monopoly of the transportation business in their communities, must make use of all forms of transportation now, including buses, trackless trolleys and, perhaps, in the future, airplanes.

I am sure the JOURNAL will be more interesting because of including in its issues reference to all forms of transportation that necessarily must, in future, make up the systems of transportation in the various cities.

C. D. EMMONS,
President.

NEWPORT NEWS & HAMPTON RAILWAY, GAS & ELECTRIC COMPANY

HAMPTON, VA., Jan. 15, 1924.

To the Editors:

I have read with interest the article "Extent and Kind of Bus Operation by Electric Railways," published in your issue of Jan. 5, as well as your editorial on the same subject in the same issue.

I have long thought the electric railway operator might profitably study the operation of buses. Not only should he study it as a competitor, but much more closely with the idea of using it to supplement and extend his own service to the people.

The people demand the most modern in transportation as in everything else, and if local transportation is to be treated as a monopoly, then the company supplying the service must be prepared to give the people what they want.

The departure outlined in your editorial indicates that you are ready to aid the wide-awake traction man in keeping abreast of the times. You are to be commended for your energy and progressiveness.

J. N. SHANNAHAN,
President.

SCHENECTADY RAILWAY COMPANY

SCHENECTADY, N. Y., Jan. 15, 1924.

To the Editors:

I have read the editorial in your issue of Jan. 5, 1924, on the subject "Railway Operation of Buses to Be Treated in the JOURNAL," and in so far as you may be interested in my doing so, I can express approval of your announced policy. Whether the bus is approached as a "useful ally or as a troublesome competitor," the electric railway man wants to know what use other railway men are making of the bus and with what results, and it seems to me to be a proper and useful function of the JOURNAL to give him that information under the same cover.

E. M. WALKER,
President.

THE CONNECTICUT COMPANY

NEW HAVEN, Jan. 15, 1924.

To the Editors:

I have your telegram of the 14th asking me to comment upon your plan for publishing current news relative to the operation of motor vehicle common carriers by electric railroads.

There is no question but that such vehicles are rapidly becoming an adjunct to practically all electric railway service throughout the country, and so many of the electric railways are now using them that it would certainly be desirable to have the greatest possible degree of publicity given to the subject in order that all managements may be thoroughly informed as to the development of this new method of transportation.

L. S. STORRS,
President.

BOSTON ELEVATED RAILWAY

BOSTON, MASS., Jan. 15, 1924.

To the Editors:

In reply to your request, beg to advise that personally I am entirely in accord with the expressed view of the JOURNAL of publishing bus articles in the JOURNAL, and it will make it just so much more indispensable to me. It would seem that it was following out the policy of co-ordination which is the basis upon which bus operation has always appealed to me.

EDWARD DANA,
General Manager.

INDIANA SERVICE CORPORATION

FORT WAYNE, IND., Jan. 15, 1924.

To the Editors:

In reply to your inquiry, I wish to advise that, in my opinion, it is proper that all information pertaining to buses be included in the ELECTRIC RAILWAY JOURNAL, for the reason that this is a transportation matter, and if such service is desired or necessary, it should be handled by the present, established transportation organizations.

S. W. GREENLAND,
General Manager.

NEW ORLEANS PUBLIC SERVICE, INC.

NEW ORLEANS, LA., Jan. 15, 1924.

To the Editors:

I have noted with interest the modification of the editorial policy in handling motor bus news, announced in the ELECTRIC RAILWAY JOURNAL of Jan. 5, and it seems to me now to reflect correctly the needs of both the electric railway and motor bus industries.

H. B. FLOWERS,
President.

THE CAPITAL TRACTION COMPANY

WASHINGTON, D. C., Jan. 15, 1924.

To the Editors:

I have read the editorial in your issue of Jan. 5 and also the article dealing with the use of buses by electric railways. I believe that the policy as outlined in this editorial of publishing in the JOURNAL news and other articles concerning the operation of buses by electric railways will be of much benefit.

J. H. HANNA,
Vice-President.

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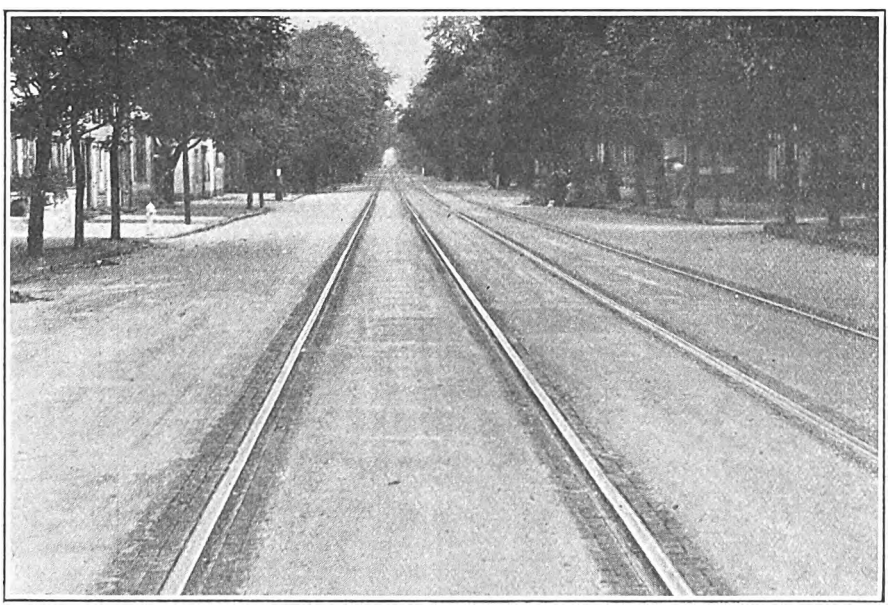
Equipment Maintenance Notes

Wood Block Selected for Paving Along Rails

ON THE Harrisburg Railways, Harrisburg, Pa., particular attention has been paid to the type of paving used alongside the rails. This has been somewhat of a problem because of the residential character of the city, which is the capital of the state, and the consequent desire for smooth and quiet pavement. Asphalt is generally used for the vehicular roadways, and the company has even tried it along the tracks. This has not proved satisfactory, however, because water has seeped in between the rails and the asphalt and damaged the pavement.

Brick liners have been tried, but it is thought that the contrast when placed next to the asphalt gives an undesirable appearance. Moreover, bricks are frequently broken when the asphalt is first being rolled. It is likely that granite blocks would have many desirable characteristics for this use, but because the rest of the street is paved with a smooth surface there has been considerable objection to their use in the track area. Various patent paving guards have been tried, but all have proved to be unsatisfactory, and consequently wood blocks have been selected by the company as the best pavement alongside the rails. These are laid parallel to the rail, three deep on the outside to fill out to the line where the railway's responsibility ends and two on the inside. They present a good appearance and wear well as long as the track foundation is solid. They are, however, rather easily displaced by movement of the rail.

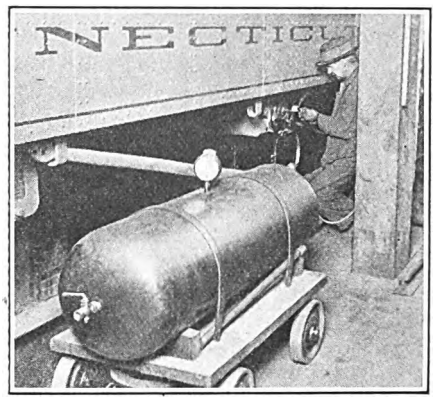


Wood Block Liners Look Well and Wear Well So Long as the Rail Is Solid

Testing Compressors on Cars

THE Connecticut Company, New Haven, Conn., overhauls its rolling stock on a 100,000-mile basis. The overhauling of car equipment also includes the compressors, which are tested on the cars before and after the overhauling. For convenience in testing, a tank of exactly 5 cu.ft. capacity has been mounted on a truck. This is provided with a gage and a valve for bleeding off the air pressure. Compressors are tested for the time necessary to pump up to a given pressure and also for the number of revolutions.

After connecting the tank to the compressor, the test consists of pumping up the pressure in the standard tank to 90 lb. This is then reduced to 40 lb. and again pumped up. When the pressure reaches 60 lb., a revolution counter is applied to the armature shaft and the number of revolutions required to pump from 60 lb. to 90 lb. is counted. A table has been prepared from the manufacturer's rating of the compressor, so as to show what the number of revolutions should be under proper conditions. A glance will then show whether there are abnormal conditions that require attention. After overhauling, compressors must conform to the requirements within certain definite limitations in order to be passed for service.



Counting the Revolutions of a Compressor Armature on Test

This outfit is convenient not only for testing compressors and overhauling, but it is also of assistance in testing when cars are reported for air or compressor trouble.

New Type Crossing Foundation in El Paso

IN INSTALLING five crossings over steam roads last winter, the El Paso Electric Railway adopted what was believed to be an entirely new type of foundation as applied in street railway practice. Four creosoted piles were driven under each crossing, care being taken to locate a pile directly under each gage intersection. These piles were capped with heavy creosoted timbers lengthwise on the steam track. About 30 in. of stone ballast was well tamped and rammed in around the tops of the piles and caps. The crossings were planked with pine boards, cut to fit between the manganese castings, and then covered with a thin layer of asphalt. The manganese crossings and the paving so far are in practically perfect condition.

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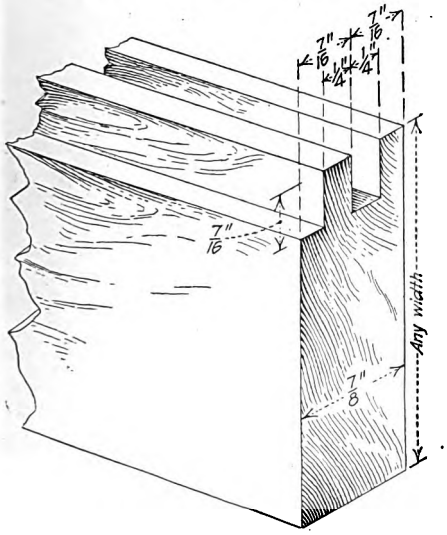
Double Tenon Increases Strength of Glued Joints

IN MAKING up car flooring, or in other details of car construction where it is necessary to employ a glue joint to increase the effective width of the board, a double tenon



Double Tenon Joint Cut on Circular Saw Is Used in Joining Flooring

joint employed by the Metropolitan West Side Elevated Railway, Chicago, in its shops has been found to increase the strength.

In the case of ⅞-in. flooring which this company uses, a circular saw with no set is used to cut the two mortises or grooves in the edge of the board. The first cut made by the saw produces the open mortise, while the second mortise is made by moving the saw over a distance equal to twice the width of the saw cut. The only precaution necessary in cutting the board is to make sure that one side of the second mortise is directly in the center of the board edge.

So accurate is this method that the practice employed at the Elevated shops has been to run off a long board with the two mortises and then cut the board into suitable lengths and match them up. This method can be used not only on flooring but on other details of car construction where glued joints are required.

Carefully Arranged Wheel Storage Saves Time

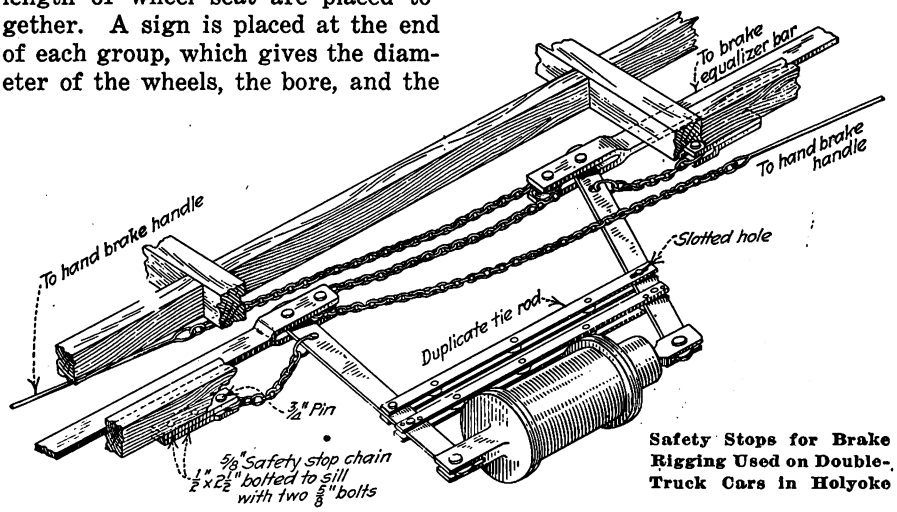
THE accompanying illustration shows a portion of the wheel storage of the New York & Harlem Railroad, New York City. Particular attention has been given to the grouping of wheels, so that those having the same bore and the same length of wheel seat are placed together. A sign is placed at the end of each group, which gives the diameter of the wheels, the bore, and the length of the wheel seat for all wheels in that particular row.

With this arrangement all that is necessary in choosing a wheel for a particular axle is to know the essential dimensions of the size wheel desired. No testing or measuring of the individual wheels is necessary, as all this work is done at the time the wheels are placed in the storage. Not only does this arrangement save time when wheels are to be mounted, but the orderly arrangement also saves much space and gives the impression of a well-regulated shop.

Wheel Storage at New York & Harlem Railroad Shop

Safety Stops for Brake Mechanism

ALL of the double-truck cars on the Holyoke Street Railway, approximately 100 in number, are equipped with a special safety stop for the brake rigging, originated by the engineers of that company. This mechanism is clearly shown in the accompanying illustration and prevents the brake rigging on one end of a car from becoming inoperative through the breakage of a pin in the mechanism on the opposite end.



Safety Stops for Brake Rigging Used on Double-Truck Cars in Holyoke

As will be seen, there are two provisions to hold the lever operated by the air cylinder in case of breakage of connecting pins. One of these is to protect against the breakage of the pin connecting this lever with the rod operating the brake equalizer bar on each truck. This protection consists of a short chain of which one end is attached to the lever and the other is bolted to a sill of the car which is stationary. Thus the end of the lever is held by, although not connected to, the equalizer bar.

The other safety device is to protect against the breakage of the pins which connect the tie rod with the two levers operated by the air cylinder. This protection, as shown, consists of a duplicate tie rod close to the other and with a slotted hole at one end in which the brake lever pin can move so that the tie rod does not interfere with the movements of the lever.

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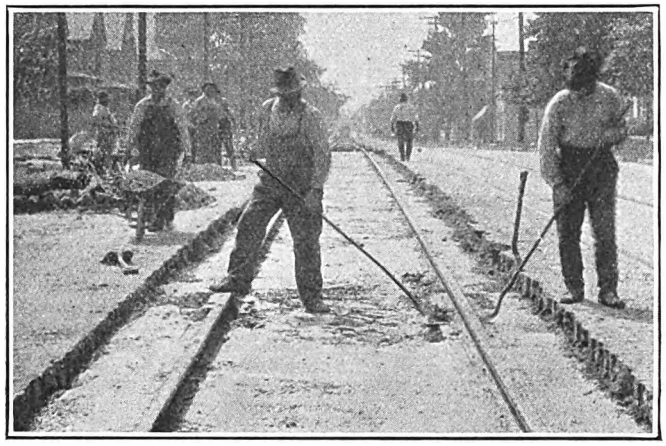
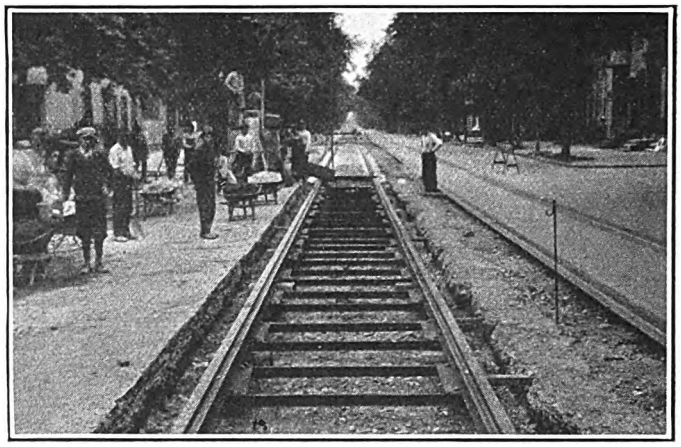


Moist Concrete Has Been Found More Satisfactory than a Very Dry Mixture



Wood Ties Placed 12 Ft. Apart Are Now Used Instead of the Short Blocks Shown Here

Track Construction Methods Using Wet Concrete

CONCRETE track foundations and International steel ties have been used extensively by the Harrisburg Railways, Harrisburg, Pa., in paved streets.

A considerable degree of moisture in the concrete is favored by the railway. Experience in Harrisburg has developed the fact that if an extremely dry concrete is used it is very difficult to get it worked thoroughly into place. Whatever additional strength might be gained by the dry mixture is lost by not having it properly placed.

An innovation which was recently tried is the use of additional wood ties spaced 12 to 15 ft. apart on rock ballast. With steel tie construction when a wet concrete mixture is used concrete has set because the steel ties resting on wet concrete have insufficient bearing. In a recent track rebuilding job, however, this company tried the use of old ties to support the rails during construction. This gave the track greater rigidity while the concrete is in process of setting and prevented displacement in a horizontal direction such as sometimes occurs if the track is not held firmly in place.

Concrete Mixer Operates on Rails or Pavement

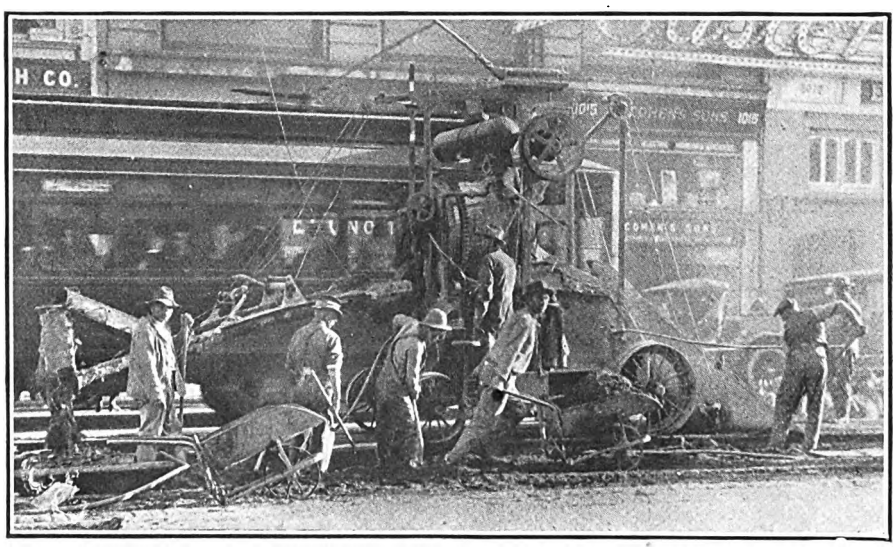
BECAUSE the street outside the tracks of the Market Street Railway, San Francisco, is occupied by the Municipal Railway, it was necessary during the recent reconstruction of the track of the former company to run the concrete mixer on the rails. To provide the wheels with flanges to fit the rails, bulb angles were used, the flange of the angle being cut off. The remaining flat bar with the bulb was then bent around the old wheel and bolted into place, the bulb forming a very satisfactory flange $\frac{5}{8}$ in. deep. With these wheels the mixer can be operated either on the rails or on the pavement, and can be run on and off the track easily.

The mixer, which is self-propelled by an electric motor, has been provided with a standard trolley pole and base, so that current can be obtained direct from the trolley wire. During the track reconstruction work on Market Street it was necessary each day at about 3:10 p.m. to remove the mixer from the track in order that cars could operate over it between 3:30 and 7 p.m. This was accomplished by moving the machine along the track by its own power to some convenient location, where the paving was undisturbed, and then running it off the rails onto the street. There it was parked alongside the curb, it being handled while off the rails by "fish lines" to the trolley wire and ground.

For the Market Street job the rock, sand and cement were distributed between the tracks ahead of the mixer in 70-ft. spaces or zones, the correct quantity of material being placed in each zone. Continuous operation of the mixer without stops on account of improper distribution of material was thereby accomplished. The concrete was placed for 5,500 ft. of single track with this outfit in nineteen days, using 4,700 sacks of cement.

Six portable loading platforms, each 10 ft. 6 in. long, were used in the track instead of the mixer, the platforms being supported by tie rods. These were moved ahead one at a time as the mixer advanced. Wheelbarrows were loaded on these platforms and the material carried to the mixer.

On other jobs the mixer is operated on the street alongside of the track, the material being placed on the side of the track ahead of the



The Presence of Four Parallel Tracks on Market Street, San Francisco, Made It Necessary to Equip This Concrete Mixer for Operation Either on the Rails or on the Pavement

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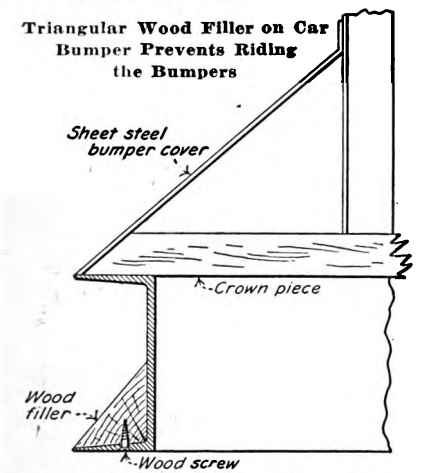
mixer. A special wire reel on the mixer has two electric cables each 250 ft. long, one for the trolley and one for the ground connection. As the mixer advances, the reel unwinds, laying the cable on the pavement behind the machine. When an advance of 250 ft. has been made, the trolley pole stand is moved ahead and the cable rewound on the reel. The trolley pole is especially made and is set on a portable base outside the track. A 6-ft. horizontal hinged arm is provided at the upper end. The outer end has a copper pan, which fits up against the underside of the trolley wire and is held in that position by a rope and weight attached to the pole end of the arm. The pan is so shaped that trolley wheels pass under it without interference.

Wood Filler Keeps Passengers Off Bumper

WHEN the flanges of the car bumper channel are turned toward the outside, a number of structural advantages are obtained. In addition the bumper acts as an



Triangular Wood Filler on Car Bumper Prevents Riding the Bumpers

anti-climber in the event of a collision. This arrangement, however, creates an accident hazard because passengers sometimes stand on the lower channel flange, which is not protected by the bumper cover.

The simple construction used by the Chicago Surface Lines, and shown in the accompanying sketch, overcomes this difficulty. A triangular shaped filler of ash or oak, cut in segments of the proper radius to fit tight against the outside of the channel, is held in place with flathead screws put in through the lower flange of the channel. When these fillers and the bumper are thoroughly painted, a neat and workmanlike job is obtained which effectually prevents "hitching on" at the rear end of the car.

Dick Prescott Gets a Job

And Some Early Impressions

DICK PRESCOTT entered the shop office of the Consolidated Railway & Light Company at 7 o'clock in the morning and asked to see Thomas Mullaney, the general foreman.

"What d'you want to see him for," growled the sullen-faced clerk who sat back of the window marked, "Timekeeper."

"I'm looking for work in the shop."

"All right, sit down over there."

At 12 o'clock, Dick Prescott was still sitting outside of Thomas Mullaney's office. Each time the heavy door at the end of the room with the legend "General Foreman" on it opened, he glanced up expectantly. Suddenly, the monotony and dull rumble of machinery were interrupted by the discordant shriek of a steam whistle. Almost instantly the outer office became a bedlam, as overall-clad men rushed noisily in past the row of time clocks to punch their time, and on out to the street. Dick caught snatches of conversation as the men jostled each other in their hurry to get to their dinner pails.

"Gee, the old man's sure on the warpath this morning."

"Yeah, guess he's sore them guys over in the carpenter shop quit this morning."

"I know what's the matter all right, all right. Heard Steve White, the carpenter foreman, talking to Harry Carter near my lathe this morning. Guess the old man got jumped on good and proper last week by the big boss downtown, because it costs more to repair cars in this shop than over in Marmon City where they pay more money to their men."

"Gosh! He sure did have all them foremen jumpin' around this morning. Says they've all got to keep on our necks and get out more work. Guess the new big boss downtown knows——"

Here the lively discussion was lost to Dick as the men passed through the door. At 12:30 the whistle shrieked again and the dull rumble, which had ceased with the earlier blast, again resumed.

Shortly after 1 o'clock the inner office door opened and a large, stocky man, wearing a dusty slouch hat and clenching the unlighted remains of a cigar between his teeth, emerged. Glaring at Dick, who quickly arose, he blurted out,

"Well, what can I do for you."

"I'm looking for work, sir."

"What's your trade?"

"I haven't any particular trade, sir. I was studying to be a mechanical engineer, but had to leave college last month because of lack of money."

"Oh you're one of them college men, eh? Well d'you think you'd make a carpenter?"

"Of course you know I wanted to be an engineer, Mr. Mullaney, but I'm glad to take anything that's open. And I assure you that I'm not afraid of hard work. I've always been pretty handy with tools."

"Engineering, eh? Say, this is a railroad shop, and what we need is hard work and hoss sense. Them engineers over in the Marmon City shop has been doing a lot of talking with a bunch of fancy records and all that, but I'll show 'em yet that I ain't been running a shop thirty years for nothing. If you want a job I'll put you on as carpenter's helper at 42 cents an hour."

"All right, sir, I'll be glad to do the best I can."

"Hey Steve," called the general foreman to the timekeeper back of the little window, "put this man on as a carpenter's helper, and start his time tomorrow morning."

"Thank you, Mr. Mullaney," said Dick as he started toward the window.

Tom Mullaney turned on his heel and approached two other men waiting for work. He could not foresee the far-reaching results of that hurried order to the timekeeper. *(To be continued next month)*

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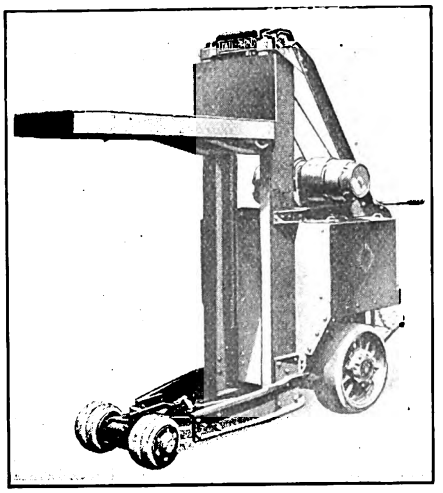
New Equipment Available

Heavy-Duty Elevator Truck for Shop Use

A NEW development in truck and tractor construction has been placed on the market by the Elwell-Parker Electric Company, Cleveland, Ohio. This is a truck with an adjusted platform that will pick up, transfer and set down a loaded skid, and will take a load at any height up to 6 ft., deliver and deposit it at any



The Platform of This Electric Truck Tractor Has a Lift of 6 Ft.

height between this and the floor level. It has been designed to handle 6,000-lb. loads easily and safely. The tractor is 9 ft. 4 in. long, 7 ft. 11 in. high and may be driven through a 3-ft., 6-in. doorway.

The load deck is a cantilever, built of heavy formed plates on two long steel arms of large section. At the supported end each arm carries two large ball-bearing rollers. The lower or forward rollers just beneath the platform are provided with deep flanges and travel on the face of heavy vertical channels, while the upper rollers are straight faced and bear on the rear of the channels.

The two platform arms also carry the moving portion of the hoist mechanism, counterbalancing a portion of the platform weight. The vertical movement of the platform is accomplished by a rack and pinion driven by an electric motor through a pair of cables. A safety or trip switch automatically limits the travel, and opens in case the outer end of the platform catches on an obstruction when descending. The loaded platform drives the hoist motor as a generator when descending and returns some of the energy which is drawn from the battery when rising.

The front axle consists of a heavy steel casting bored and fitted with a heavy steel shaft, which carries on knuckle pins two cupped wheels with long tapered roller bearings in a dustproof case. Each front wheel has dual 10-in. x 3-in. solid rubber tires, which are not pressed on but are fitted to the wheel and will differentiate when steered. The major portion of the load is carried on this axle. The wide spread of the tire contact surface distributes the load, but permits steering where a wide single tire could not.

The battery compartment will accommodate a thirty-cell Edison or a sixteen-cell lead battery. The truck with battery weighs 5,200 lb., travels at 300 to 400 ft. per minute and hoists at a speed of 5 to 6 ft. per minute.

New Tape for Maintenance and Electrical Repairs

A NEW varnished cambric tape which is bias cut and seamless is being placed on the market by the Mica Insulator Company, Chicago, Ill. In addition to having the advantages of the regular lines of impregnated bias tape, special consideration has been given to the production of uniform thickness and the elimination of seams. The elimination of the seams prevents lost time in cutting out these seams and also the waste in labor and material from the cutting; also there is less danger of short circuits occurring due to failure at seams. This tape is being furnished in both yellow and black of a thickness of 0.007 and 0.010 in. with widths of ¾ in. and 1 in.

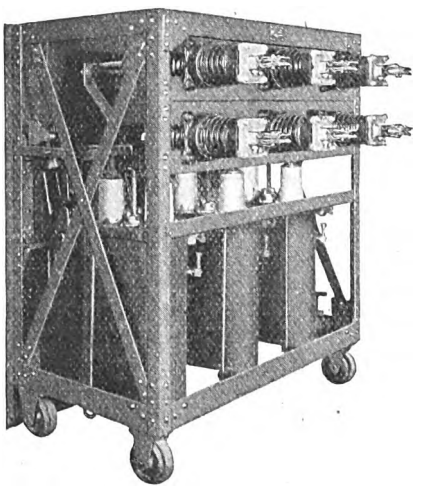
Interchangeable Resistor Assists Standardization

TO ASSIST in the standardization of resistor grids, the General Electric Company has developed a type BG railway resistor which is interchangeable, both electrically and mechanically, with resistors made by other manufacturers. It consists of a sheet steel punched end frame with sufficient holes to enable its support on the same bolt-hole centers as other generally used resistors. The convolutions of this type resistor are shorter than the General Electric CG and RG types, the grids are stronger and less likely to break or warp and the number of contacts is reduced to half. The resistor is arranged for mounting with standard porcelain supporting bolt insulators.

Truck-Mounted Oil Circuit Breaker

FOR application in electric railway substations where minimum space requirements are important and where large interrupting capacity is required, oil circuit breakers mounted on trucks have been developed by the Westinghouse Electric & Manufacturing Company. The truck-mounted models include all indoor-type breakers.

The truck-mounted breaker takes up less space than other types and the installation cost is low, since the breaker, with disconnecting switch contacts, is shipped as a unit. An interlocking device prevents accidents resulting from the circuit-breaker



Truck-Mounted Oil Circuit Breaker

truck being removed from its compartment or inserted when the breaker is in the closed position. The breaker cannot be closed until the truck is completely inserted in its compartment.

When repairs are necessary a complete unit can be removed to the repair department, where adjustments or repairs can be made under the best conditions. A spare unit can then be used in place of the one taken from its compartment.

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Association News & Discussions

Washington Transportation Conference

AT THE transportation conference called by the United States Chamber of Commerce, and held in Washington Jan. 9, 10 and 11, the six reports recently made to the chamber by its transportation committees were discussed. The first day was devoted to the reports on governmental relations to railroad transportation, railroad consolidation and freight rate schedules. On the second day the topics considered were the relation of highways and motor transport to other transportation agencies, taxation of transportation agencies and the development of waterways and their co-ordination with the railways. On Friday resolutions embodying the conclusions reached during the discussions were presented. Of the topics considered, the electric railway phases of the report of the committee on motor transport or the taxation of electric railways and buses did not come up in the discussion.

In general, the conference indorsed the present national transportation policy, as represented by the transportation act of 1920; adjustment of inequalities in the freight rates, improvement of terminal freight facilities by organized motor transport, with the greater use of motor bus and truck lines for mail lines where they can advantageously supplement railroad service, and the regulation of motor common carriers by the existing authorities. The declaration in regard to the taxation of transportation agencies follows, in full:

TAXATION OF TRANSPORTATION AGENCIES

1. Each form of transportation should bear its fair share of the burden of public expenditure.
2. Taxation of common-carrier transportation agencies should be simplified as far as possible.
3. Taxes on regulated common carriers operated for hire should bear a definite relation to gross and net earnings rather than to invested capital.
4. This requirement can best be met in the case of steam and electric rail common carriers by the imposition of a tax on gross earnings, together with a graduated tax on net earnings, in lieu of the present systems of taxation. Pending full regulation of the motor common carrier, such increases should be made in taxes now levied against it as will bring them to an amount equitably proportionate to that which may be assessed against the other carriers.
5. The entire cost of maintaining the improved highways of the country should be borne from special taxes levied against the road user. Such taxes should be used for no other purpose.
6. Co-ordination of highway construction and maintenance under centralized administrative agencies is urged to eliminate waste and secure efficiency.

The first of the regional meetings of the United States Chamber of Commerce, at which the six reports mentioned and the conclusions reached at the Washington conference were considered, was held by the Eastern district of the national chamber in Philadelphia this week.

Elihu Thomson to Receive Kelvin Medal

DR. ELIHU THOMSON, consulting engineer General Electric Company, and one of the pioneers in the development of electric traction in America, will be awarded the Kelvin medal for 1923. It will be conferred upon him in London during the coming summer, when Dr. Thomson will be accompanied on a trip abroad by representatives of American engineering societies. This medal is awarded triennially "as a mark of distinction to a person who has reached high eminence as an engineer or investigator in the kind of work applicable to the advancement of engineering with which Lord Kelvin was especially identified." The award committee consists of the presidents of the various British engineering societies. The medal was first awarded in 1920, the recipient being the late Prof. W. C. Unwin of England. At the October, 1923, meeting of the board of directors of the American Institute of Electrical Engineers, the secretary of the award committee of the Kelvin medal invited the institute to suggest a candidate for the medal, a similar invitation having been received by the other founder societies. The joint recommendation proposed the name of Dr. Thomson, who will be the first person in America to be awarded the medal.

Kentucky Utilities Association

POPULARIZING utility service and the utilities' responsibility to the public were major subjects before the seventh annual meeting of the Kentucky Association of Public Utilities in Louisville, Jan. 10. On the previous evening a dinner was given to the delegates by the public utilities of Louisville.

In his presidential address W. H. Harton, general manager Cincinnati, Newport & Covington Railway, pointed out that the public has just begun to realize that it is necessary, in order to get service, that the utility have money; in order to secure this it must go into the competitive market and show good credit, which requires good return and consequently fair rates.

Frank B. Jordan, secretary of the Indianapolis Water Company and vice-president of the American Water Works Association, urged all utilities to popularize their service in much the same way that commercial products are now being advertised. He also urged playing up the fact that utility service is the cheapest service available; that it costs only 15 cents per day per capita for all utility service including electric light and power, railways, gas, water, telephones.

The benefits of conventions to men in the ranks was very effectively and concisely stated by G. B. Powell, assistant general superintendent Louisville Railway. Executives should be at conventions, he declared, but why should they not carry back the information which they obtain there to men on the job? The men in the ranks need this information, because the majority of them do not have time to study transactions of national organizations.

Oklahoma Association Meeting

ANNOUNCEMENT is made that the sixth annual convention of the Oklahoma Utilities Association will be held at Oklahoma City March 11, 12 and 13.

A.E.C. Elects Officers

JAMES HARTNESS, former Governor of Vermont, and past-president of the American Society of Mechanical Engineers, was elected president of the American Engineering Council to succeed Dean Mortimer E. Cooley of the University of Michigan, at the annual meeting of the council, held in Washington on Jan. 10 and 11. Vice-presidents elected were L. P. Alford of New York and Charles R. Gow of Boston. Other vice-presidents are Calvert Townley of New York and Gardner S. Williams of Ann Arbor, Mich. Dr. H. E. Howe of Washington was re-elected treasurer, and L. W. Wallace of Washington was again chosen executive secretary.

An outstanding feature of the Washington assembly was the national public works conference held on Jan. 9, and attended by representatives of sixty-three engineering and allied organizations. The conference adopted resolutions favoring a reorganization of federal departments.

Another event was the annual dinner on Jan. 10 at the Chevy Chase Club. Secretary Hoover, President Nicholas Murray Butler of Columbia University, Assistant Secretary Dwight F. Davis of the War Department, President Hartness of the council, and the Italian Ambassador, Don Gelasio Benedetto Anatolio Caetani, addressed the guests. Both Secretary Hoover and Dr. Butler emphasized the need of broader engineering education and of

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greater engineering participation in the social, economic and political life of the country. The Ambassador outlined a plan by which young graduates of Italian technical schools will be brought to America and provided employment in the industries.

In his farewell address to the council, Dean Cooley said that progress of industry and social well-being were so intimately bound up with engineering that this profession could no longer be held back. He added: "The American engineer should recognize that the growth of our civilization has imposed upon him other duties than those to which he has been long accustomed. The world needs his training applied in new fields. Engineers in the past have been curiously silent regarding public affairs. Whatever the explanation of this silence, the time has come to say something and say it out loud."

Wood Preservers Adopt Specifications

THE American Wood Preservers' Association met at Kansas City, Mo., on Jan. 16. The work of this association towards conservation of timber was continued by the adoption of standard specifications for the pressure treatment of timber posts, ties, piling and poles. It is expected that these specifications will later be presented before the American Engineering Standards Committee for adoption as American standards.

Program New York Association

THE program of the New York Electric Railway Association meeting at the Commodore Hotel, New York, Jan. 24, is as follows:

"Motorbuses the Keynote of Expansion for Street Railways," by W. P. Kennedy, president Kennedy Engineering Corporation, New York City. Discussion to be led by E. H. Lamberger, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

"Production of Rattan and Its Uses," by Bertram Berry, Haywood-Wakefield Company, New York City.

Report of Proceedings of Accountants' Committee, by E. H. Reed, auditor Brooklyn City Railroad.

"Effect of Unregulated Motor Truck Freight Transportation on Electric Railway Freight Transportation," by F. E. Watts, general freight agent New York State Railways, Utica, N. Y.

"Prevention of Automobile Accidents," by J. J. Sharkey, claim agent New York State Railways, Rochester.

"Value of Daily Operating Statistics and How They Are Obtained," by A. L. Hodges, assistant secretary-treasurer Brooklyn City Railroad.

At the 6:30 dinner in the evening at the Commodore, Arthur ("Bugs") Baer will address the gathering on "Just Among Ourselves." The Hon. George H. Moses, United States Senator from New Hampshire, will speak on taxes, and a representative of the United States Treasury Department will talk on Mr. Mellon's tax plan.

Program of C.E.R.A. Meeting

AT THE annual meeting of the Central Electric Railway Association, which will be held at the Hotel Lincoln, Indianapolis, Ind., Jan. 24-25, the first morning session will convene at 10 o'clock. Following the report of the secretary and treasurer and the appointment of convention committees, the following program will be given:

Annual address, by James P. Barnes, president Louisville Railway, president of the association.

"Efficiency and Common Sense," by C. B. Auel, Westinghouse Electric & Manufacturing Company.

Discussion, led by Arthur W. Brady, R. N. Graham and W. S. Rodger.

"Multiple-Unit Control for Through Operation," by Thomas Conway, Jr., University of Pennsylvania.

Discussion, led by C. N. Wilcoxon and J. F. Collins.

The afternoon session will be devoted to a meeting of the Engineering Council. Following reports of committees, the program given will be:

"Outdoor Transformer Substations, Switching and Protective Equipment," by B. W. Kerr, president Railway & Industrial Engineering Company.

"Possibility of Utilizing the Grid Losses for Heating Purposes," by D. D. Ewing, professor electric railway engineering, Purdue University.

The future policy of the Engineering Council also will be discussed.

At 6:30 p.m. the annual dinner will be given. This will be informal. Hon. James E. Cox, former Governor of Ohio, will be the speaker of the evening. It has also been arranged to show five reels of air service pictures.

On Jan. 25 a morning session only will be held, the program being:

"Problems of National Interest to the Industry," by Charles L. Henry, president Indianapolis & Cincinnati Traction Company.

"The Future of the Industry from the Viewpoint of an Outsider," by W. L. Taylor, vice-president Fort Wayne & Northwestern Railway.

American Association News

Date and Location of Next Convention

THE following committee on date and location of the 1924 annual convention of the American Electric Railway Association was authorized at the meeting of the executive committee on Jan. 11.

Chairman, J. N. Shannahan, president Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va.; C. E. Morgan, Col. A. T. Perkins, J. H. Hanna, George Keegan, Ernest Stenger, Paul E. Wilson, E. J. Blair, H. B. Flowers, Luke C. Bradley, J. C. McQuiston, L. W. Shugg, C. L. Van Auken, Harry L. Brown, B. A. Hegeman, Jr., C. R. Ellicott, W. R. Hulbert, Cornell S. Hawley, Charles Royal and W. H. Huelings, Jr.

Midyear Meeting Arrangements

THE committee on arrangements for the Midyear Meeting of the American Association at St. Louis, March 4, under the chairmanship of W. H. Sawyer, president East St. Louis & Suburban Railway, East St. Louis, Ill., has not been announced in full heretofore. The committee membership follows:

E. B. Meissner, vice-chairman; P. S. Arkwright, W. A. Baehr, James P. Barnes, C. E. Morgan, L. H. Palmer, Harry L. Brown, F. G. Buffe, F. D. Burpee, G. H. Clifford, Edward Dana, C. R. Ellicott, H. B. Flowers, L. E. Gould, F. T. Griffith, A. A. Hale, J. H. Hanna, W. V. Hill, H. J. Kenfield, M. B. Lambert, A. T. Perkins, D. W. Pontius, R. V. Prather, Harry Reid, Ernest Stenger, E. P. Waller, Birney Club of St. Louis, Electrical Board of Trade of St. Louis.

L. H. Palmer, general manager United Railway & Electric Company of Baltimore, has been appointed chairman of the sub-committee on transportation. Each member of the general committee has been requested to cooperate with him.

A special train, or at least special cars, is already being planned to run from New York City to St. Louis, probably leaving New York on the evening of Saturday, March 1, arriving at St. Louis Sunday evening. Arrangements for this are being made by C. E. Morgan, C. R. Ellicott, A. A. Hale and Harry L. Brown.

Arrangements have been made whereby the delegates attending the convention will be able to travel for fare and one-half, the round trip ticket being purchased at point of origin. The association will send the necessary certificates to delegates.

Mr. Sawyer reports that applications have already been received for between 200 and 300 hotel and dinner reservations and that there is every indication that the St. Louis location will draw a large crowd.

Rapid Transit

THE committee on rapid transit, newly organized this year, held its first meeting on Jan. 11 in New York. Those in attendance were President Britton I. Budd, Chairman W. S. Menden, Secretary J. W. Welsh. Edward Dana, L. H. Palmer, B. J. Fallon, E. J. Blair, H. A. Johnson, J. W. Colton, G. C. Hecker, M. B. Lambert and Charles R. Ellicott.

Mr. Budd outlined briefly the purposes of the committee. He said that

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in anticipation of the probable extensive development of rapid transit during the next ten years, due to the growth of cities, and the tendency of congestion to force surface cars off the street, it would be desirable to plan ahead and provide public officials and the public with an authoritative report on some of the major aspects of the subject, particularly to point out to the people what they can afford in the way of rapid transit systems, and the desirability of taking steps to increase the surface capacity of streets as a means of postponing the investment in rapid transit until it can more nearly be carried by the earnings of the system.

Mr. Menden outlined the scope of the committee's work thus: To report on the following subjects:

1. The development of existing systems and introduction of new systems.
2. The control of street traffic; parking and other restrictions; traffic regulations and signals; and modification of street layouts, such as widening or double-decking present streets or building additional streets.

The first of these subjects was assigned to a sub-committee composed as follows: B. J. Fallon, chairman; Edward Dana, R. F. Kelker, Jr., E. J. Doyle, C. S. Klumpp, James B. Walker.

The second subject was assigned to L. H. Palmer, J. H. Alexander, G. A. Richardson, F. R. Phillips, E. J. Burns and W. R. Maltbie.

Out of a discussion of ways and means to stimulate greater activity in the development of new types and better cars and equipment for electric railways, it was decided that this committee and the committee on city operation and the one on interurban operation should give consideration to the possibility of making definite suggestions as to desirable directions of research and development work. Later the vice-chairmen of these committees and representatives of the manufacturers will be called together for the purpose of discussing possible improvements.

Hearing on Recapture Clause Postponed

INFORMATION has been received from Charles L. Henry, chairman of the committee on national relations of the American Association, that his request has been granted for a postponement of the hearing before the Interstate Commerce Commission on the recapture clause of the transportation act of 1920, as applying to interurban railways. This hearing, originally set for Jan. 23, has been postponed to March 19, at 10 a.m.

The Supreme Court of the United States has decided that the recapture clause of the transportation act of 1920 is constitutional. Under Section 15a, no railroad is permitted to earn on its fair valuation in excess of a rate which at this time is 6 per cent. The purpose of the hearing is to determine what electric railroads of the United States are subject to the jurisdiction of the Interstate Commerce Commission under Section 15a. The particular language of that section, which controls the inclusion or exclusion under the section, is whether or not a specific road is operated as "a part of a general steam railroad system of transportation or engaged in the general transportation of freight."

Mr. Budd Sees Much Progress in 1923

American Association President, in a Statement Released to the Public Press This Week, Reviews the Factors Which Are Contributing to Increased Prosperity in the Industry

IN A STATEMENT for use in the daily newspapers released on Jan. 16, President Britton I. Budd of the American Electric Railway Association gives a brief review of the trend of the electric railway industry in 1923. He sees increased prosperity for both city and interurban lines, but cautions that traffic congestion forms a grave problem. The statement follows substantially in full:

PRESIDENT BUDD'S STATEMENT

Substantial progress was made by electric railways throughout the United States during 1923. This is reflected particularly in the increased number of riders on both city and interurban lines, and great interurban freight business gains. Official reports from one-third of the industry on passengers carried indicate that all records were broken in 1923. During the first eleven months these lines carried an average of 5 per cent more passengers than in 1922, the record year, according to the United States Census reports. Final reports for 1923 will show almost sixteen billion passengers carried if the preliminary report ratio is maintained, as it invariably has been in previous years.

Ability of interurbans to render quick service on short hauls and inclusion of a pick-up and delivery service by many have caused their freight and express business to grow rapidly. Obviously this feature of interurban service is destined to prove a greater factor in the future.

General factors contributing to increased prosperity of both city and interurban lines include: Better equipment and service, regular advertising, elimination of motor bus competition, and a more frequent use of electric railways by motor car owners in order to save money and avoid traffic worries.

Operating revenues have increased 2.5 per cent over 1922, but increased wages, material costs and taxes and slightly reduced fares have offset them to some extent. The operating ratio is up from 72.82 in 1922 to 73.72 in 1923.

Wages, which constitute 46.2 per cent of all electric railway operating expenses, have risen steadily since last spring. The average maximum wages paid by eighty-five representative companies, each of which operates more than 100 miles of track, had increased from 52.84 cents per hour in January to 54.74 cents on Dec. 1. Material and supply costs have advanced about 10 per cent during the year. Taxes have risen 2.43 per cent.

Fares generally are about one-fifth of a cent lower than they were in 1922. Recently, however, there has been an upward tendency in recognition of increased operating costs. Included in cities which experienced fare raises during 1922 are Detroit, with a municipally operated line, and Cleveland, operated under a service-at-cost plan supervised by the city.

The national fare range in 649 cities is from 5 to 10 cents. A total of 173 cities have a 7-cent fare, 150 a 10-cent fare, eighty-three a 6-cent fare and fifty-two a 5-cent fare. Other fares charged in this group are: 10-cent zone fares, four; 9-cent cash fares, four; 8-cent cash fare, 1-cent transfer charge, twenty-six; 8-cent zones, five; 7-cent zones, nine; 7-cent zones, city, 8-cent, outside, four; 6-cent zones, six; 6-cent city zone, 6-cent outside zone and 2 cents transfer charge, ten; two 5-cent fare zones, two; 5-cent fare and a transfer charge, five; 5-cent city zone and 5-cent outside, fifteen.

Weekly passes or permits are being sold in more than thirty cities. Riders find them very satisfactory, but it cannot be said that they would prove profitable for all concerned in every place. They do encourage riding, however.

Companies are coming out of receiverships rapidly. During 1923 properties with a total mileage of 832 and total securities of $266,588,946 emerged. Companies going into receiverships during the year had only 218 miles of track and outstanding securities of $23,609,700. The contrast between this record for 1923 and that of 1919, when companies with securities of approximately $535,000,000 went into receiverships, is striking. [More complete figures collected by ELECTRIC RAILWAY JOURNAL and published in the Jan. 5 issue, page 25, indicate somewhat larger totals for these items, although the comparison is not changed greatly.—EDS.]

Recognition of the fact that cities must have electric railway service is more general than it was a year ago. Saginaw, Mich., after trying for two years to substitute buses for electric cars, gratefully restored electric railway service after taking a popular vote. Davenport, Iowa, took hasty steps to retain service when suspension was threatened. Birmingham, Ala., voters wiped out jitney competition by a ratio of three to one.

This does not mean, however, that the bus has no place in local transportation. The year has seen an enormous

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growth in supplemental bus service. More than 100 electric railways are now operating buses, and the future indicates the electric railway companies as the logical market for buses and ultimate domination of bus operations. Heads of electric railway and automotive organizations, realizing the need for co-operation, are getting together on needed legislation.

Probably the gravest problem facing every citizen today is that of relieving traffic congestion in cities. Private automobiles, trucks and buses are increasing so rapidly that the car rider is being delayed. It is unfair to the car riders, their families, business men, and, in fact, the whole community.

Hundreds of millions of dollars are being spent for widening streets for the benefit of automobile traffic in many cities, but no consideration is given to the car rider as to improvements which will give him better and quicker service. Four-fifths of the people do not use automobiles and the favored few who ride in pleasure cars cannot dominate the situation much longer.

City and Interurban Operation

SEVERAL members have been added to the committee on interurban operation as published in the issue of this paper for Dec. 22, page 1056. These are F. B. Culley, Augusta, Ga.; George Newell, Everett, Wash.; Martin Schreiber, Camden, N. J. Mr. Schreiber has also been added to the committee on city operation. G. C. Hecker, special engineer of the American Association, is secretary of each committee.

New York Community Section

UNDER the direction of C. E. Morgan, vice-president and general manager Brooklyn City Railroad, who is chairman of the community section committee of the American Electric Railway Association, the Metropolitan Community Section is being organized in New York City. Applications have been sent out and enrollments are coming in rapidly. The committee is anxious to get this organization well along, so that a meeting can soon be held and the active work started.

Car and Carhouse Wiring

THE committee on car and carhouse wiring of the Engineering Association held its first meeting at association headquarters on Jan. 9. The members present were H. H. Adams, chairman; John Lindall, A. T. Clark and C. G. Keen. H. R. Markle of the Western Association of Electrical Inspectors and chairman of that association's committee on electric traction systems, took part in the meeting. J. A. Brooks and Charles Gordon attended as guests.

A tentative code for car and carhouse wiring was discussed in detail with a view toward working out a set of rules which will be satisfactory from both the operating and the fire protection standpoint.

Equipment

THE equipment committee of the Engineering Association met at association headquarters, New York, on Jan. 14 and 15. Those present were F. H. Miller, chairman, Louisville, Ky.; Daniel Durie, sponsor, Connellsville, Pa.; Walter S. Adams, Philadelphia, Pa.; W. W. Brown, Brooklyn, N. Y.; R. S. Bull, Pittsburgh, Pa.; A. T. Clark, Baltimore, Md.; L. H. Fry, Philadelphia, Pa.; J. L. Gould, New York, N. Y.; J. M. Hipple, Pittsburgh, Pa.; J. C. McCune, New York, N. Y.; A. D. McWhorter, Memphis, Tenn.; J. F. Miller, Pittsburgh, Pa.; E. D. Priest, Schenectady, N. Y.; P. V. C. See, Akron, Ohio; R. B. Smyth, Boston, Mass.; C. W. Squier, New York, N. Y.; W. G. Stuck, Lexington, Ky., and H. G. Ross, representing E. S. Sawtelle of Cincinnati, Ohio.

The various subjects assigned to this year's equipment committee for consideration were discussed. Sub-committees were appointed for working out details and report on each subject. The work to be undertaken by the various sub-committees was outlined and substantial progress was made in devising methods of obtaining and tabulating information, and arriving at definite conclusions.

Subject No. 1 includes a study of gearing, with an attempt to standardize dimensions and locations of web holes. This sub-committee will send out a questionnaire on helical gearing, similar to those used in previous years, regarding the extent to which this type of gearing is used and results obtained. Additional data will be secured from gear and gear blank manufacturers.

Subject No. 2 is a study of various devices for trolley contact and the effect upon trolley wire. The sub-committee on this subject will co-operate with the committee on power transmission and distribution in obtaining information on improvements in contact devices.

Subject No. 3 consists of a review of the miscellaneous methods and practices which were withdrawn from the Manual by last year's equipment committee, with an attempt to revise these and include any additional material necessary to warrant their reinsertion in the Manual. Suggestions were made for including additional material and investigation which would be necessary for collecting and deciding upon data and improvements.

Subject No. 4 covers spring supports for railway motors, with a view to the elimination of undesirable types and the standardization of the more desirable ones. The sub-committee on this subject outlined a series of questions to be used in obtaining data regarding the troubles with springs and motor suspensions and the methods used to overcome these troubles. Information will also be collected on improvements made by various railways in their present motor suspensions.

Subject No. 5 includes a study of existing inspection practice on car axles with a view to developing a practical set of rules for inclusion in the Manual. This committee will secure information from as many roads as possible so as to assist in developing a standard set of rules.

Subject No. 6 consists of a study of air-brake tests conducted under the auspices of the Central Electric Railway Association. The sub-committee on this subject will digest the principal features included in the report, and additional information will be collected and studied with a view of pointing out methods and results that can be used by electric railways to advantage and that can be investigated further by association committees with a view of obtaining data of importance to electric railways.

Subject No. 7 is a review of existing standards. Additions and revisions to the gages used in wheel mounting and for limit of wear were found necessary due to the new wheel contours adopted at last year's convention.

A new subject, which has been designated as No. 8, to be considered by the equipment committee is a study of bus body dimensions and designs with a view toward standardization. The sub-committee on this subject will co-operate with a similar committee of the American Society of Automotive Engineers.

A.E.R.A. Proceedings for 1923

RAILWAY member companies of the American Electric Railway Association will receive the complete set of the 1923 proceedings for the American and affiliated associations during January. Manufacturer member companies will receive the Engineering Association proceedings only, but copies of the other proceedings will be sent upon request. Individual members will receive the proceedings of the particular association with which they are affiliated.

Special Reports Available

THE following compilations, completed by the association staff, are available and will be sent upon request to member companies in good standing:

Wages of Employees Other than Trainmen: A compilation based on the reports of 175 companies showing their classifications of employees and wages paid in their shop, barn, way and structure, power, overhead line, and stores departments.

Trend of Railway Operations in 1923: A month by month statement of the combined operations of eighty typical electric railways during the ten months ended Oct. 31, 1923, compared with the same months in 1922. Also shows the monthly trend of traffic on these eighty roads since January, 1920.

List of Electric Railways Operating One-Man Cars: A second revision of the list originally issued in April, 1923. This new list shows a total of 426 companies and 10,106 one-man cars.

In addition to the above, supplements to the Wage, Fare Bulletin and the Cost of Living Studies have been prepared, bringing them down to date.

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The News of the Industry

Citizen Ownership Urged

Retiring Director of Transit at Philadelphia Finds Regulation Has Not Brought Result Expected

William S. Twining, retiring director of the Department of City Transit, Philadelphia, recently issued his annual report for 1923. Besides recording the year's activities the report explains the relationship between the Philadelphia Rapid Transit Company and the city, and also offers some valuable suggestions from Mr. Twining himself with respect to transit development in the city and vicinity.

CITIZENS SHOULD OWN FACILITIES

Mr. Twining urges customer ownership of Philadelphia's transit facilities, arguing that the present plan of government regulation of the privately owned transportation companies is unsatisfactory, and holds no hope for the proper solution of the city's transit problem. His idea of customer ownership is that of direct ownership by the citizens who need and use the particular service involved. He says that although the principle of regulation was loudly acclaimed many years ago as a cure for all transit troubles, it has not brought the results that were expected. It was his belief that permanent relief would come instead through the business corporation and that the salvation of the industrial civilization lay in the expansion of industrial corporations until they were virtually public in character.

NO PROGRESS TOWARD SOLUTION

Viewing the transit problem only as a problem because of its attempt to combine the functions of the two antagonistic agencies of public service, namely, government and business, he said there was no reason why the people of any community should not organize themselves into a co-operative business corporation whose object is to serve the public with such kind, amount and quality of service as the majority of its stockholders may desire. It was his idea that Philadelphia, with its 2,000,000 people, should form itself into a people's co-operative transit corporation, which should not only acquire the facilities owned by the Philadelphia Rapid Transit Company and its subsidiaries, but would further build, construct and extend facilities into such sections of the city as seemed advisable. He said:

> The answer lies in public ownership, but not in political or government ownership. The answer lies in the adoption by the public of the slogan "Every citizen a stockholder," which should replace the one the company has adopted of "Every employee a stockholder."
>
> Inasmuch as the transit corporation has recently announced its intention of favoring a financial reorganization, I respectfully suggest that the organization be such as will result in a campaign to increase the number of the company's stockholders sufficiently that the company may represent a substantial majority of the citizens and become virtual public ownership.

Referring to the construction activities in 1923 the report says that no progress has been made and that the solution of the matter is back at the same point that it was in 1916. He looked to the future when the moving platform would be the next stage in transit development. This he approved, particularly its use in the central business streets, which are too narrow to accommodate the traffic.

Mr. Twining's report was addressed to Mayor Moore. Its presentation marked the closing of his service to the city as technical adviser on transit matters. His position has been filled by E. H. Ehlers, a review of whose career was recently given in the ELECTRIC RAILWAY JOURNAL.

Trackless Trolley Is Favored at Toledo

Toledo's new crosstown line will probably utilize the trackless trolley system if the recommendation of a special sub-committee of the railroads and telegraph committee of the City Council is carried out by the whole body.

The committee has yet to agree upon a route. Two routes are being considered—one 5.5 miles in length and the other 5.95 miles.

The committee upon investigation of various installations reported that the trackless trolley would cost 29.44 cents per car-mile to operate as compared with 36.08 cents per bus-mile for gasoline buses. It was estimated that under the conditions of the installation as proposed this difference would mean an annual saving of about $26,560 on the system.

It is expected that the Community Traction Company, under the proposed plan, would purchase twelve trackless trolleys and operate them on a twelve-minute headway. This would provide equipment sufficient to give a nine-minute headway in the rush hours night and morning.

The committee has estimated the cost for the 5.5-mile route as follows: Overhead wiring, $27,500; rolling stock, $108,000; repair parts, $2,000; garage, $20,000; total, $157,500.

It is expected that action will be taken soon on the proposal by the new Council.

Dynamiters Plead Guilty

Four Men Indicted in Connection With Buffalo Outrage Against International Railway Admit Overt Acts

Four striking employees of the International Railway, Buffalo, who are under indictment with sixteen others for alleged conspiracy to dynamite the Buffalo-Niagara Falls high-speed train on the International in August, 1922, at Ellwood, N. Y., during the last strike, have entered pleas of guilty before Federal Judge George S. Morris of New Hampshire, sitting in special term of the United States District Court in Buffalo. Those who pleaded guilty are:

Emory Cheuning, Buffalo; Alvin Heinemann, George S. Galloway and Edward C. Sands, Lockport.

At the request of the United States District Attorney, Judge Morris deferred sentence.

Indictment against four others who were said to be implicated in connection with the case were dismissed at the suggestion of District Attorney Donovan on his plea of lack of evidence. The names of the men whose cases were dismissed are:

Albert T. O'Connor, George S. Reed, Frank McKurth, Charles Launders.

All the others under indictment, including John M. Parker, Niagara Falls, Ont., president of the Buffalo local of the Amalgamated Association, and Clarence E. Conroy, business manager of the local, have entered pleas of not guilty with the exception of State Senator Robert C. Lacey. Mr. Lacey has not yet appeared in court. He is out on bail.

Mr. Parker is a member of the Board of Aldermen in Niagara Falls, Ont., and Messrs Conroy and Lacey were candidates for the Buffalo City Council at the last municipal election. Both were defeated.

The overt acts named in the indictment against Heinemann, and to which he entered a plea of guilty, charges the theft of a large quantity of dynamite from a magazine of the Morris Hardware Company in Lockport on the night of Aug. 14, 1922. The explosive, the government alleges, was brought to Buffalo by Francis Reilley, a striking platform man, and stored at his home, 285 Chester Street. The next day it was taken, it is alleged, by John C. Hurley, a striking employee, to his home at 91 Woodlawn Avenue. Mr. Hurley has pleaded not guilty to an additional charge of perjury in addition to conspiracy.

It is alleged by the government that on the night of Aug. 17, 1922, the dynamite was taken from Mr. Hurley's home

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by two other striking trainmen to a spot about 3 miles from the Buffalo city line near the town of Ellwood. Here it was placed, it is alleged in indictments against the men, on the Buffalo-Niagara Falls high-speed line tracks and was exploded when a three-car train filled with tourists from Philadelphia passed over it. Forty-two passengers were injured and the train was wrecked.

Subway Extension from West Philadelphia Discussed

Thomas E. Mitten, chairman of the executive committee of the Philadelphia Rapid Transit Company, and General W. W. Atterbury, vice-president of the Pennsylvania Railroad, called on Mayor Kendrick on Jan. 16 to discuss his plans for a city beautiful.

The Mayor's program includes the building and gradual development of a new City Hall on the site bounded by the Parkway, Arch Street, Broad Street and Fifteenth Street, and the removal of Broad Street Station of the Pennsylvania Railroad together with the elimination of the "Chinese wall," making available this greater business area. The new station, it is understood, will be built on the west bank of the Schuylkill River, and suburban traffic eastward will flow into the subway.

A general revision of traffic control also was discussed, and finally it was decided the Mayor's consulting engineer, Solomon Swaab, together with his Director of Transit, Prof. H. E. Ehlers, will confer with E. B. Temple, chief engineer of the Pennsylvania Railroad, and Ralph Senter, chief engineer for the Philadelphia Rapid Transit Company, who will work out and submit plans covering this proposed development.

The Mayor explained the idea is that this entire program shall be developed step by step, causing no tax rate increase, and improvements contemplated will be made with the money available. Each unit of improvement, he said, will fit into and harmonize with his comprehensive plans for a city beautiful.

Suggestions from Employees Solicited at Buffalo

Herbert G. Tulley, president of the International Railway, Buffalo, is urging all employees to send in suggestions looking toward the improvement of the service, increased safety and better working conditions. Notices of the new plan have been posted in all car houses and shops and at the offices and the stations along the local and interurban lines of the company.

A special form has been prepared which employees are urged to fill in and send to President Tulley direct. All the information thus obtained will be treated confidentially. Eligibility for advancement in position will be considered for those who by information or suggestion show marked ability. The blue suggestion card carries the caption, "Knowing Why Makes Doing Easier."

On Jan. 15, the day that the plan became effective, more than fifty-five suggestions were received. A separate card must be used for each suggestion.

Commission's Authority Upheld

State Supreme Court Says Wisconsin Body Has Power to Allow One-Man Operation

The operation of one-man cars in Milwaukee and the right of the Wisconsin Railroad Commission to regulate such matters have been upheld in a decision by the Wisconsin Supreme Court.

The matter came before the court in a test case instituted by the city to determine whether a Milwaukee ordinance adopted by the Common Council to prohibit operation of these cars within the city limits is ineffective and whether the authority of the Railroad Commission to regulate such questions supersedes that of the city. The Milwaukee ordinance provides that all cars must be operated by two men. Some time ago the Common Council instructed the city attorney to test the validity of the ordinance.

The decision of the court upholds the contention that the powers of the Railroad Commission superseded those of the City Council in regulating Milwaukee's railway service. The case before the court grew out of an order issued by the Railroad Commission permitting the Milwaukee Northern Railway to run one-man cars in the city. Appeal from this order was taken by the city before Judge E. Ray Stevens of the Dane County Circuit Court at Madison. When the lower court upheld the right of the commission to make orders respecting "regulation, practice and service" the case was carried to the Supreme Court. Indirectly involved in this test case was the validity of the state law giving the Railroad Commission supervision and control over the street railway systems in Wisconsin.

In his decision, Justice Doerfler said in part:

> It appears that within the proper constitutional limitations the supreme power to create and maintain a proper standard for service rests primarily in the Legislature, and the Legislature cannot divest itself of this power by delegating it in part or in whole to a municipality.
>
> It constitutes the original source of power. In other words, it is the very fountainhead of power, and such power continues under all circumstances. The Legislature being the creator of municipal powers, its creature cannot at any time possess power superior to it.
>
> In order to furnish reasonably adequate service a railroad must possess and maintain proper facilities, which embrace a proper roadbed, tracks, cars, and so forth, and without facilities it would be idle to attempt to establish and maintain proper service, and the same is equally true as to the manning of a car with a crew for operating purposes.

One-man cars are now operating on three lines of the Milwaukee Electric Railway & Light Company and the city lines of the Chicago, North Shore & Milwaukee Electric Railway and the Milwaukee Northern Railway. The Milwaukee Electric Railway & Light Company proposes to install one-man cars on its Clybourn Street line.

Winthrop More Daniels Made Cuyler Professor at Yale

The Association of Railway Executives has established at Yale University a professorship of transportation in memory of T. De Witt Cuyler, Yale '74. The endowment for this chair amounts to $125,000 and represents gifts from members of the association and friends of Mr. Cuyler.

Winthrop More Daniels who resigned from the Interstate Commerce Commission last year to accept a professorship at Yale, will be the first incumbent of the Cuyler professorship. Mr. Daniels's field is in the economics of transportation, and he has written much of economics and public utilities. He taught at Princeton from 1892 to 1911, when he became a member of the Board of Public Utility Commissioners of New Jersey, and served on the Interstate Commerce Commission from 1914 to 1923.

Mild Weather Helps Operation

Up to Jan. 1 this winter electric railway systems in cities in eastern Canada are said to have expended for the removal of snow not more than 20 per cent of all the money spent up to the similar date last winter. This season there have been very few snowstorms and unless the weather suddenly becomes very severe the companies appear to be in a position to profit greatly. The Moncton Tramways, Electricity & Gas Company, for the first time in many years, has been able to operate its system during the winter. In previous years, the service has been entirely discontinued early in December and not resumed until the snow disappeared in April. When the railway withdrew a bus service was substituted.

Wage Schedules Extended in Milwaukee

A new wage agreement to run until June 30, 1924, has been negotiated between officers of the Employees' Mutual Benefit Association and executives of the Milwaukee Electric Railway & Light Company. The new agreement just negotiated provides for an extension of present wage schedules and working conditions for the next six months after which time a new agreement will be entered into embodying developments within that interval.

Railway Service Must Be Resumed in Spartansburg

The South Carolina Supreme Court in a decision handed down on Jan. 14 orders resumption of service by the South Carolina Gas & Electric Company in Spartanburg. In this the city wins a victory in that it is granted the mandamus petition to require the company to "restore its lines and operate the same according to law." The litigation in the case has been going on for a year. From time to time outstanding events in the controversy have been referred to in the ELECTRIC RAILWAY JOURNAL.

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Substantial Improvement Reported in New York City

Combined Results for Year Ended June 30, 1923, Show Surplus for First Time in Five Years—2,577,812,855 Cash Fares Paid—439 Rides per Capita—$479,000,000 Invested in Rapid Transit Lines

CONSIDERABLE improvement is reported by the New York Transit Commission during 1923 in the general transit situation in New York City. The commission also reports substantial progress in the effort it has made both to provide additional transit facilities and to secure better service through the existing facilities. These improvements were summarized by the commission in its report presented to the Legislature on Jan. 14.

The aggregate net annual deficit in the operation of the entire transportation system of the city—subway, elevated and surface lines—has been wiped out. The figures for the fiscal year ended June 30, 1923, with both the gains and losses of the individual companies taken into account, show a net operating income or surplus, for the combined companies, of $1,549,270. For the fiscal year ended June 30, 1922, there was an aggregate net deficit of $2,043,760; for the year ended June 30, 1921, $16,914,256, and for the year ended June 30, 1920, $10,725,522.

This the commission lists first in its review of the accomplishments. It then refers to the fact that the Brooklyn Rapid Transit Company, after four years and a half of operation under a receiver, has, with the exception of two minor subsidiaries, been completely reorganized and placed in a position under which the purchase of badly needed new equipment may be financed and materially better train and car service provided.

It says that the financial condition of the Interborough Rapid Transit Company has continued to improve under the readjustment plan promoted by the commission and ratified by it in 1922, a plan which considerably reduced the fixed charges borne by the company, including the cutting of the rental annually paid the Manhattan Railway for use of the elevated structures leased by the Interborough company, from $4,200,000 to $1,800,000, these gains permitting a corresponding increase in the financing and in the effectiveness of the service, both subway and elevated.

It is pointed out that for the first time in the history of New York City representatives of the public, nominated by the commission and accepted by the companies, are sitting as members of the boards of directors of both the Interborough Rapid Transit Company and the New York Rapid Transit Corporation, the corporate successor of the Brooklyn Rapid Transit Company. The Transit Commission insisted upon recognition of this principle of public representation as a prerequisite of its approval of the organization plans of both companies, and the results of such representation, the commission says, have been in every way satisfactory.

The elevated lines of the Manhattan company in the boroughs of Manhattan and the Bronx have recovered a loss of 25,000,000 passengers shown for 1922, as against the year preceding, and show an additional gain of more than 7,000 for the year 1923.

With the approval of the commission, the Richmond Light & Railroad Company, which is the principal surface car company serving Staten Island, has been taken out of a three-year receivership and purchased by new interests, already actively engaged in providing for its rehabilitation.

Nearly Seven Hundred Cars Purchased

Since the beginning of 1922 the companies of every description operating within the city have purchased a total of 682 new cars, of which 200 were for steam railroad service, 250 for subway service and 232 for trolley service. In addition, orders for a further installment of 150 subway cars are to be placed in the near future. These car purchases, already financed, include 200 subway cars by the Interborough company, 50 subway cars by the New York Rapid Transit Corporation, 200 surface cars by the Brooklyn City Railroad and 32 cars by other surface railway operators. In addition, nearly 250 surface cars have been rebuilt for use upon various lines. Of the total of entirely new cars, 600 will be in service by the end of 1924, representing in the aggregate the greatest addition to rolling stock equipment for the city lines in many years.

The commission refers to the opening of the Flushing extension of the Queensboro subway, a distance of a mile and a half, at a cost of $4,600,000, and to the extension of the Fourth Avenue subway, now operated by the New York Rapid Transit (B.-M. T.) from Eighty-sixth Street to Fort Hamilton, a distance of half a mile, the estimated cost of which is $1,900,000.

It is expected that the Fourteenth Street-Eastern subway of the Brooklyn-Manhattan system, which has been under construction since 1916, will be completed and placed in operation as far as Meserole Street, in the Bushwick section of Brooklyn, a distance of about 4 miles, during the late spring or early summer. This line extends from Sixth Avenue, Manhattan, under Fourteenth Street, to the East River, and under several thoroughfares in the Williamsburg district, to its temporary terminal. Plans are also being made for the proposed extension of this line to East New York as a subway rather than as an elevated structure, a further distance of 3½ miles. This entire line, including completed and uncompleted portions, will cost approximately $25,000,000.

The extension of the Queensboro subway from the Grand Central station to Eighth Avenue in Manhattan, placed under construction by the commission in the early part of 1922, is about one-third finished.

The commission says that helpful and promising co-operation with the Board of Estimate and Apportionment has been established through the acceptance by the board in June last of a suggestion by the commission that it appoint a conference committee to consider the matter of the laying out of further new subway routes and all other matters that may from time to time require the concurrent action of the two bodies. Through the medium of the conferences that have followed the appointment of this committee, agreements have been reached upon the following routes, substantial sections of which it is planned to place under construction during 1924:

(a) The West Side-Washington Heights line, which will run south from 193d Street and Fort Washington Avenue in upper Manhattan as a four-track line, with two tracks connecting with the Brooklyn-Manhattan subway at Fifty-ninth Street and Seventh Avenue and two extending south from Fifty-ninth Street, by way of Eighth Avenue, to the Pennsylvania station. This line is estimated to cost $65,000,000. Its length will be approximately 8.6 miles.

(b) The Brooklyn Crosstown subway, running from Long Island City, in the Borough of Queens, through the Greenpoint, Williamsburg and central sections of Brooklyn to a point of connection with Manhattan, by way of the existing Fourth Avenue subway, at Fulton Street and Ashland Place. The length of this line is 7.4 miles and its estimated cost, $38,000,000.

The commission is again enabled to report encouraging progress in the working out of the details of the proposed general plan of reorganization and readjustment of all the lines operating within the city. A tentative plan of reorganization was presented to the public and reported to the Legislature some two years ago. Hearings, covering a number of months, were later held upon the various details under consideration, and a large amount of testimony taken, particularly with relation to the values to be determined as a basis for the admission of the properties of particular companies in the plan ultimately

CLASSIFIED TABLE OF ACCIDENT REPORTS

From all railroad companies for ten months ended Oct. 31, 1923

	Total of All Companies
Car collisions	1,167
Persons struck	1,816
Vehicles struck	21,616
Boarding	6,185
Alighting	5,457
Electric shocks	289
Derailments	2,291
Other accidents, including traffic delays	22,066
Total	60,887
Injuries reported	
Passengers	21,377
Employees	10,402
Others	3,771
Total	35,550
Serious (included in above)	
Killed	229
Fractured skulls	101
Amputated limbs	10
Broken limbs	279
Other serious	954
Total	1,573

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to be agreed upon. Many matters of detail relating to the plan have had the commission's further consideration during the year. The completion of the process of valuation of properties, as well as the preparation of forms of agreement to be entered into between the companies and the commission, on behalf of the city, in the event of final ratification, have involved intensive study, both by the members of the commission and their staff of legal, accounting and engineering experts. A number of more or less related problems are still under discussion, the solution of some of which will have a bearing upon the final structure of the reorganization plan itself. The commission has also deemed it wise to await the completion of the immediate reorganization of some of the larger transportation companies which have been in receivership before attempting to make the plan effective. In this connection the commission explains that in the last analysis its dealings are with the owners of the properties involved and not with the courts by whom the receivers were appointed.

As the commission sees it, the restoration of these properties to their owners will operate to facilitate the final reorganization, and incidentally serve to cut away a good deal of the cumbrous structure of previous street railway financing. In all of the reorganizations that have taken place during the past two years, the commission has insisted, in fact, that the rearrangement of the affairs of any of the companies, financial and otherwise, should be so shaped as to pave the way toward their absorption in the comprehensive plan. The commission says it will be equally insistent in respect of the plan of the reorganization of the New York Railways, operating a substantial part of the surface roads in Manhattan.

Two new receiverships were created during 1923, when, early in January, the lines of the New York & Queens County Railway not subject to the Steinway Railway mortgage—the latter lines having been placed in receivers' hands in 1922—were unable to meet their obligations and went into the hands of a receiver, and during December, when a receiver was named for the New York & Long Island Traction Company, operating in Queens County and outside the city in Nassau County.

The commission reiterates its position in respect to the operation of buses. It says that its attitude has been repeatedly and clearly set forth, should not be misunderstood and must not be mistaken. The commission believes, and has frequently stated, that buses should be an integral part of the transportation system of New York City. As feeders for rapid transit lines or as distributors at certain points of passengers from rapid transit lines, buses can be made to serve a very useful purpose that no other facility can adequately provide. Their use for through operation or long-haul operation in New York is, under the street congestion conditions which exist, of doubtful value. Probably they cannot be so used effectively. The commission says it has repeatedly announced its willingness to co-operate in any legitimate way to place upon the streets buses, properly constructed, properly equipped and manned, under responsible management and with sufficient resources behind them. It believes that a real bus operation, expressed in terms of service, would be of lasting benefit to the traveling public of the city and would supplement existing facilities in such a way as materially to help conditions of congestion, which cannot entirely be relieved until new rapid transit trunk lines are provided.

Suburban Traffic Problem

The commission continued during 1923 its investigations and studies in respect to the need of future provision for the handling of suburban passengers within the city of New York. The growth of suburban areas adjacent to New York City has been very rapid in recent years. Within a radius of 50 miles of New York City Hall, which comprises generally the suburban commutation traffic area, there was, on the basis of the 1920 Federal census, a population of substantially 8,800,000 persons, including the five boroughs of the city. This population was divided substantially two-thirds within the municipality and one-third within the suburban area. Figures collected by the commission for the calendar year 1922 show that the trunk line railroads carried a both-way passenger traffic of 227,301,338 passengers. In addition, the Hudson & Manhattan Railroad, operating a subway line from two terminals in Manhattan to Newark, Jersey City and Hoboken, transported in and out of New York 37,291,763 local passengers aside from its Newark rapid transit traffic and the traffic received by it from railroad companies.

In 1860, the first year of which there is accurate record, horse-drawn cars in Manhattan and Brooklyn carried about 50,800,000 passengers. In the last fiscal year ended June 30, 1923, the street railroads and rapid transit railroads of New York together transported 2,577,812,855 passengers, an increase of 86,604,045 over the previous year. In terms of percentages this increase was 3.48. The figures do not include the results of operation upon the Hudson & Manhattan Railroad lines, which are not properly a part of the New York City transportation system and carry relatively a small number of the passengers between local stations in New York. The figures also do not include 55,974,110 passengers carried by the Fifth Avenue Coach Company. In 1860 each person within the communities which roughly today comprise the city of New York rode forty-three times a year upon the transportation lines. In 1923 the riding had increased to 439 trips per capita.

For the first time since 1918, as stated previously, the combined financial returns of the street railroad companies showed a net corporate income of $1,549,270, instead of a deficit. Operating revenue for the year, for all companies, amounted to $138,455,485, or about $5,000,000 more than for the year previous. Operating and maintenance expenses were $96,323,696, or a little less than $4,000,000 more than in 1922. Taxes, tolls, etc., in 1923, were $17,986,067, or approximately $99,000 more than in 1922. The accompanying table shows the results of operation from the financial standpoint from the years 1908 to 1923, inclusive.

RESULTS OF OPERATION OF STREET RAILWAYS IN NEW YORK CITY
Fiscal Years Ended June 30, 1908-1923
(Excludes Hudson & Manhattan Railroad)

Fiscal Year Ended June 30	Street Railway Operating Revenue	Expenses of Maintenance and Operation	Taxes, Tolls, etc.	Street Railway Operating Income (a)	Net Corporate Income (b)
1908	$68,804,197	$41,075,378	$4,313,851	$23,414,968	$2,782,585
1909	71,538,312	40,930,824	4,918,453	25,689,035	6,321,627
1910	77,356,451	42,615,837	5,025,503	29,715,111	9,540,526
1911	80,948,588	44,851,455	5,316,346	30,780,787	10,224,404
1912	84,862,972	46,416,134	5,595,847	32,850,991	11,863,193
1913	88,448,788	47,314,442	5,863,232	35,271,114	11,574,125
1914	90,379,410	48,638,663	5,637,679	36,103,068	11,849,985
1915	89,965,346	48,900,450	5,548,121	35,516,775	11,501,157
1916	94,717,678	50,523,325	5,955,536	38,238,817	12,352,438
1917	95,943,519	54,204,314	6,891,049	34,848,156	8,739,442
1918	98,820,096	58,464,097	7,900,289	32,455,710	4,659,330
1919	104,565,318	72,980,401	7,570,659	24,014,258	Loss 9,328,434
1920	121,632,966	92,322,912	6,940,316	22,369,738	Loss 11,410,387
1921	129,237,751	103,293,674	7,027,590	18,916,487	Loss 17,159,155
1922	133,452,687	92,422,503	7,887,319	33,142,865	Loss 2,704,752
1923 (c)	138,455,485	96,323,696	7,986,067	34,145,722	1,549,270

(a) Excess of revenues over expenses and taxes. (b) Balance after interest, rents and other fixed charges. (c) Provisional.

There were reporting to the commission at the end of the fiscal year sixty-five common carriers, seven less than in 1922. The sixty-five common carriers include fifty-four street and electric railways, ten steam railroads and three stage-coach corporations. The reorganization of the Brooklyn Rapid Transit Company brought about a number of changes in the capitalization of the companies comprising that system. The New York Rapid Transit Corporation, owing to the exigencies of the reorganization, had not completed its annual report for the fiscal year at the end of 1923. Excluding the Hudson & Manhattan Railroad, and noting the exception as to the figures for the Brooklyn company, the several common carriers making full annual reports to the commission have a combined net

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STREET RAILWAY TRAFFIC (INDICATED BY NUMBER OF CASH FARES) IN NEW YORK CITY, 1860-1923, WITH PARTIAL DISTRIBUTION BY BOROUGHS (Excludes Hudson & Manhattan Railroad)

Fiscal Year Ended June 30	Street Surface Railways						Rapid Transit	Grand Total	Per Capita
	Manhattan	The Bronx	Brooklyn	Queens (Excl. B. R. T.)	Richmond	Total			
1860	38,455,242	.....	12,374,931	.....	.....	50,830,173	.....	50,830,173	43
1870	114,101,539	1,038,014	37,203,281	.....	121,086	152,463,920	.....	152,463,920	103
1880	148,615,107	1,775,485	77,928,395	1,052,380	213,905	229,585,272	60,831,757	290,417,029	152
1890	215,296,648	3,394,726	109,288,647	2,976,185	287,325	331,243,531	237,906,029	569,149,560	218
1900	360,002,672	21,364,690	204,106,397	11,441,751	6,872,856	603,788,366	242,564,692	846,353,058	246
1910	371,165,696	56,524,261	289,308,085	34,430,074	11,712,623	763,140,739	725,282,196	1,488,422,935	312
1911	382,046,845	62,777,966	305,977,350	42,515,629	12,301,757	805,619,547	745,525,416	1,551,144,963	320
1912	395,238,026	67,837,245	322,321,981	45,182,732	12,959,799	843,539,783	779,439,926	1,622,979,709	329
1913	419,722,253	74,702,309	345,987,401	47,463,382	13,568,066	901,443,411	809,563,028	1,711,006,439	341
1914	420,662,533	79,652,133	351,905,284	49,973,696	14,011,414	916,205,060	836,947,406	1,753,152,466	343
1915	415,551,116	81,502,803	354,700,113	52,686,108	14,312,009	918,752,149	829,914,163	1,748,666,312	337
1916	427,373,847	84,535,737	363,630,177	54,167,403	14,884,534	944,591,698	890,850,383	1,835,442,081	348
1917	349,788,114	71,153,030	373,079,651	50,906,681	15,238,157	860,165,633	990,089,597	1,850,255,230	345
1918	371,136,389	79,917,071	360,207,555	43,448,206	15,287,922	869,997,143	1,029,165,648	1,899,162,791	349
1919	370,084,711	80,806,261	362,105,288	46,723,575	15,958,198	875,678,033	1,118,215,449	1,993,893,482	360
1920	349,772,761	94,141,991	432,936,227	49,562,574	15,007,235	941,420,788	1,331,915,745	2,273,336,533	405
1921	384,128,024	107,675,507	418,106,603	51,944,034	15,797,894	977,652,062	1,418,649,471	2,396,301,533	420
1922	388,357,767	114,679,520	472,538,028	58,826,451	18,567,125	1,052,968,891	1,438,239,919	2,491,208,810	430
1923	383,209,500	119,140,781	490,128,692	59,849,701	19,408,180	1,071,736,854	1,506,076,001	2,577,812,855	439

STREET RAILWAY TRAFFIC IN NEW YORK CITY, 1921-1923

Number of Revenue Passengers (Cash Fares). Excludes Hudson & Manhattan Railroad

	Fiscal Year Ended June 30			Increase* of 1923 Over 1922	
	1921	1922	1923	Number	Per Cent
Subway and elevated lines:					
Interborough Subway	639,385,780	644,975,474	676,650,431	31,674,957	4.91
Elevated	374,293,051	348,517,216	348,524,700	7,484	0.00
Brooklyn Rapid Transit elevated and subway	404,970,640	444,747,229	480,900,870	36,153,641	8.13
Total	1,418,649,471	1,438,239,919	1,506,076,001	67,836,082	4.72
Street surface lines in:					
Borough of Manhattan	384,128,024	388,357,767	383,209,500	D5,148,267	D1.33
Borough of the Bronx	107,675,507	114,679,520	119,140,781	4,461,261	3.89
Borough of Brooklyn	418,106,603	472,538,028	490,128,692	17,590,664	3.72
Borough of Queens (a)	51,944,034	58,826,451	59,849,701	1,023,250	1.74
Borough of Richmond	15,797,894	18,567,125	19,408,180	841,055	4.53
Total	977,652,062	1,052,968,891	1,071,736,854	18,767,963	1.78
Grand total	2,396,301,533	2,491,208,810	2,577,812,855	86,604,045	3.48
Population (b)	5,705,364	5,790,680	5,875,996	.....	....
Fares per capita	420	430	439	.....	....

* The prefix D indicates decrease. (a) Exclusive of Brooklyn Rapid Transit. (b) Estimated on basis of one-tenth of decennial increase, 853,165.

capitalization, in round figures, of $1,168,003,000, of which the city of New York appears with $266,845,000, the major portion of its capital investment of approximately $290,000,000 in rapid transit lines.

Traffic Increases

The traffic increase for the fiscal year 1923 upon all of the street railway lines, which include the subways and elevated railroads, was a few million less than in the previous year. The figures do not include any of the traffic on steam railroad lines nor upon the electrically operated divisions of such roads. The major increase of the year was upon the rapid transit and surface lines operated by the Brooklyn companies. With total traffic for the year of 480,900,870 upon these lines, there was an increase of 36,153,641 or 8.13 per cent. In 1922 the chief gain appeared upon the surface lines in Brooklyn, although in both instances the gain was much larger than in 1923. The principal change, however, reflected in the transportation figures for the fiscal year appears in respect to the lines of the Interborough Rapid Transit Company. Up to last year, for a period of several years, this company had shown substantial, and in a few instances unusual, gains in traffic.

In the 1922 fiscal year, however, due to a 25,000,000 passenger traffic reduction upon the elevated lines, the company showed an increase of less than 6,000,000 for all lines over the previous year, the 1921 figures over 1920 having been 53,000,000. This year, however, the Interborough subway lines showed a gain of 31,674,957 passengers, or 4.91 per cent, while the elevated lines of the same system, which in 1922 lost about 25,000,000 passengers, this year showed a gain of 7,484 passengers. This increase upon the elevated lines was due in part to congestion of traffic on other routes, which diverted many passengers to them, and in part to a campaign undertaken by the Interborough on behalf of the elevated railroads, when an increase of express service and other physical changes were made in passenger service.

The total traffic upon the rapid transit lines of both systems amounted in 1923 to 1,506,076,001, which was a gain of 67,836,082 passengers, or, expressed in terms of percentages, of 4.72 per cent. The total traffic for 1923 upon the street surface lines in the several boroughs amounted to 1,071,736,854, which was a gain of 18,767,963. The largest traffic, 490,128,692, and the largest gain numerically, 17,590,664, was in Brooklyn. This was a gain of 8 per cent. In the Borough of Manhattan the surface road traffic of 383,209,500 represented a falling off from the year before of 5,148,267, or 1.33 per cent. The next largest traffic was in the Borough of the Bronx, with 119,140,781, an increase of 4,461,261, or 3.89 per cent. Surface traffic in the Boroughs of Queens and Richmond showed gains, that in Richmond representing a gain in per cent of 4.53. The percentage gain for all surface lines throughout the city was 1.78, and for all street railroad lines 3.48. On an estimated population of 5,875,996, at the end of the fiscal year 1923, per capita riding was 439, against 430 in the previous year.

2,577,812,855 Passengers in a Year

The accompanying tables show (1) the number of revenue passengers reported by the several systems, the estimated populations of the city of New York and the average number of rides per capita for the fiscal years 1921, 1922 and 1923, and (2) the street railway traffic in 1860, 1870, 1880, 1890, 1900, and for every year from 1910 to 1923 inclusive.

The amount of securities authorized by the commission in the calendar year 1923 aggregated $97,063,000 par value and 1,025,906 shares of no par stock, as shown in the table below.

The expenses of the commission for the year 1923 totaled $2,431,971.86.

STOCK AND BOND ISSUES AUTHORIZED BY THE COMMISSION IN 1923

Companies	Class of Security	Date of Authorization	Amount of Issue Authorized	Amount Applied for	Case No.
Eighth Ave. Railroad	Mortgage bonds	June 13, 1923	$100,000	$100,000	2625
Richmond Railways Inc.	Bonds	March 27, 1923	1,700,000	2,000,000	2664
	Stock	March 27, 1923	*[20,000 shs.]	*[20,000 shs.]	2664
Ocean Electric Railway	Stock	March 13, 1923	315,000	315,000	2673
Brooklyn Rapid Transit reorganization plan	Bonds	March 23, 1923	92,698,000	x93,000,000	2679
	Stock, pref.		*[239,556 shs.]	z[350,000 shs.]	
	common		*[766,350 shs.]	z[850,000 shs.]	
Interborough Rapid Transit	Equipment ctf.	Dec. 14, 1923	2,250,000	2,250,000	2627
Total bonds			$97,063,000	$97,665,000	
Shares of no par stock			[1,025,906 shs.]	z[1,220,000 shs.]	

* No par stock. x Approximately. z Not exceeding.

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Foreign News

Hydro-Electric Resources in France

One of the best known French authorities, Monsieur Cavaille, who was responsible for the operation of French railways during the war, states that the unexploited hydro-electric possibilities are of unquestioned sufficiency for the supply of the general railway systems of France, and of local and interurban tramways as well. He estimates that the country's hydro-electric resources susceptible of immediate development are 6,000,000 hp. in the Alps-Rhone and Jura, 1,800,000 hp. in the Pyrenees and 1,500,000 hp. in the mountains of Auvergne and the Massif Central.

Before the war France had developed but 900,000 hp. of this, while Italy, far less prolific in natural resources, had already developed above a million horsepower in the Alps alone. In 1921 the figures for France were increased to 1,775,000 hp., of which 600,000 hp. was in the Pyrenees and the Massif Central.

Railway Electrification in England

The leading British steam railway companies have now announced their large programs of new works, many of which are to be expedited in order to relieve unemployment. Among the schemes which the London, Midland & Scottish Railway will put in hand is the electrification of the line from Manchester to Oldham. This will form an addition to the electric lines already existing for dealing with the heavy traffic north of Manchester.

Award to Belgrade Tramways

During the war the tramways of Belgrade, which belong to a Belgian company, were seized by the municipal administration. An arbitration committee sitting in Brussels has finally awarded the Belgian company an indemnity of 16,000,000 francs. The settlement will be placed in the joint hands of the Belgian and the Serbian-Croatian governments.

British Tramways and Local Taxation

Voluminous tables showing the profits and losses on municipal undertakings, including tramways, by which the taxes have been reduced or increased, are contained in the annual statement of the borough treasurer of Preston, Lancashire, covering local taxes levied for the year 1923-24 in the principal towns of England and Wales. It appears that in thirty towns the tramways have received aid from taxes, while in nineteen towns the tramways made profits which were contributed to the relief of taxation. This compares with thirty-seven and eleven towns respectively the previous year.

Rotterdam Tramways Receipts

The general meeting of the Rotterdam Tramways has passed upon the general operating accounts for the fiscal year ended Nov. 30, 1923. While the receipts for the year amounted to 6,338,688 florins, those in the last six months were but 2,381,758 florins.

Prague Street Railway Shows Profit

The electric light and street railway properties of Prague, Czechoslovakia, which are municipally owned and operated, earned a net profit for the city treasury of 4,746,000 crowns (1 crown equals approximately 3 cents at current exchange) during the calendar year 1922, according to the report of operations which the city has recently made public. Gross revenues from both sources combined during that year amounted to 268,872,000 crowns, combined operating expenses to 229,436,000 crowns, and gross profits were 39,436,000 crowns. Of the latter amount 14,954,000 crowns went for interest on loans and amortization and 19,736,000 crowns for depreciation, leaving the net profit indicated above.

The operating statement shows that the electric street car lines had gross revenues of 135,700,000 Czechoslovak crowns and total expenditures of 134,700,000 crowns.

According to the city record, these properties have yielded uninterrupted net profits in varying amounts since 1904. These two properties, as well as the city gas and water works, are subject to a first mortgage under the $7,500,000 city of Greater Prague fifty-year 7½ per cent bonds, issued in the United States in the spring of 1922, simultaneously with £1,500,000 issued in London under the same conditions. The operating results of the street railway and electric light properties are therefore of more than casual interest to American readers.

The city's financial estimates for the operation of these properties in the year 1924 have not yet been completed. Projects that will probably be carried out during the year include extensions of street railway lines to suburban districts, the installation of certain new transmission lines, the possible establishment of electric bus lines as "feeders" in outlying districts, and in the power plants a replacement of steam engines by steam turbines. At the present time the Ringhoffer Works, in Prague, is engaged on a contract for the delivery of thirty electric motor cars for the street railway lines.

Diesel Engines for Automotrices

Since the International Tramways Congress to be held in Paris in 1924 is to discuss the development of the automotrice as a supplementary feeder for electric and railway lines, the Swiss firm of Sulzer Frères is coming forward with the heavy oil Diesel motor idea for this purpose. Recent developments of this firm include a 200-hp. engine, of which two have been built and are soon to be operating on the mountain system of the Société Régional du Val de Travers. The Swiss Federal Railways proposes to make use of a somewhat more powerful unit. The same Swiss firm, through its French affiliation, is also experimenting with a similar motor for use in the French colonies, to run on any of the vegetable oils produced in considerable quantities. This is another development of the idea that France should be self-sustaining. The automotrices of Morocco at present are operated entirely with gasoline, largely from United States sources.

Paris Underground Extension

The new spur of the Paris Metropolitan Underground, running from the Invalides station of the Opera-Auteuil line to the Croix-Rouges-Sevres station of the Nord-Sud line, is now open for service. The line will ultimately be opened to the Place de la Republique, some 2 miles distant, on which section work has already greatly progressed, and would have been completed except for the lull caused by the war and the adjustments of credits since that period.

Glasgow Tramway Extension

In the latter part of December the Glasgow tramways were linked up with the lines in Coatbridge and Airdrie, towns lying a few miles to the east of Glasgow. While these lines were acquired some time ago by Glasgow Corporation, the construction of a connecting link has only recently been completed, so that the lines might be operated together.

Change-Giving Machines in London Stations

The latest device to be adopted by the London Underground Railway for accelerating the booking of passengers is the change-giving machine. This new machine, which has been installed at a number of stations, coupled with the "automaticket" and "rolltic" ticket-issuing machines, makes the process of issuing tickets and supplying change a very rapid one. If, say, half a crown is tendered for a 2d. ticket, the pressing of a button of the automaticket machine delivers the ticket to the passenger's hand. At the same time the half-crown coin is inserted into the change-giving machine, and pressing two keys causes it to eject 2s. 4d. Tests show that the operation of supplying a ticket and change can be carried out in four seconds.

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Financial and Corporate

Properties to Be Separated

Electric Railway Securities Company Will Take Over Railways Included in Commonwealth Company

As the final step in a program begun nearly two years ago for the separation of the ownership of the power and light properties from that of the electric railways of the Commonwealth Power, Railway & Light Company, Grand Rapids, Mich., the stockholders are being notified of a plan to distribute one share of common stock of the Commonwealth Power Corporation and one-half share of the Electric Railway Securities Company, a new holding company, for each share of Commonwealth Power, Railway & Light Company common stock. The power corporation will represent ownership of the power and light properties and the securities company will represent ownership of the street and interurban railways.

STOCKHOLDERS AUTHORIZE INCREASE

Preliminary to making this distribution, the Commonwealth Power Corporation is calling a special meeting of its stockholders for Jan. 28 for the purpose of increasing its authorized no par value common stock from 180,000 shares to 200,000 shares. The additional 20,000 shares will be delivered to the Commonwealth Power, Railway & Light Company at $35 per share under a contract entered into Nov. 27, 1922, for the acquirement of the United Appliance Company and coal properties now being operated in connection with Commonwealth Power Corporation properties. The Commonwealth Power, Railway & Light Company has contracted to sell the 20,000 shares to Hodenpyl, Hardy & Company, Inc., New York, at the same price. This sale does not carry with it any stock in the Electric Railway Securities Company. The $700,000 thus realized together with other assets will provide for the company's outstanding indebtedness.

An initial dividend of $1 per share has been declared upon the common stock of the Commonwealth Power Corporation for the quarter ending April 30, payable on May 1 to stockholders of record April 18, 1924.

The Commonwealth Power, Railway & Light Company was organized in 1910 and acquired control of important power, light and electric railway properties principally in Michigan, Ohio, Indiana and Illinois, and developed them to a high state of efficiency. Its favorable progress was interrupted by abnormally high costs due to the war, and its effects, which were especially severe upon the railway properties, and the separation of the power and light properties from the railway properties was determined upon in May, 1922, to enable the company better to finance its requirements.

Warrant Basis Again in Seattle

The Seattle Municipal Street Railway went back on a warrant basis for a four-month period on Jan. 10, following a decision of the Seattle Clearing House Association that the lines' warrants should be honored over that period. According to E. L. Blaine, chairman of the finance committee of the City Council, the losses sustained by the railway department last spring and summer, when the 5-cent fare was in effect, are responsible for the present situation. At that time, it was found necessary to make loans from the bond redemption and interest funds to the operating fund, amounting to more than $600,000, a part of which has been paid back.

According to a statement of City Treasurer Ed Terry, the railway department on March 1 will face a deficit of $400,000 in annual redemption payments falling due at that time. In order to meet the payments, it will be necessary to divert daily receipts to the redemption fund, and ask the banks to carry the operating expenses of the lines.

Plans for retiring warrants amounting to more than $375,000 monthly have been worked out by Mr. Blaine and D. W. Henderson, superintendent of railways, so that each bi-monthly warrant issue will be retired before the end of the four-month period. The last issue, covering operating expenses payable on April 25, will be retired on May 1, and on May 10 the department will be back on a cash basis, Mr. Blaine states.

Payment Made on Toledo Bonds

Payment of a 25 per cent distribution on the bonds of the Toledo & Western Railroad, Toledo, Ohio, has been approved by Judge John M. Killits in the Federal Court at Toledo. The property was sold at receiver's sale to the Doherty interests some months ago. The price was $600,000. The present distribution will be $250 on each $1,000 bond of the Toledo & Western Railroad first mortgage bonds, but does not include the bonds of the Toledo, Fayette & Western. There were $1,250,000 of the Toledo & Western and $250,000 of the Toledo, Fayette & Western first mortgage bonds outstanding. The present distribution amounts to approximately $312,500.

Reorganization of the company has been delayed another month while several plans are being worked out. The receivers are still actively in charge of the road.

Nevada County Traction Seeks to Abandon Service

The Nevada County Traction Company has applied to the California Railroad Commission for authority to remove its tracks and abandon service in the cities of Grass Valley and Nevada City.

The applicant sets forth in its petition that due to the diversion of traffic to the private automobile and the motor bus its revenue is not now sufficient to pay the cost of power used in operating the line between Grass Valley and Nevada City. Its equipment is in such a state of disrepair that it is now impossible to render either safe or efficient service.

The company applied to the Board of Supervisors of Nevada County and the City Councils of Nevada City and Grass Valley for consent to abandon its entire system and trackage, which consent was granted conditional upon substituting therefor a motor bus service.

The board of directors of the company has refused to sanction such a course, and two applicants having applied to the Railroad Commission for certificates to operate motor bus service between Grass Valley and Nevada City, the traffic will be served in case either applicant is granted a certificate to operate such a service.

Financing New Work a Problem at New Orleans

Following the meeting of the board of directors of the New Orleans Public Service, Inc., on Jan. 11 R. S. Hecht, chairman of the board, issued a statement in which he pointed out some of the obstacles standing in the way of obtaining the money needed to cover required construction as set forth in the estimates submitted by the engineering and executive committee.

Anent this matter Mr. Hecht is quoted as saying:

> The board is dealing with a difficult problem in finding the money for these requirements, inasmuch as the company's new 5 per cent bonds, which a year ago were sold at 90 are now selling on the market at 82, and to float any additional bonds of that issue would not only further depress the market, but would grealy increase the cost of the new money.
>
> While the executive committee has not met to determine these matters, there is every indication that, even after some curtailment, the reasonable requirements for new work and equipment will amount to from $5,000,000 to $6,000,000 this year. Substantially the same amount was expended for new work and additional facilities in 1923 out of the funds provided for at the time of the reorganization.

At a conference held on Jan. 12 in the office of Commissioner Murphy, of the Department of Public Finance, at which there was a full representation of the Commission Council, with the exception of Mayor McShane, it was agreed that a meeting be held later in the month with the officials of the Public Service, Inc., to receive their plans for financing the additional equipment desired by the New Orleans Public Service, Inc.

The corporation is seeking authority

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to get the needed money for betterments and improvements, but whether this will take the form of additional stock or bond issues has not yet been determined. The Commission Council is disposed to favor the issuance of bonds, as the law of Louisiana prohibits the selling of stock at less than its face value. This is also in keeping with the agreement with the city.

Auction Sales in New York.—At the public auction rooms of A. H. Muller & Sons there were sold on Jan. 16 ten shares of North Carolina Public Service Corporation preferred, $86 a share.

Deficit in November.—The Tacoma Municipal Street Railway, ("Tide Flats" line) Tacoma, Wash., earned an operating income of $8,450 during November, 1923. There was a deficit, however, of $3,137 after all operating depreciation and debt charges were made against the line.

Dividend Declared in Madison.—The Madison Railways, Madison, Wis., has declared a semi-annual dividend at the rate of 7 per cent together with a bonus at the rate of 1 per cent per anunum on the full paid preferred shares of the stock of that company issued subsequent to March 1, 1922. The dividend is payable on Feb. 1.

Meeting Called to Consider Dissolution.—A meeting of stockholders of the Tiffin & Fostoria Railway has been called for Jan. 21 to consider acting upon the "proposed dissolution of said corporation and the surrender and abandonment of its corporate charter and franchise." The company operates a 14-mile line connecting Tiffin and Fostoria, Ohio.

Gold Bonds Offered.—Halsey, Stuart & Company, New York, are offering at 98½ and interest yielding more than 6.58 per cent $2,000,000 of the first mortgage lien 6½ per cent gold bonds, series D, of the Kentucky Utilities Company, Somerset, Ky. The bonds are due Sept. 1, 1948, and are non-callable prior to Sept. 1, 1933. The Kentucky Utilities Company, with its subsidiaries, serves sixty-one communities in Kentucky, Virginia and Tennessee with one or more classes of public utility service.

Sale of Power House Property Confirmed.—Judge Julius Mayer, in the Federal District Court, has signed an order confirming the sale of the power station of the New York Railways at First Avenue and Ninety-sixth Street, New York City, to the New York Edison Company. The property was sold as a result of foreclosure proceedings.

Oversubscription of Stock Offering Gratifying.—Employees of the New York State Railways recently oversubscribed the recent offer of a limited amount of the company's stock. Six hundred shares had been offered to the employees and as the company had no stock for sale it was, therefore, in no way benefited other than through the closer relationship thus established with its employees. James F. Hamilton, Rochester, N. Y., president, has expressed his gratification over the result of the stock offering. To those who were unfortunate enough to be too late to receive the stock an opportunity will be extended under the same terms and conditions except that the stock will be purchased in the open market and at the best price then obtainable.

Purchased Line in Operation.—The Bryan-College Traction Company, recently organized at Bryan, Tex., has taken over the operation of the interurban line from Bryan to College Station, site of the Agricultural & Mechanical College of Texas, about 5 miles distant from Bryan. Officials of the company report that bus competition has not interfered with operation of the line. The officers of the company are: Eugene Edge, president; E. H. Austin, vice-president; J. M. Gordon, treasurer, and James Sullivan, secretary. The company purchased the line and equipment from S. D. Hunter of San Antonio last July when the property was sold under foreclosure. Preparations had been made to junk the line.

Approval of $750,000 Second Mortgage Sought.—The New York Transit Commission on Jan. 14 held a hearing on the application of the Eighth Avenue Railroad, New York City, for permission to place a second mortgage of $750,000 upon its carhouse property on the west side of Eighth Avenue between Forty-ninth and Fiftieth Streets. This mortgage, if approved, would either secure existing certificates of indebtedness to the same amount, of which $611,200 is outstanding, or would become security for an issue of $750,000 to retire these certificates. In either event, the company would be in a position to obtain $138,000 in cash, the amount of the certificates still held in its treasury, which is needed for improvements. The hearing was continued until Jan. 20.

Line Resumes.—The Shawnee-Tecumseh Traction Company, Shawnee, Okla., which was put out of business by the October flood, is again operating. The owners agreed to restore service if granted an increase in fare to 25 cents. The public went on record in favor of the increase, and the company filed its application with the Corporation Commission for the higher fare.

Railway Abandons System.—Authorization to abandon and discontinue its railway system has been granted by the State Public Service Commission to the Fort Scott & Nevada Light, Heat & Power Company, Nevada, Mo. Evidence was introduced at a hearing before the commission on Oct. 31 at Nevada to show that the system had been operated at a loss during the past six years. The company proposes to substitute buses and operate them at the same fares as paid on the cars.

Holding Company Debentures Offered.—Public offering was made on Jan. 11 of a new issue of $10,500,000 of Standard Gas & Electric Company, Chicago, convertible 6½ per cent gold debentures, due on Jan. 1, 1954. The bonds are priced at 93½ to yield 7 per cent. The underwriting group is composed of H. M. Byllesby & Company, the Federal Securities Corporation, Janney & Company and Hambleton & Company. The purpose of the new issue is to refund three of its maturities, including $2,000,000 of 7 per cent gold notes due in 1925, an issue of $2,500,000 of 7 per cent convertible bonds due in 1937, and an issue of $2,695,000 of 7½ per cent bonds due in 1941. The company operates about 40 miles of electric railway through its ownership of the Northern States Power Company.

Net Income Falls Off.—The Department of Street Railways, city of Detroit, realized a total revenue of $1,886,857 for the month of November. The main item was $1,799,220, derived from transportation. In November, 1922, the total operating revenue amounted to $1,593,120, which included $1,499,984, the revenue from transportation. The total operating expenses for November, 1923, were $1,401,541, against $1,107,092 for the same month in 1922. The net revenue showed a slight decrease, being $486,028 in November, 1922, and $485,316 in November, 1923. The net income fell off from $91,768 to $60,579 in November of the year just ended. In November, 1923, 39,071,049 passengers were carried, against 37,103,301 in November, 1922.

Service Resumed.—Service was resumed on Jan. 13 on the Athol & Orange Street Railway, Greenfield, Mass., temporarily interrupted by the canceling of its liability policy by an insurance company. The restoration of service followed an arrangement by townspeople to assume the liability risk, the amount of which had been scaled down by the receiver.

City Retains Engineer for Appraisal.—H. H. Buckman, local engineer, was recently retained by the city of Jacksonville, Fla., to make an appraisal and valuation of the physical properties of the Jacksonville Traction Company and audit its books in the preparation of the city's defense to the company's application to the State Railroad Commission for an increase in fares. The city's side of the rate question will be heard on March 4.

$500,000 Judgment Against International Railway Reversed.—The International Railway, Buffalo, has been held not to be responsible for the payment of a note for $500,000, signed by the International Traction Company to the Bankers Trust Company, which, with the Guaranty Trust Company and others in New York City, advanced money for construction. The decision of the Appellate Division reverses the judgment awarded to the Bankers Trust Company by the Supreme Court in 1922, and dismissed the complaint on the ground that the trust company failed to provide any legal cause of action. The International Traction Company was a holding company controlling all of the stock of the railway which it pledged as collateral for loans and then defaulted in the payment of interest.

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Traffic and Transportation

Ten-Cent Fare in Warren, Ohio, Authorized

The City Council of Warren recently adopted a new franchise for the West End Traction Company, which had received permission to abandon its lines in the Warren-Youngstown district.

The franchise provides a fare within Warren of 10 cents cash, six tickets for 50 cents, and in the Warren zone of the interurban line a fare of 15 cents cash, ten tickets for $1. The cash fare is an increase of 5 cents, in each case.

The West End Traction Company, a subsidiary of the Pennsylvania-Ohio Electric Company, filed its abandonment petition with the Public Service Commission on Oct. 6. The commission authorized the termination of service from Youngstown to Girard, Niles and Warren on Jan. 1. The cities of Warren, Niles and Girard, in Trumbull County, later petitioned the commission to delay until Feb. 1 the abandonment of service.

The company consented to the modification of the commission's order with the understanding that increases in fare would be granted to permit operation to continue.

General Butler Will Clean Up Traffic, Too

General Butler, the new Director of Public Safety of Philadelphia, Pa., has a plan looking toward the relief of traffic congestion in the central section of the city. Under present conditions the main highways, Chestnut, Market, Walnut and Arch Streets, are constantly congested because motorists will not turn north or south to less-traveled highways when approaching the center of the city. Mr. Butler's plan would require them to make wide detours when approaching from the west and to enter the business districts by roundabout routes, thus spreading the traffic. Charles B. Hall, president of the City Council, said that the Council would co-operate with Mr. Butler in imposing rigorous parking regulations and speed limitations. He said that a conference would be held very shortly, attended by the Mayor, the City Solicitor, Transit Director Ehler's and the president of the Council, at which a survey of the transit situation would be made and plans discussed for an early start on construction of the Broad Street subway and the Chestnut Street line.

The Council will shortly pass a resolution providing for the appointment of a Transit Commission, of which the Mayor will be chairman and City Solicitor Gaffney vice-chairman The commission will be made up of one member of the Council from each of the eight districts, representatives of transportation companies and of civic and business organizations.

Return to Former Fare in Connecticut in Prospect

It is the intention of the Connecticut Company to return to the fare rate in effect up to April 1 of last year, when a voluntary decrease from three tokens for a quarter to two for 15 cents was put into effect. So after Feb. 10, the public will be called upon to accept three rides for 25 cents. The news of the impending increase was noted in the Connecticut papers for Jan. 17, but the formal announcement of the company with respect to its reasons for the change was not expected to be made until Jan. 19. It is understood that the company will claim that the voluntary decrease given last April was made in the belief that operating costs would not increase and that the lower fare would result in more general riding. It is stated that the company has been disappointed in both these expectations, because costs have taken a bound through necessary wage increases and what little extra use of cars was brought about by the two-for-fifteen rate has not been great enough to meet the falling off in revenue resulting from this lower fare.

More Trainmen Under New Seattle Policy

In order to carry out the "one day's rest in eight" policy for trainmen on the Seattle Municipal Railway, eighty student motormen and conductors have been engaged to take up training in handling the municipal line in Seattle. The fight for a day off was carried before the City Council budget committee last fall and was won by the trainmen's union. In the future, all men who handle Seattle cars will be known as "trainmen," with odd numbers assigned to conductors, and even numbers to the motormen. Operators of one-man cars will have numbers higher than 1,000, according to the recent issue of new badges. Numbers are being issued in the order of seniority.

Vote Against the One-Man Car

The City Council of Hartford, Conn., has legislated against the use of the one-man car there by the Connecticut Company. The vote was taken on Jan. 14. The measure passed eleven to eight. The company is given six months' time in which to supplant the one-man cars.

Fight on Five-Cent Fare in Akron

City officials of Akron, Ohio, are preparing to take steps to prevent the increase in fare from 5 cents to 7 cents on the lines of the Northern Ohio Traction & Light Company. The company has filed the tariff calling for the increase which is to become effective on Feb. 1. Mayor Rybolt called a meeting of the councilmen as soon as he had heard that the company had asked for the increase and said that he stood exactly where he did before election, namely, for cash fare not exceeding 5 cents. Councilman Ross said that he would introduce an emergency ordinance making it unlawful for any transit agency to charge fares higher than 5 cents in Akron. A. C. Blinn, vice-president and general manager of the railway, on the day on which the new rates were filed sent a letter to the Mayor and the members of the Council telling them of the company's plans for the current year with respect to improvements and the necessity for securing money to carry out these plans. On Jan. 9 the company refused an extension of its franchise requested by the City Council declaring that the expenses for extensions and other needed improvements made it impossible to operate successfully on a 5-cent fare.

Fares Lowered.—City fares have been reduced from 10 to 7 cents by the Toledo, Fostoria & Findlay Railway in Findlay, Ohio. The company operates an interurban line.

Helping to Decrease Accidents.—The Milwaukee Electric Railway & Light Company as an experiment has placed along some of the principal streets used by its cars flashing red lights suspended from the trolley wires above the crossings which are visible from whatever direction autoists may be approaching. These signals warn them in plenty of time to decrease their speed before reaching the car tracks.

Will Use One-Man Cars.—One-man trolley cars are to be used in the future on the Medway, Uxbridge and Hopkington lines of the Milford & Uxbridge Street Railway, Milford, Mass. Bus competition has made the change imperative.

Weekly Pass in Effect.—Weekly passes, good over its own lines between points in Beech Grove and Shelby Street and LeGrande Avenue, at a cost of $1 for the week have been established by the Beech Grove Traction Company, Indianapolis.

Increased Fare Sought.—The Shawnee-Tecumseh Traction Company has applied to the Oklahoma Corporation Commission for authority to charge a 25-cent fare between the two cities. The increase in fare has been agreed to by citizens of the two cities on account of the loss in revenue to the company due to recent flood damage. Service has been restored on the interurban lines between Shawnee and Tecumseh, after interruption of service on account of disastrous floods last October.

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Personal Items

M. A. Pooler Promoted to Vice-President

M. A. Pooler, general manager of the New Brunswick Power Company, St. John, New Brunswick, Canada, has in addition been elected vice-president of the company. Mr. Pooler assumed the duty of manager of the St. John property in the summer of 1922, severing his seven years connection as general manager of the Potomac Public Service Company. His utility associations also include service with the Pennsylvania-Ohio Power Company of Youngstown, Ohio, which furnishes electric railway, electric light and power service. Mr. Pooler was graduated from Purdue University in Indiana and from the Case School of Applied Science of Cleveland. The New Brunswick Power Company, which operates the local electric railway, is controlled by the Federal Light & Traction Company of New York.

Messrs. Allen, Sylvester and Lunda Promoted

Promotions to four executives connected with the electric railway and other departments of the Wisconsin Public Service Corporation are announced by J. P. Pulliam, vice-president and general manager of the company. They were made to fill vacancies created by the appointment of C. E. Warwick to the newly formed post of director of safety with headquarters in Green Bay. Mr. Warwick was formerly superintendent of the electric railway department of the company.

Gratified with the results achieved by its electric railway department in the safety campaign, the company now plans to adopt similar safety practices and rewards for the electric, power and gas departments, which work will be furthered and supervised by Mr. Warwick. Later on the gospel of safety will be established in the corporation's properties located in Oshkosh, Sheyboygan, Marinette and Menominee, Mich.

C. H. Allen, acting superintendent of the Green Bay division of the electric railway department, has been appointed superintendent to succeed C. E. Warwick, while W. H. Sylvester, formerly in charge of the electric department at Green Bay and for some time past acting superintendent of the Manitowoc division of the electric railway department, has been appointed superintendent of the Manitowoc & Northern Railway lines furnishing interurban service between Manitowoc and Two Rivers.

E. M. Lunda, who has been employed as equipment engineer for the electric railway lines, has been appointed master mechanic for the Green Bay and Manitowoc divisions, which furnished both city and interurban electric railway service.

Fred E. Schornstein Resigns from Eau Claire Property

Fred E. Schornstein has tendered his resignation as district manager of the Wisconsin-Minnesota Light & Power Company, Eau Claire, Wis. It is understood that he will leave within a short time for an Eastern city to take up duties of a similar nature. As district manager of the company Mr. Schornstein had supervision over the electric light and power supply in Eau Claire, Chippewa Falls and numerous other cities and towns throughout that section of the state. He also had supervision over the electric railway department operating the city service in Eau Claire and an interurban line in Chippewa Falls, Eau Claire and Altoona.

F. E. Schornstein

"Major" Schornstein, as he is known, came to Eau Claire in November, 1920, after being transferred from the company's properties at Red Wing, Minn., where he was in charge of the company's electric light and power department for three years. He was born in Cleveland and worked for several years in various capacities connected with the public utility business.

C. M. Shaw Made Superintendent at Montreal

Announcement has been made by Col. J. E. Hutcheson, general manager of the Montreal Tramways, that C. M. Shaw had been promoted from the position of assistant superintendent to that of superintendent, replacing the late A. J. Gadoua. Taking Mr. Shaw's position is W. Branchaud, who was secretary of the traffic department.

Mr. Shaw entered the service of the Tramways in 1903, as clerk in one of the offices. Later he was transferred to the head office and passed through several promotions before becoming head of the schedule department. He next was made assistant superintendent. Mr. Branchaud started in the accounting department.

Messrs. Mellinger and Stahle Promoted at York

Jacob H. Mellinger, who has been assistant superintendent of the York Railways, York, Pa., since 1906, has been made superintendent, and James A. Stahle, another employee, has been promoted from dispatcher to assistant superintendent.

Both promotions were made in recognition of faithful and efficient service rendered over a period of many years. Mr. Mellinger entered the service of the company in 1882 as night foreman in the carhouse. He was promoted to the superintendency in 1895 and remained at that post until 1906, when the financial holdings of the concern were taken over by Brown Brothers, Philadelphia. At that time the personnel of the company was rearranged and Mr. Mellinger was given the title of assistant superintendent.

Mr. Stahle entered the employ of the railway twenty-one years ago as a motorman.

Changes in Personnel of Northwestern Pacific

W. J. Cummings, district freight and passenger agent of the Northwestern Pacific Railroad at Eureka, Cal., has been promoted to assistant general freight and passenger agent with jurisdiction over the entire property. G. H. McMullin, superintendent of the southern division with headquarters at Sausalito, will be superintendent of the northern division with headquarters at Eureka, succeeding W. J. Hunter, who, having reached the age of seventy, has been placed on the company's honor roll. M. L. Gillogly, heretofore industrial assistant to the president and general manager, is to be superintendent of the southern division with headquarters at Sausalito, and T. F. Allen, who has been supervisor of transportation, will be assistant superintendent with the same headquarters. G. H. Hicks, valuation and property engineer, has been appointed chief engineer in charge of all engineering work.

The Northwestern Pacific Railroad operates approximately 40 miles of electric railway connecting Sausalito, San Rafael, Manor and Mill Valley.

Obituary

Edward G. Riggs, since 1913 executive assistant to the president of the New York, New Haven & Hartford Railroad in charge of public relations, died on Jan. 17. Mr. Riggs was sixty-eight years old. He was on the staff of the New York *Sun* for many years, writing on politics and finance.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Relative Durability of Various Commercial Woods

Among the native woods of the United States, black locust and osage orange are the most durable. When exposed to conditions which favor decay, they will probably last almost twice as long as white oak and from three to four times as long as red oak, according to information recently published by the Forest Products Laboratory. Bald cypress, redwood, catalpa and most of the cedars are also highly durable. Douglas fir, longleaf pine, the white pines, and western larch average only a little less durable than white oak, but hemlock, fir, loblolly, lodgepole and western yellow pine are considerably less durable. Practically all sapwoods have very low durability.

There are not enough records in existence on some of the woods to permit compilation of conclusive data, therefore the durability figures given in the accompanying table are subject to correction. They are based, however, on the most complete data obtainable, supplemented by observation and expert opinion from many sources.

RELATIVE DURABILITY OF U. S. COMMERCIAL WOODS

White Oak Taken as 100 per Cent

CONIFERS	
Cedar, eastern red (juniper)	150-200
Cedar, southern white	80-100
Cedar, other species	125-175
Cypress, bald	125-175
Douglas fir (dense)	75-100
Douglas fir (average mill run)	75-85
Fir (the true fir)	25-35
Hemlock	35-55
Larch, western	75-85
Pine, jack	35-45
Pine, longleaf, slash (Cuban)	75-100
Pine, Norway	45-60
Pine, pitch, sugar	45-55
Pine, shortleaf	60-80
Pine, So. yellow (dense)	80-100
Pine, western white	65-80
Pine, white	70-90
Pine, western yellow, pond, loblolly, lodgepole	35-50
Redwood	125-175
Spruce, Engelmann, red, Sitka, white	35-50
Tamarack	75-85
Yew, Pacific (western)	170-
HARDWOODS	
Ash	40-55
Aspen	25-35
Basswood	30-40
Beech	40-50
Birch	35-50
Butternut	50-70
Catalpa	125-175
Chestnut	100-120
Cottonwood	30-40
Elder, pale	25-35
Elm, cork (rock), slippery	65-75
Elm, white	50-70
Gum, black, cotton (Tupelo)	30-50
Gum, red	65-75
Hickory	40-55
Locust, black	150-250
Locust, honey	80-100
Magnolia, evergreen	40-50
Maple	40-50
Mulberry, red	150-200
Oaks, red oak group	40-50
Oaks, white oak group	100
Oak, chestnut	70-90
Osage orange	200-300
Poplar, yellow	40-55
Sycamore	35-45
Walnut, black	100-120
Willow	30-40

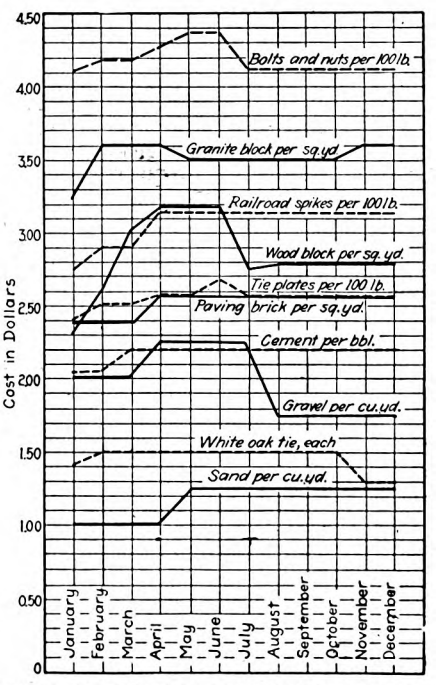
Large Brake Shoe Earnings

Preliminary estimates of the earnings of the American Brake Shoe & Foundry Company for 1923 indicate earnings of between $12 and $15 a share on the common stock. This is considerably in excess of the figures for 1922, when the stock earned $9.60 a share. Dividends have been paid at the rate of $5 heretofore, and it is thought unlikely that there will be any change in this rate or any extra dividend in the immediate future.

Material Prices Are Becoming Stabilized

The cost of the materials entering into the construction of electric railway track showed comparatively little variation during the year 1923. Such changes as did occur took place for the most part during the earlier months of the year. There has been a noticeable trend toward stabilization during the last six months.

Standard steel rails, both bessemer and open hearth, were quoted at $43 per ton throughout the year. Similarly the price of angle bars remained steady at 2¾ cents per pound throughout the year. Tie plates and railroad spikes varied slightly, as shown in the accompanying chart. The price of bolts and nuts rose slightly during the early summer, but soon returned to the same figure that prevailed during the early part of the year. White oak ties fluctuated between $1.30 and $1.50 each.



Price Variations of the More Important Material Used in Track Construction

Paving materials showed slightly greater variation in price than did track materials. Cement was quoted at Chicago at $2.05 per bbl. during January and February, 1923, and thereafter for the rest of the year at $2.20 per bbl. Crushed stone remained constant at $1.75 per cu.yd. Paving brick, wood blocks and granite blocks were quoted at higher figures in December than in January last year.

The price trend, shown in the accompanying chart, indicates a fairly well stabilized level for construction materials. It agrees with the statement on the subject of electric railway general costs quoted in the ELECTRIC RAILWAY JOURNAL for Jan. 5, page 18.

25 per Cent Increase for G. E.—Bath Plant Purchase Denied

For the full year of 1923 the orders received by the General Electric Company, Schenectady, totaled $304,199,746. This is an increase of approximately 25 per cent over the 1922 figures, which totaled $242,739,527. In the last quarter of 1923 the company booked $74,452,422 in new business, as compared with $66,568,333 for the same period the preceding year, or a gain of 12 per cent for the three months.

The company, from its New York office, has denied the report that it was about to acquire the Bath Iron Works, Bath, Me., as an auxiliary plant. It had been rumored that the Bath plant was being sought by the General Electric in the interest of the extension of its turbine building plant.

Air Brush Plant Sold

Good will, patents and all other property of the Dayton Air Brush Company of Dayton, Ohio, were sold at receiver's sale recently in Dayton to George Serapin, Dayton. Operation of the plant, which has been halted for some time, will be resumed by the new owner, it is reported. George W. Simmons, Dayton, was the receiver.

Metal, Coal and Material Prices

Metals—New York	Jan. 15, 1924
Copper, electrolytic, cents per lb.	12.437
Copper wire base, cents per lb.	15.125
Lead, cents per lb.	8.00
Zinc, cents per lb.	6.725
Tin, Straits, cents per lb.	49.125
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.825
Somerset mine run, Boston, net tons	2.125
Pittsburgh mine run, Pittsburgh, net tons	2.00
Franklin, Ill., screenings, Chicago, net tons	1.95
Central, Ill., screenings, Chicago, net tons	1.675
Kansas screenings, Kansas City, net tons	2.25
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.65
Weatherproof wire base, N. Y., cents per lb.	17.50
Cement, Chicago net prices, without bags	$2.10
Linseed oil (5-bbl. lots), N. Y., per gal.	$0.95
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	11.60
Turpentine, (bbl. lots), N. Y., per gal.	$1.02

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Rolling Stock

Community Traction Company, Toledo, Ohio, will purchase twelve trackless trolleys if the Council accepts the recommendation of its special sub-committee on railroads and telegraphs.

Los Angeles Railway plans to purchase 100 cars and construct twenty more in its own shops.

Illinois Traction System, Peoria, Ill., it is reported, has placed an order with the American Car & Foundry Company for 100 box cars.

Track and Line

Memphis Street Railway, Memphis Tenn., is planning two important extensions for 1924. They are the Overton Park Avenue line from Montgomery to Evergreen and the crosstown line on Bellevue south, which will complete this line from Poplar Avenue to Florida Avenue. This will give access across the city from the southwestern section to the northeastern part of the city. This latter extension will immediately follow the completion of Bellevue viaduct.

Pacific Electric Railway, Los Angeles, Cal., has applied to the Railroad Commission for authority to double-track its line along Lake Avenue south of Washington Street in the city of Pasadena.

United Railways & Electric Company, Baltimore, Md., according to H. Findlay French, director of the Industrial Bureau of the Board of Trade, has tentative plans for the expenditure of $1,750,000 during 1924. He says this covers way and structures, rolling stock and power expenditures, the largest amount being for track reconstruction. Several automatic substations will be placed in operation. During 1923, he said, the company spent about $1,185,000, the major part of which was for track and reconstruction.

Los Angeles Railway plans to extend six car lines in 1924 which will involve 10 miles of trackwork. Reconstruction of more than fifty single track miles is contemplated in the coming year. One of the biggest track rebuilding jobs is to be done on Central Avenue from Fourteenth Street to Slauson. The company has on order 2,000 tons of rails, costing $150,000. Substation and other power facilities necessitated by the extension of lines and the increased number of cars will involve an expenditure of more than $200,000.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., proposes to build an extension from its Lakeside power plant west through Tippecanoe and the town of Lake.

Texas Electric Railway, Dallas, has completed an extension of its lines in Waco, Tex., affording service to the Baptist Sanitarium. The extension was built at a cost of $16,000.

Janesville Traction Company, Janesville, Wis., during 1923 rebuilt six blocks of city track and replaced sections of the city with new overhead wires.

Madison Railways, Madison, Wis., spent approximately $40,000 last year in double-tracking and relocating rails and for its share of street paving.

Power Houses, Shops and Buildings

Dubuque Electric Company, Dubuque, Iowa, will take possession of the Ryder Building in July. Besides the general office and display rooms the building will house a recreation center for the employees.

Pacific Electric Railway, Los Angeles, has been granted permission by the Railroad Commission to abandon and remove the waiting station at Second and Hill Streets, Ocean Park, and to substitute a standard type station.

Trade Notes

General Electric Company, Schenectady, N. Y., has appointed Herman W. Schroeder district auditor of the southwestern district, following the recent creation of this district. Mr. Schroeder was first employed as a bookkeeper for the Southwest General Electric Company in 1911. Under the new arrangement he will have charge of accounting, credits and collections in the General Electric southwestern district, as distinguished from the Southwest General Electric Company, distributing jobber.

Henry M. O'Bleness, formerly assistant to the president of the Midvale Steel & Ordnance Company-Cambria Steel Company, Philadelphia, has joined the Central Industrial Service Company, Frick Building Annex, Pittsburgh. This announcement was recently made by W. W. Groves, president of the Central Industrial Service Company. Mr. O'Bleness will serve in the capacity of vice-president and will be active in the management of the business. Prior to his connection with Midvale Steel & Ordnance Company - Cambria Steel Company, Mr. O'Bleness was in the executive department of the Carnegie Steel Company at Pittsburgh.

Springfield Railway Equipment Company, Springfield, Mo., has filed articles of incorporation for the purpose of manufacturing a "car replacer or rerailer" for use in cases of derailment. The shareholders are George B. Orr, George H. Hunter and J. W. Hughes, who comprise the first board of directors.

New City Car Company, Chicago, manufacturer of railroad cars and supplies, has been incorporated with 50,000 shares of preferred stock, $100 par value, and 50,000 shares common stock, non-par value. The New York office of the company is Forks, Erie County.

Bridgeport Brass Company, Bridgeport, Conn., announces that its Philadelphia office has been moved from the North American Building to the Bankers Trust Building.

New Advertising Literature

Driver-Harris Company, Harrison, N. J., has issued a fifty-five page booklet on alloys for electrical resistance. It contains some useful data for the engineer in chart form together with statistics on temperature resistance curves.

Roller-Smith Company, New York, N. Y., has issued Bulletin No. 210, descriptive of ammeters, voltmeters and accessories.

Hasler-Tel Company, New York, N. Y., has issued a pamphlet on the Hasler speed indicator. Besides describing the speed indicator the pamphlet names representatives of 19,493 users of the Hasler.

Dossert & Company, 242 West Forty-first Street, New York, have just received from the press the twentieth year catalog of Dossert solderless connectors for stranded and solid wires, rods and tubing. It marks a very substantial enlargement over previous catalogs in the matter of data and information, brought up to the minute. The book further takes up the subject of putting together a typical Dossert joint—illustrating the process completely. Another innovation is the presentation, on a single page, of twelve of the most frequently encountered types of joints and how they can be made into Dossert joints—illustrating the proper Dossert to fit the joint in question. It is a sixty-four-page book.

Consolidated Car Heating Company, New York, N. Y., has for distribution a limited number of its new wall calendars, published the first of the year. The calendar is illustrated with large and very clear pictures illustrating the details and applications of the company's line of electric car specialties, heaters, bell and buzzer systems, automatic ventilators, pneumatic door engines and other devices. Each month's sheet also includes a supplemental month-preceding and month-following calendar.

Combustion Engineering Corporation, New York, N. Y., has issued Bulletin AH-1, 1923, on the CEC air heater, "a plate type of heater which has demonstrated its ability to increase power plant furnace efficiency through the recovery of a portion of the heat ordinarily lost in flue gases."

Crouse-Hinds Company, Syracuse, N. Y., has issued folder No. 9 on safety panels and cabinets; also Bulletin No. 2054 on condulets of the F. A. series.

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New York, January 26, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 63
Number 4

Main Value of Electrification Is Increased Use of Entire Plant

GRADUALLY the ideas regarding the value of electrification for steam railroads are becoming clarified. One by one the important terminals are being converted to electric operation to eliminate the smoke nuisance and to permit underground entrances to large cities.

Electrification for main trunk lines, on the contrary, has been deferred in many cases because it has not been possible to figure a direct monetary saving as the result of the necessary investment in electric equipment. The commonly made comparison between operation of the existing service with electricity as against steam is to compute the cost of each, figuring the various items as estimated by the engineer in charge, who usually has had years of steam railroad experience but who is relatively unfamiliar with what electric traction can do.

With the improvements that have been made in steam locomotives in the past few years, the one-time large advantage of electric operation in fuel economy has ceased to be, if it ever was, a convincing argument in favor of electrification. Unfortunately, it is on this narrow basis that the decision has frequently been made not to electrify.

Looking at the problem in this way is taking a short-sighted view of a situation that is now confronting the railroads, and that will become increasingly serious as the density of traffic increases. Many of our railroads were constructed originally for much less tonnage than they are now hauling, and the demand for transportation, both freight and passenger, is fast coming to the point where it cannot all be handled. This is almost certain to come from one or both of two main causes—insufficient main line track capacity or inadequate terminals.

Track capacity is determined by the number of trains that can be handled safely over it, and this in turn is a function of the train weight and speed. Each road is almost certain to have a ruling grade, a tunnel, a stretch of single track, or other limiting section that determines the capacity of the entire system so far as through traffic is concerned. Remove this and more trains can be hauled.

The simplest way to increase the capacity is, of course, to construct additional tracks on the limiting section. Due to the very nature of the limiting section, which is determined largely by the topography, this may, however, be difficult, so that remedies must be considered that will increase the ability of the existing tracks to handle cars. No way has yet been devised to do this that can compare with electrification. Making the locomotive a transformer rather than a generator of power removes many of the limitations, both of the physical layout and the movements over it, so that the line can be used more intensively.

The electric locomotive also is particularly flexible, both as to permissible speed and ability to be coupled up in various combinations to adjust locomotive capacity for various loads. Not only can one crew handle the combination but the several units work absolutely in unison. This makes possible a large increase in the tonnage that can be hauled in one train, and in the schedule speed at which it can be moved.

The Lesson of the Virginian Electrification

THE decision to electrify the Virginian Railway, which was the outstanding event of last year in the heavy traction field, well illustrates how the capacity of the plant will be increased. Steam power had about reached the limit on the ruling division of the road. Some of the heaviest Mallet engines in the world were being double and triple headed, and even then the speed up the grade was only 7 m.p.h. for maximum trainloads of 5,500 tons.

This was very good performance under steam operation, but it was not enough. The tracks elsewhere on the system were not working to capacity on account of this division, even though the best thought of locomotive designers and operators had been concentrated on the problem of freight movement. Electrification was the logical answer, for by its application the trainloads will be increased at once to 9,000 tons, and if necessity arises in the future they can be still further augmented to 12,000 tons. Furthermore, the speed on the ruling grade will be doubled. This means that the entire system will have its capacity raised greatly.

The lesson of the Virginian can be applied in many places. Thus it is not merely to handle traffic more expeditiously over the mountain or other limiting divisions that electrification is of value. It is the ability of the electric operation to make possible an increase in the usefulness of the entire plant.

Suppose, for instance, a railroad with a total investment of $100,000,000 has reached its maximum ability to handle traffic. If electric operation, whether for the ruling division only or for the entire system, can double the capacity of the road, the earning power of the entire investment has been increased just that much. If, for instance, the cost of electrification to do this is $20,000,000, it will accomplish as much as the construction of a duplicate steam road for $100,000,000.

Looking at the problem in this way, it is not a question of whether the pounds of coal burned is greater with one system than with the other, or that the maintenance per locomotive is more or less. It is the relation of electrification to the earning power of the entire system that should govern the decision.

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Making the Railway a Good (Not Bad) Advertiser of the Holding Company

IT FREQUENTLY happens that there is included in a holding organization composed primarily of power companies one or more small railway properties.

Because of past performances, these railway properties are sometimes taken over with considerable misgiving at the time of the consolidation, and are treated very much as a doorstep foundling in an unwelcome household. The spirit and appearance of the orphan is quickly reflected in the attitude of the public as the result of the condition of the physical equipment with which they come in contact.

A number of progressive utility managers have appreciated the possibilities of such small railway properties as points of contact for the establishment of favorable public relations, making as they do a very much closer physical contact with the public in a community than do the other utility properties of the company. A comparatively small investment in improved track and new cars is quickly brought to the attention of the public and reacts to the credit of the entire holding organization.

A number of recent examples have been observed in which very gratifying results have been obtained from such a policy in handling the small railway property. On the other hand, failure to appreciate the possibilities of the situation may lead to a general spirit of antagonism toward the entire utility organization. The past difficulties of the railway should not be allowed to influence the judgment of a new management when such a property has been included in some general consolidation program.

Reduction of Noise Has Great Possibilities

A RECENT development in plans for merchandising railway transportation, both in this country and abroad, is the reduction of noise to a point where it is not objectionable to the passengers. While this applies most particularly to subway service, it is in large measure desirable for surface cars also, especially since the bus interests have made a great talking point of the noiselessness of the gasoline vehicle in their "ride on rubber" campaigns.

An article printed elsewhere in this issue describes the tests made on the London Underground and the results obtained. The findings have been applied in the design of new cars.

It appears that much can be accomplished in the way of noise reduction if a careful study is made of the problem. Even though the steel car is admittedly much noisier than the wooden car, its use is necessary in certain cases, such as tunnels and subways, and is desirable elsewhere. The methods now being used in London to deaden and deflect the noise are not especially radical. They consist principally of the insertion of sound-absorbing material in the roof, walls and floor of the car, shrouding of the trucks with leather hoods so as to confine the sound produced in the running gear, and the use of heavy, permanently closed windows. Ventilation is obtained through special devices with baffle plates to keep out the sound.

Had conditions permitted a treatment of the fundamentals of design in order to eliminate the sources of noise an even more vital contribution to the technique of noise prevention might have been made. For instance, the investigation gave proof, if any were needed, that the major source of noise proceeds from the contact of the wheels on the rails. A further line of investigation is thus indicated. A carefully planned series of experiments might well lead to the development of some new type of wheel, truck and gearing that will function as well as the rigid wheels and driving mechanism of the modern car. These, while excellent mechanically, tend to produce a great deal of noise in operation, and a substitute form of drive conceivably might be quite as satisfactory and still much quieter.

Modernization Committees Deserve 100 per Cent Co-operation

MUCH interest has been taken in the work of President Budd's two new committees of the American Electric Railway Association, those on city operation and interurban operation. As it was pointed out in these columns some time ago, the purpose of these committees is to speed modernization, which is felt to be the outstanding need of the industry. While it is yet too early to make any prediction of the good that actually will be accomplished, they have already made a good start.

A number of the other committees of the association have not yet held their organization meetings, but these two have had their personnel completed for more than a month, have worked out a rather elaborate plan for dividing the country into districts, and have sent out letters to every electric railway in the United States and Canada, whether members of the association or not, informing them of the work to be attempted and asking co-operation. Replies are just beginning to come in, and they all indicate hearty agreement with the aims of the committees and assure fullest co-operation. One manager states that if a concerted effort of this kind had been made ten years ago, at least 50 per cent of the interurban companies that have gone by the board could have been saved.

The plan of campaign calls for personal visits to all properties in the country by the regional vice-chairman of the two committees, fourteen in number, covering the seven districts into which the country has been divided. The work has progressed far enough that the first visit already has been made by one of the vice-chairmen of the committee on city operation.

To obtain the greatest good for the industry it is essential that the regional vice-chairman obtain full information on the best practices of the companies they visit. Even though there may be but one small item of outstanding value on a particular property, still it is the function of these men to discover it and pass it on to the other companies. In return, each property will get the benefit of all that is found of value on all the other properties. It is expected that the plan of disseminating such information will be furthered by preparing reports for publication in the technical press of the best material developed, so that it will not be necessary to wait for the presentation of the formal reports to the association before the information is made available.

Altogether, the plan is a very broad-gage one and merits the confidence of all companies. Not only will they be doing something of value to the industry in giving their whole-hearted co-operation, but they will gain much that can be applied directly to their own work, and hence should strengthen their own positions with the public, their employees and the investor.

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Pennsylvania Railroad Builds Three Experimental Locomotives

One of These 200-Ton Engines Is for Freight Service on Alternating Current and the Other Two for Passenger Service on Direct Current—Motors and Mechanical Parts Are Identical to Give Interchangeability

WITH the prospect of extensive main-line electrification, including that of the Altoona grade, before many years, the Pennsylvania Railroad placed in service in the spring of 1917 a split-phase locomotive of 4,000-hp. continuous rating. This locomotive was described in the ELECTRIC RAILWAY JOURNAL of June 9, 1917, page 1048. The war, government control of the railways, and other causes delayed the test of this locomotive, which is now in regular freight service between Philadelphia and Paoli.

The railroad has now designed another type of locomotive for freight service. As an experiment, it is planned to equip the same locomotive for high-speed passenger service simply by changing the gear ratio and control devices.

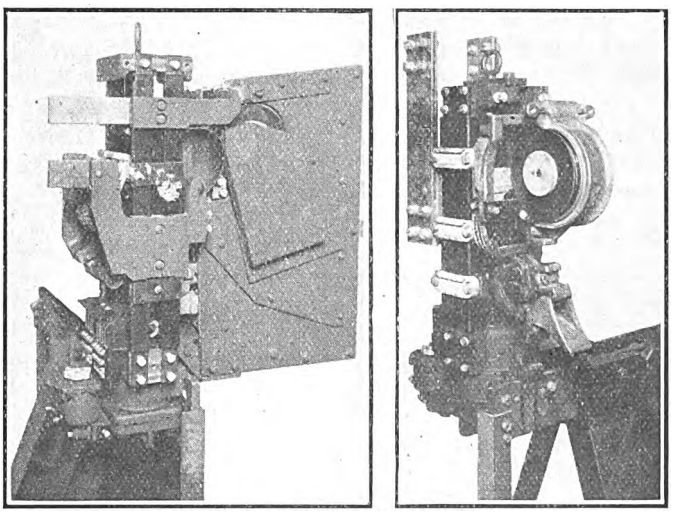
At the company's Altoona shops there are now being built three of these locomotives. The electrical parts have been supplied by the Westinghouse Electric & Manufacturing Company. One is to be used for freight service on the single-phase a.c. trolley, while the other two are to be given extensive tests to determine their adaptability for passenger service, after which it is proposed to use them as d.c. locomotives on the New York tunnel and terminal division of the railroad.

Each locomotive will weigh approximately 400,000 lb. and will be equipped with four single-phase commutator-type motors. These motors have a continuous rating on single phase of 760 hp., giving a total locomotive rating of 3,040 hp.

The locomotives have a 2-8-2 wheel arrangement and the so-called steeple-type cab construction. Two motors are connected to each of the two jackshafts. They are mounted outside, and at either end, of the driving wheelbase. Each jackshaft serves two pairs of drivers.

The single-phase freight locomotive will have a gear ratio of 30:118 and a maximum speed of 35 m.p.h. The two locomotives that are being arranged for d.c. passenger service over the New York tunnel and terminal division will have a gear ratio of 50:98, permitting a maximum speed of 70 m.p.h.

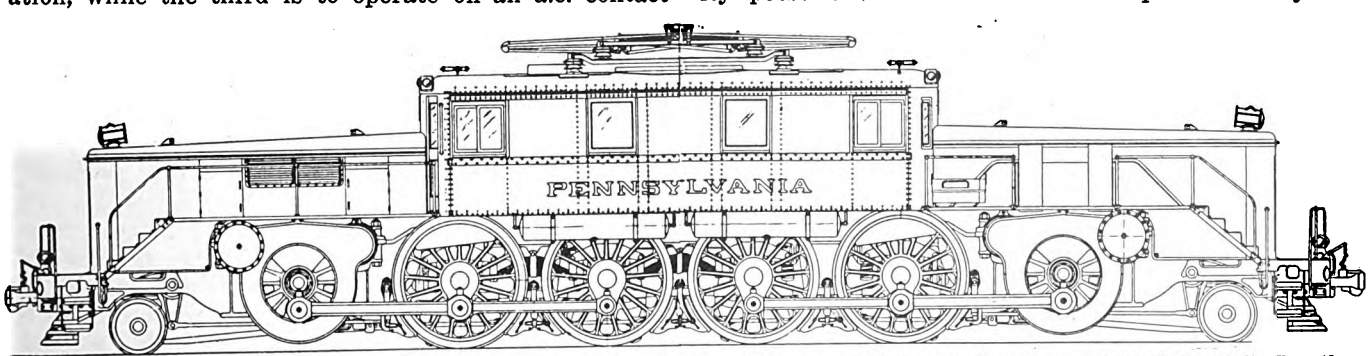
Although two of these locomotives are for d.c. operation, while the third is to operate on an a.c. contact line, the motors and all other parts possible are being made identical. The space required for the transformer on the a.c. locomotive is devoted to accelerating resistance on the d.c. locomotive. The pantograph on the a.c. locomotive gives place to the third-rail shoe on the d.c. locomotive, etc.



Electro-Pneumatic Unit Switches. At the Left, 3,000-Amp. Switch, of Which Twenty-one Are Used for Each D.C. Locomotive. At the Right, 1,500-Amp. Switch, of Which Twenty-one Are Used for the A.C. Locomotive

Side rods will transmit power from the jackshaft to drivers. Flexibility between the motor armature and the running gear will be provided by springs set in the gear center, and flexible pinions in one of each pair of motors geared to their common jackshaft. These springs in the gear center and in the pinion, which are of the leaf type, have been especially devised by the Westinghouse company. They are inserted into their pockets without initial tension, and are so designed that they will be active throughout the operating range of the locomotives.

The outstanding feature of the a.c. freight locomotive is the traction motor, which has the largest capacity possible under the limitations prescribed by the



This 200-Ton Experimental Single-Phase Road Locomotive for Preferential Freight Service for the Pennsylvania Railroad Is Exactly Similar to the Passenger Locomotive

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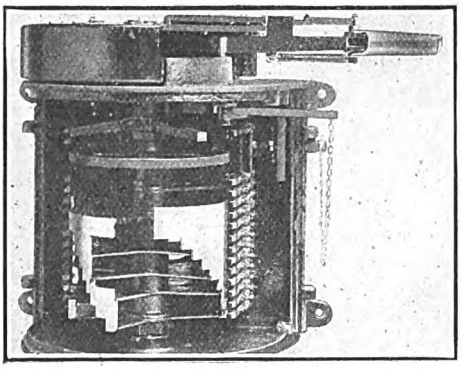
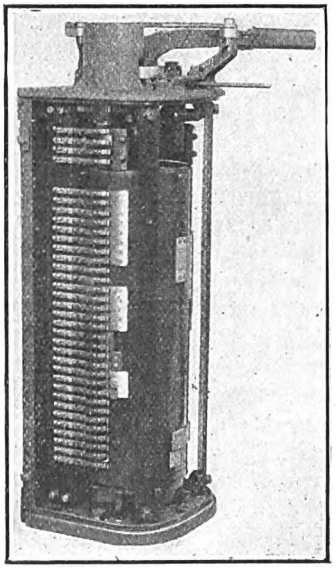
Pennsylvania Railroad, and incidentally the greatest capacity of any single-phase commutator type traction motor ever built in this country. The outside diameter of the frame is 76 in., while the motor is 43¾ in. long. The main frame of the locomotive forms a cradle into which the motor is inserted, thus making the latter an integral part of the main frame. The motor bearings are carried on the locomotive side frames and are entirely separate from the main frame of the motor. In order to maintain the motor rating forced ventilation is employed. Air is drawn through the motors instead of being blown, as is customary.

Another novel feature is the use of an oil-insulated, force-cooled transformer. The transformer tank is built into the locomotive, but is entirely separate from the cab structure. Its base rests on pads on the main frame, while the top is formed by a portion of the cab roof. The sides of this tank are formed from a single sheet of steel, with a vertical riveted seam. The bottom is a cup-shaped piece set into the side sheets and riveted into place. The cover is made integral with the locomotive cab roof, so that the removal of the transformer core can be accomplished by simply removing that portion of the roof directly over the transformer.





The Master Controllers. Above, for the D.C. Locomotive; Center View, for the A.C. Locomotive

The transformer oil will be cooled by being pumped through a forced-ventilated radiator.

The locomotive has three motor-driven blower sets. The one for the transformer has an oil-pump for circulating the oil, while the other two, one for each pair of traction motors, furnish air only. Otherwise the three are identical.

The traction motor control apparatus consists of a master controller, a reverser, the necessary unit switches for a notch-by-notch voltage increase to the normal voltage of the traction motors, preventive coils, and the minimum number of relays consistent with safety. A small motor-generator set is used for charging the control and lighting storage battery. The brake system is of the standard locomotive type. The brake lever system is designed for clasp brakes, giving 100 per cent braking power at the driving wheel. The above constitutes practically all of this very simple locomotive. The locomotive capacity is as follows:

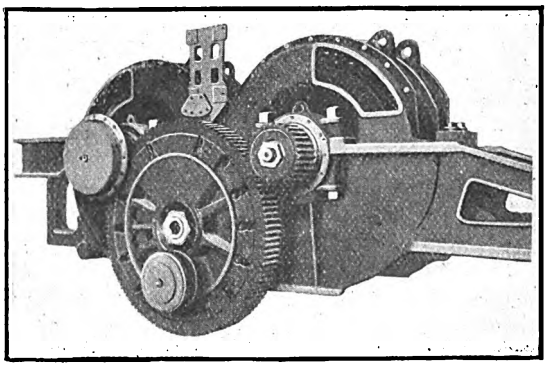
	Continuous	Hourly
Tractive effort, pounds	50,000	62,000
Speed, miles per hour	23	19.75
Maximum tractive effort, pounds (at 33⅓ per cent adhesion)	..	100,000
Maximum speed, miles per hour	..	35

This means that the locomotive is capable of hauling 2,370 adjusted tons up the western slope of the Altoona grade at an approximate speed of 24 m.p.h.

The principal dimensions, which apply to both a.c. and d.c. locomotives, are as follows:

Distance between centers of each pair of drivers	7 ft. 5 in.
Distance between centers of jackshaft and nearest driving axle	8 ft. 2 in.
Driving wheelbase	22 ft. 3 in.
Total wheelbase	54 ft. 11 in.
Diameter of drivers	80 in.
Diameter of leading wheels	34 in.
Length over frame	63 ft. 8½ in.
Length, inside to inside of pulling knuckles	68 ft. 2½ in.
Height, rail to roof of cab	13 ft. 4⅛ in.
Height, rail to top of pantograph when in lowered position	16 ft. 6⅝ in.

The passenger locomotives are of the same fundamental design as the freight locomotives just described. They are intended for operation on the New York tunnel and terminal division, at 600 volts d.c., and are capable of handling the heaviest Pullman train entering or leaving the New York terminal.



Above, Two of the Large Single-Phase Motors Mounted in Cradle, Showing the Springs in the Gear Center

The traction motors are identical with those used on the freight locomotive, and the blower sets are also duplicates. A number of parts on the electrical equipment required for d.c. operation which cannot be made duplicate of the parts on the a.c. engine have been made so as to duplicate parts on the present terminal locomotives. Among these parts may be mentioned the third rail shoes, resistance grids, etc. This will further aid in the ease with which the locomotives can be maintained, and should be a material factor in reducing maintenance costs.

The d.c. locomotives are being equipped with the largest unit switches in existence. These switches are of the standard Westinghouse electro-pneumatic type, and have a continuous capacity of 3,000 amp. The arc rupturing capacity of these switches on a 750-volt circuit is many times this figure. A total of twenty-three switches is required on each locomotive.

These locomotives will be completed and placed in service early this year, at which time it is proposed to make extensive tests to determine the practicability of this type of locomotive both for high-speed passenger and for freight service. If the expectations of the railroad officials are fulfilled, a great advance will have been accomplished in electric locomotive design by this adaptation of one type of locomotive to both freight and passenger service.

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Reducing Noise in Train Operation

In an Extended Series of Tests the London Underground System Has Developed Methods of Preventing Noise from Entering the Cars—Sound-Absorbing Material Placed in Roof, Walls and Floor; Heavy Closed Windows, Special Ventilators and Shrouding of Trucks Are Principal Features Incorporated in New Cars

MUCH progress has been made by the Underground Electric Railways of London, Ltd., in its effort to reduce noise in the operation of trains. A surprising amount of research has been done, and while much remains to be accomplished, the amount of noise incident to the operation of underground trains has been reduced and the ear-piercing sounds have been eliminated.

The experiments have shown that it is not the loudest sounds which cause the most discomfort. Certain frequencies in vibrations are much more annoying. Since a large percentage of the noise comes from the truck, some engineers were of the opinion that the body of the car should be isolated as much as possible from the truck. This was tried, but it was demonstrated that the theory is unsound.

London's tube railways follow the deep blue clay stratum which underlies the city. Under the heart of the city the depth of the tubes varies from 20 to 180 ft. The tubes are driven easily because the clay can be cut with a knife and carries no water. Right-of-way is obtained without cost. The tube, however, is not much larger than the vehicles which pass through it. The noise has little chance to escape, and it is reflected from the walls against the cars.

In deep tubes great care must be exercised to prevent fire. A very little smoke is troublesome and causes great alarm among passengers. For that reason no inflammable material goes into the construction of the cars. The small amount of wood used in the strips on the floor is fireproofed carefully. This has limited the materials which could be used in reducing noise and has added greatly to the difficult work on the electrically propelled cars.

Another factor which has had to be taken into consideration in reducing noise is to do nothing which would promote corrosion. Since some of the materials used in the reduction of noise had that tendency, it was found necessary to overcome it by giving the steel sheets a lead bath. This procedure was found to be more than justified since the plating of lead stopped all corrosion which otherwise would be active in the atmospheric conditions such as exist the year around in the tubes. Another compensation for this treatment is the fact that it makes a splendid base for paint.

As a result of an extensive series of experiments, a number of features were incorporated in the new cars ordered for the tube railways tending materially to reduce the noise. One of the first things noticed in the tests made was that the windows, even when closed, were the passageways for the most intense of the sounds. This led to a material reduction in the size of the window and the use of glass ⅜ in. thick. A narrow strip along the top of the window is made so that it may be opened when the train comes to the surface in the outlying sections. The guards on the train are careful to see that these openings are closed before the train dives down again on its return trip. The ventilators are so constructed that they can be relied upon to furnish all the air needed, no matter to what extent the car is crowded. The air passing through the ventilators follows a circuitous course so that no direct path may be furnished for sound waves.

All sound boxes are eliminated. Wherever the design of the steel tends to form a box which catches and magnifies sound it is packed with mineral wool or some other non-inflammable substance to deaden the noise. The brake rods run on padding. The brake shoes are made of a composition of asbestos and rubber. Quilted asbestos is laid separating all contacts between steel. Layers of this quilted asbestos cover the entire roof and a ⅛-in. layer is placed between the top wooden wearing surface of the floor and the lower plate of steel. The entire car contains a layer of this asbestos, ½ in. thick, on the inside of the body panels. The panel attachments are made with fiber or hard wood to reduce the continuity of vibration.

There has been long experimentation with tires for the car wheels made of soundless materials, but nothing has been found as yet which gives promise of replacing steel for that use. These experiments are continuing. Hope of their ultimate success has not been abandoned. If the noise arising from the contact between the rail and the steel tread of the wheel could be eliminated it is recognized that the principal cause of noise would be overcome.

Deflecting plates have been placed on the sole bar near the bogies to assist in preventing noise rising from them, and the trucks are shrouded with a leather skirt.

Much attention is given to the maintenance of the roadbed. By preserving exact levels much noise is obviated. Incidentally, it has been found very profitable to keep the roadbed in a high mechanical state of perfection, since it reduces greatly the wear and tear on equipment.

How the Noise Was Measured

These noise-deadening features of the new cars were decided on as the result of an extended series of tests made under the direction of Prof. A. H. Low of the Low Engineering Company, Ltd. In the investigation it was found necessary to consider both causes and effects of the noises occurring in tube operation. The pitch was considered in addition to the total amount of noise, on account of its effect in interfering with conversation.

The intensity of the noises was measured by the use of an ingenious device consisting of a trumpet to catch the sound, and arranged so as to cause a diaphragm to vibrate. This vibration operated a mirror, causing a beam of light to play on a sensitized film, much like a reflecting galvanometer.

Almost the first records disclosed that the windows, even when closed, were the passageways for the most

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intense of the sounds, but that by making them small and of extra thick glass the admission of sound could be reduced to a great extent.

One of the conclusions reached was that shrouding of the trucks was a great factor in reducing noise, as a large portion of the sound was generated by the contact of the metal wheels on the metal rails. The shrouding need not be great, but it should slope outward from top to bottom, should not have any air gaps and should be well stream-lined.

If air is not admitted direct, as through the windows, but the intakes are baffled properly, the noise is not seriously increased.

Damping of the panels was found of great advantage, but little difference was seen between felt and asbestos when they are not compressed under boards. Floor damping was not found so essential. For this purpose, however, loose material with a rubber foundation was determined to be the best.

Results of the Engineering Investigation

The following extracts from the original report of Dr. Low to the company cover the principal features investigated:

For practical purposes it is not possible mechanically to construct various parts to such limits as would avoid sounds of all kinds, when the source is so completely inclosed as in the average tube railway. It is, therefore, necessary to realize that all that can be done, while reducing the wave production as far as possible, is to insulate the passengers against excessive sound.

In cases such as are experienced in the tube railways there is usually a complete conflict of sound and noise, and the resulting oscillations of the atmosphere are such as to be without any definite wave slope. This renders it necessary to attend to every detail of sound, however apparently trifling. Total oscillation is reasonably easy to distinguish to the average ear, and therefore an audiometer of the damped diaphragm type is sufficient to measure total sounds and noise and to approximate the wave shape, with the ultimate object of tracing the sources and paths of the vibrations.

On the London Underground Electric Railways there is a general tone of noise which is very typical. On a photograph taken by the audiometer it was found to consist largely of two self-damped waves, occasionally beating together, but more often reflected after an original beat or resonance effect. This is quite clearly the result of one particular note undergoing reflection at different points of the containing tube's surface or support, and the use of a plain stethoscope confirms the opinion. This was checked by tapping a stationary carriage.

The floor does not reproduce the main note to any extent, and when damped with ½-in. asbestos no noticeable improvement is obtained. On the other hand, the roof, windows and sides, bare or covered, reproduce the exactly typical "tube roar" showing a far higher and more varying period than the floor. The floor vibration is quite slow. This was checked by a vibrometer. It was not to be expected that covering the walls would assist matters as much as an insulator, because no close contact can be obtained and the sound is reproduced and amplified via the air spaces, often in such a manner as to resound with the main noise. Opening the windows merely increases the main note, and by damping the air inlet or using ventilators separated by a sufficient distance to prevent direct sound connection, allowing for car speed and windage, an improvement results, sound being comparatively slow in its movement.

The windows and ventilation openings cannot be conveniently doubled or blocked out. It is quite simple, however, to produce artificially, as by the movement of the train, a sufficiently high blast of wind to prevent effective sound transmission; also to rubber-insulate the windows and increase their actual rigidity by thickening the glass and adding double-padded posts.

The majority of the noise can be itself divided into three classes:

1. Wheel and rail shock.
2. General loose rattle.
3. Motor and gear noises.

These three individual wave forms are very much interdependent, and both original and resultant noises are blended and selected by reflection, resonance and reverberation.

The motor noise, type 3, is caused by the wheel jumping and consequent rock of the motor toe, with horn-plate movement, etc. Apparently better results may be obtained by using helical gears and impinging a jet of oil on the actual point of contact at entry. Insulation of the motor is important, but this class of noise, when transmitted, is of too high a periodicity to be objectionable at a later stage.

Noise wave, type 2, is due to many details which can be corrected with relative ease. Rubbing bars should be kept in permanent contact by flat intention springs. Axle boxes can be held to the horn-plates in the same manner, but, better still, a floating type of axle with radius rods would be simple, cheap, silent and easy of maintenance and lubrication. Looseness of the actual axle bearing is not in itself serious. All brake and car couplings can be held by springs, in order that the first operative movement will serve only to compress the spring and take up slack. No difference would be made in the working, and the blended noise rattle would be obviated, particularly if straight coupling could be adopted.

Wheel and Rail Shock Causes Most Noise

Wave type 1, that of wheel and rail shock, is far the most serious source of irritation and is greatly aggravated by the formation of both longitudinal and transverse vibrations within the tube itself. The particular form of damped oscillation produced is of low frequency, and it is so irregular that it is capable of resounding and combining with notes and noises of pitches varying over a wide range. In consequence, the slightest rail vibration, excluding rattles, is communicated to the "rolling wave" and produces recurrent reverberation and resonance.

To illustrate this point an experiment has been conducted with a plain reflection tube of 3 in. diameter and 3 ft. long. When such a tube is struck by a hammer or a ball rolled down its length a distinct "tube" rumble is obtained. This disposes of the suggestion that local windage obtained by drilling the main girders, or that the motor or other self-contained noises on the train can possibly produce the chief resonance which is so objectionable. If the tube model is struck centrally by a hammer a node is formed at some distance, and the same may apply to the rail itself, which, magnified, presents a series of serrations.

From this and other experiments with the model tube Professor Low draws the conclusion that if the speed of sound in the tube is compared with the speed of travel,

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at fairly high speeds the roar can easily be due to a beat between the roof and the tube-reflected sound and the wheel roll.

It has already been proved by a stethoscope that the floor and lower sides do not transmit much noise. Damping the floor with asbestos gives little improvement, and yet if windows and ventilators are closed there is a vast improvement from the addition of packing.

If in the prepared carriage a bay is left uncovered, the noise from the sides is not much greater when in contact, but at the center of the carriage the noise is far worse. On the contrary, if the roof and all sides are covered a still greater improvement takes place.

Unless the air pressure falls rapidly enough to break the wave, it is noticeable that except at such points the station gaps do not cure the sound, though with shrouded bogies the reflection time is greater and consequently the improvement is disproportionately increased. This suggests that if the lower wheel-carrying portions could be fitted closer to the tube by the interposition of some anti-vibratory substance, and by some attachment of high natural frequency, the noise could be reflected forward or backward, so that less resonance would occur. This would not reduce the apparent sound volume, except to a passenger in the car. The same reasoning applies to air ventilation, which should clearly never be direct. The ventilators should be louvred heavily. By means of shattered air scoops ventilation could be had through windows operated by the passengers, and as long as direct connection is avoided there will be no singing of the air in resonance with the main note.

The air pressure due to the rapid motion of the train can be utilized as a screen, and at the same time the effective length of the air column under the influence of the train should be reduced by stream-lining the sides and end of the train, in order that the natural period of this air column may be increased beyond the oscillatory period.

Breaking Up Sound Waves Essential

As a definite conclusion it will be seen from an audiometer photograph representing the noise with all parts padded and doors closed, but without shrouding, that closing of the doors has a great silencing effect. This is borne out by the marked increase of noise from an unprotected bay of seats and from the reduction of noise by closing the ventilators, so that no short sound path is available. During this "noise photograph" the car was inclosed almost completely in asbestos covering, but only the sides and the roof really needed protection. No single wave was produced, proving conclusively that the recurrent beat from the vibrating sides and the wheel roll caused the trouble.

There is no reason why a car should not be solidly built with cork or asbestos padding fireproofed and inserted tightly between the double walls. Rattles can easily be prevented by solid construction of running gear; ventilators can be made indirect; doors can fit well, and windows can be thickened and held in thick rubber insertion. Heavier gangway partitions would follow as a matter of course. If fiber centers or complete fiber wheels cannot be adopted, the wheels can be made less liable to jump and chatter by altering the period of the supporting spring. Considerable lengthening is most desirable, as also is proper spring lubrication.

That the wheels are far from steady, even on a good road, is made very clear when the ultra-rapid cinema points are measured up. The wheel is not maintained in proper resultant position by the present loose method of carrying, and its lifting periodicity does not vary greatly from the oscillatory period of the general noise wave as shown by the audiometer.

The rail fastenings are of great importance when in an atmosphere rather higher in pressure than that to which the passengers' ears have been accustomed. This tends to assist the sound to travel, unless the air is impeded by deflectors and sheaths to obtain the correct reflection. Packing up the rail track to reduce actual rail noise is fairly effective, but insulation from and the avoidance of resonance are the two points of greatest importance from the aspect of the traveler.

Methods Proposed to Reduce Noise

The things that should be done in order to reduce the noise due to train movement, as developed in the tests, are summarized below in a list of practical suggestions:

1. The track should be packed as high as possible with fine ballast.
2. Fishplates and rail couplings should receive attention.
3. The whole of the brake and coupling gear should be fitted with flat intention springs, including rubbing blocks.
4. All doors, gates and trellis couplings should be held on ball catches which take up wear.
5. Fiber or fiber-supported car wheels are advantageous.
6. Carriage springs should be increased in length and lubricated by inclosure if possible.
7. Motor gears should be lubricated by a directly applied oil jet under pressure.
8. The lower part of carriages should be stayed in both directions, particularly where the girder surrounds the wheels.
9. The sides, roof and doors of carriages should be stiff and double. The entire space should be packed with cork powder, slag wool or asbestos compound. This point is of paramount importance.
10. The window ventilators should not open and louvres should be fitted with wind deflectors outside and not opposite to the entrances.
11. The carriages should be stream-lined as far as possible and the space between them sheathed in with leather supported in trellis couplings. Both ends of the train should be fitted with wind-cutting ends, or the carriage ends should be made more curved.
12. Windows should be slightly reduced in size, increased in thickness, and held in rubber insertion at least $\frac{1}{8}$ in. thick.
13. All loose chains and wires between carriages should be spring-held and covered with cloth bagging.
14. Wheel bearing play should be reduced if possible and a torque rod system substituted. The brakes need not then hang on one bar, which is bound to cause chatter in one direction. Brake shoes should not be in one piece, and two units should be fitted to increase the chatter period.
15. The wheels and all parts below the stepboard should be heavily shrouded to deflect the sound, and as far as possible each wheel should be well shrouded with a small wind scoop arranged on the leading edge. This was found extremely effective in practice.
16. If possible, a minimum of actual wheel should be visible in elevation. The shrouds should be of a heavy substance of very high natural period, such as malleable

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cast iron lined with fiber. It is important to insulate the lower parts altogether.

17. The insulation of motors, etc., by mounting on fiber is almost useless. The noise is wheel rolling reflected from the tube sides, which beating inside, with the window carriage side and roof vibration, mixes with the resonance externally produced by the entire combination of sounds and noises.

18. Larger wheels might be fitted on some cars.

19. Where wood is used an improvement is noticeable; metal supports should never be attached at one point only. The wooden car note is slightly lower in pitch and of less varying amplitude. This renders the sound less objectionable in character, but apart from this fact the improvement is not great.

20. Cross seats are a slight advantage in preventing a long fixed air column to vibrate.

21. Motor armatures should be balanced accurately to eliminate excessive vibration.

In a final set of experiments triplex windows were used with padded center posts to break up the large dimensions.

The results were very satisfactory, particularly when the glass was partially covered by a small piece of paper.

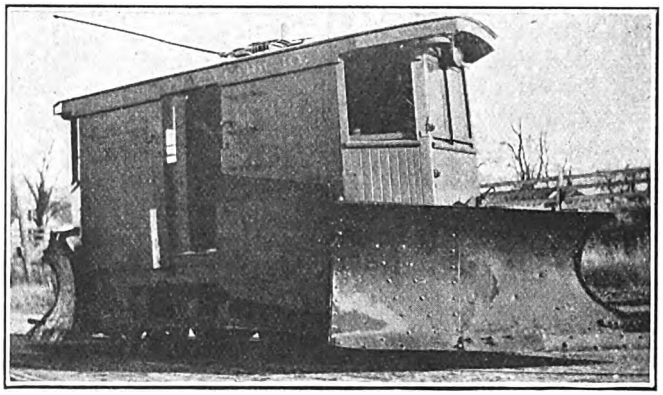
The joints of doors were also carefully fitted. An appreciable reduction of noise is obtained by shrouding alone. To obtain proper results from shrouding, roof padding is needed, as the object is chiefly a reduction of resonance.

For this reason shrouding does not reduce the apparent noise to any one outside the carriage.

It Pays to Send Out the Snow Plows Promptly

How the Portsmouth Electric Railway Keeps Its Line Open in Winter Despite Heavy Snows—Low Rail in Open Country Increases Difficulty of the Task—Taunton Plow Has Special Nose

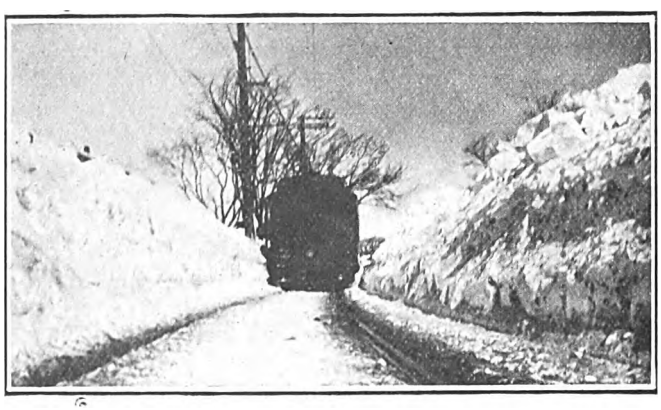
THE winter of 1922-1923 was one of the most severe that has visited New England in many years. Between Dec. 1 and March 1 nearly 100 in. of snow fell, and as there was no protracted period of thawing the depth of snow on the ground kept increasing until it was piled alongside the tracks of the Portsmouth Electric Railway as high as the roofs of the cars. On March 7 there was a snowfall of about 6 in., driven by a 40-mile gale. The snow piled into the cuts to such an extent that it was impossible for the plow to throw it over the top of the bank, and the line had to be cleared by shoveling. In spite of such severe conditions as these, however, the railway was successful in keeping its lines open all winter. The policy of sending out the snow plows promptly when the snow began to fall and keeping them out until the storm ended is thought to have been responsible for this success.



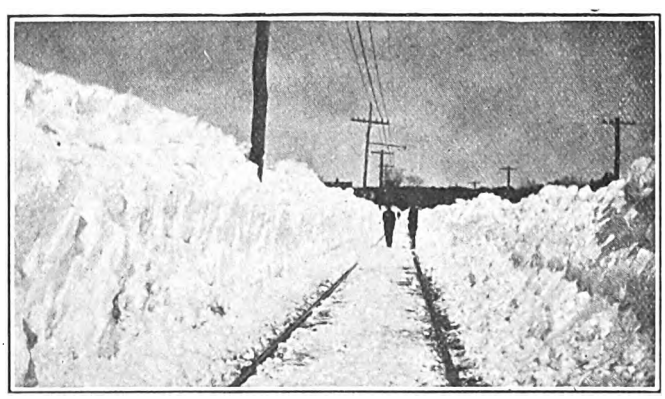
This Snow Plow Is Equipped with an Adjustable Wing Which May Be Swung in Where the Clearance Is Small

The Portsmouth Electric Railway operates two lines in the city of Portsmouth, N. H., and an interurban line from Portsmouth to Rye, Rye Beach and North Hampton, connecting at the latter point with the Exeter, Hampton & Amesbury Railway. One of the difficulties with which the railway has to contend in winter storms is the fact that much of the line in the open country is built with low rail. The snow-fighting equipment consists of two Wason 15-ton plows and one Taunton 18-ton plow. The Taunton plow is equipped with a special nose, as shown in the accompanying illustration, and is ordinarily assigned to the interurban line. One Wason plow takes care of about 7 miles of city track. The third plow is for emergency and is not used unless one of the two others becomes crippled or in case the storm is so severe that two plows are insufficient to keep the lines open.

A crew of four men is used on each of the Wason plows and a crew of three men on the Taunton plow. These men come from all departments of the railway. For example, a typical plow crew consists of one trainman, one shopman, one trackman and one lineman. As each man has his part to do they always go out together in the same crew. This has been found to be the best practice. As soon as a storm begins the snow-fighting crews are assembled, although this is done beforehand if advance notice has been received from the weather bureau.



In the Cuts the Plows Could Not Throw the Snow Over the Accumulated Piles



Nearly 100 In. of Snow Fell in Portsmouth During December, January and February Last Year

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How to Secure Better Public Relations

Bad Treatment of Utility Corporations Results from Personal Grievances of Customers—Public Relations Committee Should Make Company Better Understood—Its Manager Should Take Active Part in Civic Affairs — Correct Attitude of Employees Important—Securities Should Have Wide Distribution Locally

By E. C. Hathaway

Chairman of the Board, Railway Audit & Inspection Company.
Formerly Vice-President and General Manager Norfolk & Portsmouth Traction Company, Norfolk, Va.

WITH the growth of commissions, many railroad men feel that there are marked socialistic governmental tendencies in this country at present and that a large portion of the public favors municipal ownership and operation of utility corporations. This is a point upon which I take issue.

In the first place, the average American is always ready to exercise his prerogative of criticising those conditions which do not suit him. The utility corporations are usually in the front line trenches and so are apt to receive the shot first. This does not mean that there is any inherent prejudice against the corporations as such. The criticism they have to bear comes from their impersonal character. Any person who criticises his local railway, lighting and power company or gas company knows that, except in an impersonal way, it is utterly impossible for the corporation to defend itself. It is almost unknown to have a customer of a large dry goods store or other business rush into public print to tell how badly he has been treated in a business way either by that store or its employees. This, I take it, constitutes the fundamental difference between the two attitudes of the public.

In many cities the wholesale and retail business concerns do more business annually than any one of the utilities, but the critical customer has always the privilege, if he is dissatisfied, of patronizing some other concern in the same line of business. This is not possible with the utilities, which are natural monopolies, so that the customer has to accept conditions as they are or go after the corporation in whatever manner seems likely to be the most effective to him.

Many Critics Have Personal Grievances

I have personally investigated a great many of these criticisms of public service corporations and have found, in the last analysis, that the cause was nearly always bad treatment of the critic by some employee of the corporation. This shows the necessity of instilling into all employees who come in contact with the public the need of keeping the customer satisfied. It matters little whether the monthly bill is $1.50 or $500. The principle involved is the same in all cases. Oftentimes an individual of small caliber will make it exceedingly difficult for the management to do business with either the council or the corporation commission, as the case may be. It is important to have the employees of a public utility company realize that the sale of its service is purely a commercial proposition, and it is as vital to make the customer feel he is being treated with proper consideration as in the case of the retail merchant.

The cities in which utilities operate are naturally divided into two classes. The first is the medium-sized city, in which the general manager of the utility is practically on hand-shaking terms with the vast majority of his customers. The second is the city where it is impossible for this personal relation to exist. In the latter case it becomes necessary for the corporation to create a practical contact with the public that will inure to its benefit, so far as personal relations are concerned. A move which I strongly favor is to create from the board of directors a "public relations committee," this committee to be represented by a man who is not only willing but enthusiastic to present the company side of the case and with a natural flair for making friends.

This has been done to a great extent in the past, but the men engaged for the service have been paid inadequate salaries and their function, it was presumed, was either to get favorable publicity from the newspaper people or to be able to damp criticism in such papers should it exist. This is wrong.

Qualifications of the Public Relations Manager

Primarily, the man should be selected with a full knowledge of his personal characteristics. He should be a fluent and ready speaker. His duty should be to identify himself with every public movement, and he ought not to feel himself too important to go out and address a meeting of twenty people, if it were necessary, or five hundred if the opportunity should present itself. He should have the proper sort of an office, with adequate space. All complaints of whatever character should be delivered to his office, and it would be up to him to study and analyze these complaints, find out whether they are merely the result of some small difficulty and, if so, be in a position promptly and definitely to adjust the situation after the responsibility has been fixed. He should be a member of the leading clubs of the city, social, business or otherwise, and he should be expected not only to identify himself with these clubs but to attend carefully all the meetings so that he would be in a position to forestall or explain any shortcomings of the company, whether they are real or fancied. Finally and unquestionably, he should receive the fullest confidence and support of the operating management. Some of the keenest operators of public utilities in the United States, men who can secure results, who are economists to the highest degree, ought never to be permitted to come in contact with the public or to plead the company's cause with the people, because their general trend of mind and reasoning are such as to unfit them for small adjustments, and they are naturally not diplomats.

In the creation of such a department it might be a

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trifle difficult at first to bring about the proper and whole-souled touch between the public and the operating management, but this can be done if the conditions are fairly met and the results will be beyond the most sanguine expectations. It may be said that this has been done in a way in the past, but in many cases the men picked have not been of a caliber large enough to impress themselves upon the public. The plan proposed is entirely within the range of possibility and, once properly launched, the supposed socialistic attitude of the public at large will be discovered to be a myth and not an inherent antagonistic attitude toward corporate interests.

After all, if we may be permitted to use an advertising term, it means not only to sell the service to the public but to sell the management as well, and this may easily be done if the proper ability, time and thought are devoted to the subject.

If we dip for a moment into what seems to be ancient history, the writer can remember the time when Mr. Rockefeller was perhaps the most execrated man in the United States. He, and his company as well, was always under fire both by the press and the public. Ultimately, he saw the necessity of being what might be called properly press agented. He has given freely of his money, of his time, and of the best minds and professional skill that he could engage to promote the general health and welfare of the people in the United States. Had he accomplished nothing more than the discovery of the hookworm and the simple remedial agencies that would wipe it out he would not have lived in vain. Millions in brains, brawn and activity have been added to the South by the researches of Rockefeller Institute, which has been so generously supported by him. In the intervening years, the kindly feeling for Mr. Rockefeller has grown to the point where he may justly be said to be one of the most popular ultra rich men in the United States. Even the effect on the Standard Oil Company has been to bring about a feeling that, while it is to a considerable extent a monopoly, in all probability this condition is preferable to an open market operated by cut-throat methods.

Public utilities when started years ago were usually backed by local capital and managed by local people. The increase in the population of the country, coupled with the ever-widening demand for this service, soon brought about a condition where the organizers had not the money-raising ability to provide for their growth and future needs. They were sold—at a good profit to be sure—to the banking interests of the country, out of which grew a coterie of bankers whose specialty and business it was to purchase and operate these utilities. The banking interests, shortsightedly, did not recognize the necessity of building up local interests by every legitimate means at their command, and especially by the sale of guaranteed preferred stock or bonds upon terms and at prices which would be attractive to the local investing public. They also neglected to cultivate the good will of the local interests, and, pushed to its logical conclusion, this condition brought about a revolt against what might be termed "Absentee Landlordism."

Employees and Stockholders Can Help

Having made clear the writer's idea of the necessity for and the caliber of the representative of the public relations committee, we come to the question of contact with the public through the medium of employees whose duties lie in this direction. Practically every young manager in the business in the last ten or fifteen years has prepared for himself and read before the association at its various meetings an article covering the necessity for courtesy on the part of these employees from the humblest position up. It is a self-evident proposition on which too much stress cannot be laid, but its operation is a managerial function. It must come from the officers directly connected with the operation of the property to whom these men are subordinate. It is just as important now as it ever has been, and nothing is to be gained by dwelling on this subject.

Next in line come local interests in public utilities. The up-to-date banker of to-day has reached the conclusion that the local public should absorb at least 60 per cent of the indebtedness of the company in the shape of guaranteed preferred stock. This stock can and will be absorbed by the public providing the proposition is properly presented and the wisdom of this investment made clear. In the opinion of the writer, it should be sold in smaller units per share than it now is, the par value running from $10 to $50 per share instead of $100, which is the popular par value.

The interest developed by the ownership of this guaranteed preferred stock will be much greater than that developed by the ownership of common stock as in the past and, if anything like the percentage above mentioned can be placed at home, a bulwark protecting the company from outside aggression will be erected, which is going to make the politician and the corporation baiter think twice before precipitating a fight.

It will be no trouble to get these stockholders to go to the public meetings, prepared not only to talk for but to fight for what they conceive and what are really their personal rights in the premises.

Conclusions

Therefore, in the order of their importance, we may summarize the new development as follows:

1. Public relations committee from the board of directors and chairman thereof.
2. The fullest distribution possible of the company's securities in the shape of preferred stock, making the par value so low that any consumer may become a stockholder if he so wills.
3. The fullest education of the employee who comes in contact with the public of his importance to the company's interests, what his attitude means and how his efforts may be capitalized so that they may be of service to and an asset for the company.

Competition in Reduction of Accidents

THE Boston Elevated Railway has posted at various points on the system, where they can be watched by employees, graphic representations of increases or decreases in industrial accidents on the property. These accidents are grouped into four departments—transportation, shop, maintenance and power. The representation is in the form of a racetrack, with horses to represent each of the departments, but the comparison will be within each department, as there is no connection between two departments.

It is hoped that this graphic method showing the record of each department against that of the year previous will create interest and concentrate attention upon the need of all employees and supervisors to watch industrial accidents constantly, so that they may be gradually reduced.

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Public Decides Upon Color for Street Cars

IN FORT WORTH the one-man safety cars of the Northern Texas Traction Company were formerly painted palmetto green. But in order to make the cars more visible, and also to make them more attractive, the company decided upon the use of yellow for the car exterior. Several cars were painted in different color schemes and the public was asked to decide upon the one to be adopted permanently.

The three principal color combinations in this experiment were as follows: (1) Trucks, black; side sheeting and dash up to the window rail, dark orange; from the window rail up to the roof, ivory; trimmings and numbers, black. (2) Trucks, black; body up to the roof, dark orange; window sash and doors, ivory; trimmings and letters, black. (3) Trucks, black; body up to the roof, cadmium yellow; doors, trimmings and numbers, red.

Comments upon these color schemes were many, but the general opinion of the public, as well as that of the company, favored the third. This has therefore been adopted as standard for all one-man cars. Two-man cars are painted lemon yellow, and no change in this arrangement is contemplated. Changing the color of the safety cars and inviting the public to comment upon the various schemes attracted much favorable attention to the railway.

The Readers' Forum

Substantial Encouragement in "Journal" Statistics

PUBLIC UTILITIES ADVERTISING ASSOCIATION

PORTLAND, ORE., Jan. 16, 1924.

To the Editors:

You men on the JOURNAL, who prepared the Annual Statistical Number, are to be warmly congratulated for the splendid publication you issued. Not the least important part of that publication is the substantial encouragement it should give to the men who are studying the trend of things in the industry. There is much information in that issue to offer encouragement to carry on vigorously through the coming year.

W. P. STRANDBORG,
President.

How Plan to Publish Railway Bus Matter in "Journal" Is Viewed

FURTHER letters from other sections of the country which have come in in response to a request for an expression of view on the new policy of publishing railway bus articles in the JOURNAL follow. This policy was set forth in the editorial on page 3 of the Jan. 5 issue of ELECTRIC RAILWAY JOURNAL. Other letters commenting on the plan were published last week on pages 108 and 109.

INDIANAPOLIS STREET RAILWAY

INDIANAPOLIS, IND., Jan. 17, 1924.

To the Editors:

My idea is that bus articles appearing in ELECTRIC RAILWAY JOURNAL which give the experience of the street railway companies in the operation of buses would be of very considerable interest to the street railway fraternity throughout the entire country. I think we are all anxious to learn from the experience of street railway companies which have actually tried out bus operation just what results can be definitely counted upon.

ROBERT I. TODD,
President.

HENRY L. DOHERTY & COMPANY

NEW YORK, N. Y., Jan. 21, 1924.

To the Editors:

Replying to your telegram of the 14th relative to the policy of the ELECTRIC RAILWAY JOURNAL publishing bus articles, I feel that this is entirely in keeping with the progressiveness of your publication, as the tendency today is for co-ordinated transportation service in cities.

As you are aware, it is my thought that the electric railway is here for a great many years to come, but there are places where auxiliary service can be furnished by buses, and this should be done by the present railway operating company.

F. R. COATES.

UNION TRACTION COMPANY OF INDIANA

ANDERSON, IND., Jan. 17, 1924.

To the Editors:

Answering your wire of the 14th inst., I am glad to know that the ELECTRIC RAILWAY JOURNAL intends to devote more attention to the operation of motor buses by electric lines. There is no question that motor buses have their place in electric railway operation. The subject is therefore one concerning which the electric railway industry may expect full treatment in the pages of the JOURNAL.

ARTHUR W. BRADY,
President.

THE KANSAS CITY RAILWAYS COMPANY

KANSAS CITY, MO., Jan. 21, 1924.

To the Editors:

I have your inquiry of Jan. 14 in regard to the policy of the JOURNAL as announced in an editorial in the Jan. 5 issue relative to publishing bus information in the JOURNAL.

I see no reason why those interested in the operation of street railway properties should not have the opportunity of being advised of what occurs in the bus field, and I know of no better medium for such information than the JOURNAL.

I think it is a generally accepted fact at the present time by street railway operators, legitimate manufacturers, and, in many communities, public officials and the public, that for the maximum good of all parties interested transportation is a monopoly and that co-ordination is essential as against competition and duplication. Street railway operators are now taking advantage of the bus and co-ordinating it with existing street railway service, in many cases at an operating loss, on the principle that it is their obligation fully to serve their community. Bus news, because of the above facts, is street railway news at the present time, and just because the ostrich, by sticking his head in the sand, ignored and denied the existence of some unpleasant circumstance would hardly be justification for any of us to follow the same course. Personally, I prefer to get my reading covering the street railway field from the recognized street railway journals, and I am of the opinion that the position taken in your editorial will meet with general approval.

I think there is a danger in certain bus propaganda

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now being broadcast. I am also of the opinion that there is more or less of a definite connection between certain bus interests and the activities of political lawyers in certain communities in applying for and asking for bus permits and franchises. I am not very favorable to this method any more than I would be if a car company, in order to sell its product, would attempt to establish street railway competition through any means. I am also convinced that the street railway industry will very soon find out those manufacturers of buses and bus parts who are sincerely interested in doing business with existing transportation companies, and who would frown upon any attempt to force bus installations through other than such legitimate means.

The policy as expressed in your editorial, to my mind, is a sound one.

F. G. BUFFE,
General Manager for the Receivers.

INTERSTATE PUBLIC SERVICE COMPANY, INC.

INDIANAPOLIS, IND., Jan. 16, 1924.

To the Editors:

I firmly believe that the bus has its proper place in the transportation world, not as a competitor, but as a feeder to the present street and interurban transportation agencies.

While I have never changed my opinion that the bus operators should not be allowed membership in our association, yet I feel that we cannot have too much information at our command with reference to what is going on in the bus transportation field, and therefore I feel that bus articles, stating facts as you find them, published in the JOURNAL, should be an advantage to us.

HARRY REID,
President.

THE BROOKLYN CITY RAILROAD COMPANY

BROOKLYN, N. Y., Jan. 23, 1924.

To the Editors:

I heartily concur in your change of policy as expressed in your editorial of Jan. 5 relative to publishing in the JOURNAL information covering railway operation of buses.

I appreciate being able to keep in touch with results of any bus operation by railway companies through the ELECTRIC RAILWAY JOURNAL, which should cover the transportation field in all its phases.

C. E. MORGAN,
Vice-President and General Manager.

CHICAGO SURFACE LINES

CHICAGO, Jan. 17, 1924.

To the Editors:

I have read with a great deal of interest the editorial and the special article in your issue of Jan. 5, 1924, on the subject of the bus in the railway field, and I believe the suggestion that your paper should treat comprehensively the activities of railways in taking up the bus is a step in the right direction. The alert electric railway operator of today should endeavor to keep pace with all developments in the transportation field in order to look after the interests of the people he is employed to serve. Transportation requirements of any community can best be furnished by one agency, and that agency should be the electric railway organization.

Your paper has always kept pace with developments in transportation. It is entirely consistent, therefore, that it should still further broaden its scope by publishing bus articles so that readers may know what developments are going on in this latest form of local transportation. The rapid expansion of electric railways into the bus field in the past few years should impress the railway operators with a desire at least to know how these pioneering companies will work out their co-ordinated facilities. The JOURNAL can serve a useful purpose in bringing such facts to their attention.

G. A. RICHARDSON,
Vice-President.

GEORGIA RAILWAY & POWER COMPANY

ATLANTA, GA., Jan. 17, 1924.

To the Editors:

I note in the Jan. 5 issue of the ELECTRIC RAILWAY JOURNAL that railway operation of buses is to be covered in the JOURNAL. This is, in my opinion, a very good move on the part of the JOURNAL, because the railway industry is vitally interested in the operation of buses.

I personally feel that the street railways will, in a very short time, adopt operation of buses, to the exclusion of outside interests, because the matter of transportation is a natural monopoly, and if the people are better served by buses than with street railways, under certain circumstances the bus should be operated and controlled by the street railway companies. Any information that the JOURNAL is able to gather on the operation and maintenance of buses will be of untold value to the street railway industry—particularly to those who are operating buses.

We are not now operating any buses, but we have made certain investigations, and I believe that in time we will do so.

F. L. BUTLER,
Vice-President and General Operating Manager.

THE DENVER TRAMWAY COMPANY

DENVER, COL., Jan. 19, 1924.

To the Editors:

The trend of the times indicates that we are rapidly becoming transportation men in a broader sense than ever before and that bus service, to a certain extent, is squeezing into the electric railway field.

With 121 street railway companies operating 1,207 buses over more than 1,500 miles of bus routes, and these figures growing rapidly every day, the street car man is sound asleep who cannot see that buses are a steadily increasing factor in city transportation.

Your editorial, page 3, and subsequent summary, page 5, of the Jan. 5, 1924, ELECTRIC RAILWAY JOURNAL makes this very plain. The columns of the ELECTRIC RAILWAY JOURNAL without question should carry all bus matters pertaining to the economics of city transportation.

Companies facing expensive track and paving reconstruction jobs will do well to consider bus operation seriously before buying new ties and steel and signing up paving contracts.

Bus manufacturers should be pressed to join the manufacturer member ranks of the A.E.R.A. Many street railway executives consulted in the past three months are firmly of the belief that buses can properly provide all the transportation requirements of cities under 60,000 population and we know that street railway managements in a number of towns have retired rolling stock, removed tracks, wires and poles and in their stead substituted buses.

EDWARD A. WEST,
General Superintendent.

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Association News & Discussions

Automotive Vehicles and the Electric Railway

Methods of Utilizing Bus and Motor Truck as Auxiliaries and Prevention of Automobile Accidents Were Chief Subjects of Discussion at Meeting of the New York Electric Railway Association

A PAPER by William P. Kennedy, president Kennedy Engineering Corporation, on "The Motor Bus—Keynote of Expansion for Street Railways," was the feature of the morning session of the Midwinter Meeting of the New York Electric Railway Association, held at the Hotel Commodore, New York City, on Jan. 24. An abstract of the paper appears elsewhere in this issue. Following Mr. Kennedy, E. H. Lamburger, general engineer Westinghouse Electric & Manufacturing Company, discussed briefly some of the problems of design of gasoline and trolley buses. He said that in general trolley buses were the more economical to operate. Some of the engineering difficulties encountered in design were also described.

Experience of his company with buses were given by L. S. Storrs, president the Connecticut Company. Mr. Storrs said that he thought the attitude of railway men toward the bus had recently been undergoing a change. At one time manufacturers of automotive equipment were claiming so much for the automobile and giving so little credit to the electric railway as a transportation medium that railway men were forced in self-defense to claim everything for their own method of transportation and disparage the bus. Now, however, this situation no longer exists, and railway men are beginning to look with more favor upon the bus as an auxiliary. According to Mr. Storrs, automotive men have begun to realize that technical skill is required for successful bus operation, and that electric railway men are peculiarly fitted to handle the transportation problems arising therefrom.

Mr. Storrs said that when many existing railway lines were laid out it was not possible to foresee the exact directions of community growth, and hence there now are sections where adequate railway service is not available. The first use for the bus is in such territory. Another good way for railways to avail themselves of this vehicle is in the establishment of crosstown routes to provide service which has long been looked upon as necessary, but where the demand did not justify laying track. The use of the bus in de luxe service on routes paralleling existing railway lines should not be attempted until after these other needs are fulfilled. A responsible railway cannot, like an individual bus owner, abandon a route because it becomes unprofitable. Having once undertaken to operate a certain line the railway is obliged to continue it, and great care should therefore be taken not to establish a bus route that may become a burden rather than an asset.

C. R. Barnes, City Commissioner, Rochester, spoke briefly concerning the installation of the trolley bus in that city. Efforts made to improve the design of trolley buses were described by E. C. Bull, vice-president Brockway Motor Truck Corporation.

The meeting was presided over by Vice-President Morgan, as President Duffey was unable to be present owing to the serious illness of a member of his family. Mr. Morgan appointed W. J. Harvie and T. C. Cherry as a committee to draft a telegram expressing the sympathy of the association to Mr. Duffey.

After saying that the industry was now beginning to see daylight, Mr. Morgan introduced Bertram Berry of the Heywood-Wakefield Company as the first speaker, who presented a paper on "Production of Rattan and Its Uses." An abstract of this paper is given in this issue on page 163.

Progress of Accounting Described

The progress of the accounting committee of the New York Electric Railway Association was told by E. H. Reed, auditor Brooklyn City Railroad. During the past year this committee has discussed numerous subjects, among them being that of a uniform system of sub-accounts for use in the monthly operating report. This will be of benefit to railway officials in making comparisons with other roads. Although all railways prepare reports in accordance with the uniform system of accounts as prescribed by the Public Service Commission wide variations in sub-accounts have been found. In fact, the practices of no two companies were found sufficiently alike to permit of informative comparisons. It is the belief of the committee that uniformity in the classification of accounts as prescribed by what are commonly known as the "up-state" and "down-state" commissions would benefit the utilities as well as the commissions themselves. J. M. Joel, general auditor of the New York State Railways, Rochester, also spoke briefly.

A paper on the prevention of automobile accidents was presented by J. J. Sharkey, claim agent New York State Railways, Rochester. An abstract appears elsewhere in this issue. In the discussion following Mr. Sharkey's paper, William Farrell, Utility Mutual Insurance Company, expressed doubt as to the advantage of compulsory automobile insurance, since this might encourage recklessness on the part of the automobile driver. The systematic use of posters is valuable, in the opinion of R. S. Messenger, claim agent Rochester & Syracuse Railroad. C. E. Morgan, vice-president and general manager Brooklyn City Railroad, told of the effect in reducing accidents of the bright colored designs painted on the dashboards of his company's new cars. The importance of this was emphasized again by Mr. Messenger, who said that his company had obtained good results by changing the exterior color of the cars from green to traction orange.

The decrease in automobile fatalities in Massachusetts, Connecticut and Maryland resulting from motor vehicle laws "with teeth" was brought out by A. T. Davison, general counsel Third Avenue Railway. L. H. Palmer, vice-president and general manager United Railways & Electric Company, Baltimore, and J. E. Hewes, vice-president and general manager Albany Southern Railroad, also spoke.

An interesting experiment being tried by the United Traction Company, Albany, was described by H. B. Weatherwax, vice-president. He said that his company had made an arrangement with an insurance company to insure the railway against all claims and damages. The premium to be paid is 5¼ per cent of the gross revenue on the city lines, and 3½ per cent on interurban lines. All the claims investigation and legal work is done by the insurance company, but the railway retains entire disciplinary control of its trainmen.

Motor Truck Freight Transportation

At the afternoon session a paper on unregulated motor truck freight transportation was presented by F. E. Watts, general freight agent New York State Railways. An abstract of this paper will appear in a future issue.

In a written discussion H. C. Stanton, general freight and passenger agent Rochester & Syracuse Railroad

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and Empire State Railroad, Syracuse, spoke of motor truck freight lines that have been established to compete with the electric railways. These lines can give serious competition on account of less overhead, less cost for equipment, no maintenance of roadbed, and no state supervision, he said. The motor vehicle is of unquestioned value, and organized truck lines can relieve the railways of uneconomical service; but they should abandon their efforts to handle general traffic in competition with the railways. Immediate steps should be taken to place motor truck carriers in New York State under the regulation of the Public Service Commission, and that body should deny certificates of public convenience and necessity to motor truck lines competing directly with railways furnishing adequate service.

Railways Should Supply All Forms of Transportation

Labert St. Clair of the American Electric Railway Association spoke of the advantages of electric railways taking up any kind of transportation demanded by the public. He said that if the public wants to ride in buses or manufacturers wish to ship by motor truck, electric railways should beat the independent operators to the job of supplying this service.

Electric railways must recognize the fact of motor truck freight haulage, and they cannot avoid it, said W. H. Collins of the Fonda, Johnstown & Gloversville Railway. He told of methods used on his lines to attract business, such as the adding of industrial sidings and giving the best possible service so as to deliver goods right at the door of the plant. This is proving of particular help in drawing business to the electric railway which would otherwise be handled by motor truck companies.

Victor S. Curtis, the Connecticut Company, said that he considered it the duty of electric railway officials to try to get the various motor truck freight transportation companies regulated. He felt that they should obtain certificates of convenience and necessity, the same as the electric railways.

Comments on motor truck freight transportation were made by Mr. Morgan, who told of some things being done in the Middle West which have proved of advantage to electric railways. He said that the various railway companies should put their houses in order and move freight while others slept, instead of loading in the early morning hours and moving it during the day time. He said that railways in the Central West had found sidings of particular help. Celery from Kalamazoo is now shipped by electric railway to Detroit, a distance of 146 miles, during the night, arriving in the Detroit market early in the morning.

T. C. Cherry, president Auburn & Syracuse Electric Railroad, said that he considered that certificates of convenience and necessity should be required for motor trucks. He made a motion that this subject be referred to the legislative committee of the association.

Methods of Charting Statistics of Operation

A. L. Hodges, assistant secretary and assistant treasurer Brooklyn City Railroad, presented a paper on the value of daily operating statistics and how they are obtained. An abstract of this paper will appear in a future issue.

In discussing this paper, Mr. Morgan explained some of the high points of the various charts exhibited and emphasized the value of getting information to the management quickly if it is to be of value in remedying conditions.

J. A. Queeney, Philadelphia Rapid Transit Company, said that he had adopted the same general system of plotting operating statistics as explained by Mr. Hodges, and found these of great assistance in showing what each car is earning and the various costs that result. The layover time has been reduced considerably in Philadelphia as a result of such a study.

In Terre Haute one department kept conditions charted and these are of great value, according to E. M. Walker, president Schenectady Railway.

H. W. Blake, editor ELECTRIC RAILWAY JOURNAL, referred to the charts as a fine example of the science of transportation engineering. He said that power station operation charts had been used for a long while but that the application of charts to transportation should be of great service in solving their particular problems. They are even more important to the transportation department than to the power department, because its gross expenses were greater. Study of these records shows where the service is most needed and where it is more profitable.

How the auditor can assist the manager was told in a paper by E. H. Reed, who spoke again during the afternoon session. The usual monthly balance sheet should be perfectly clear. It is now perhaps as concise and satisfactory as could be desired, but all those who are entitled to know the facts contained therein may not grasp the full import of a financial statement in the accepted form. The accounts should be stated in enough detail and clearness of expression to be easily ready by those most interested in the company's financial affairs.

A balance sheet which gives comparison of figures of the current month with that of the previous month, and also with that of the same month in the previous year gives the management a broader view of the financial affairs of the company, which could not be obtained in any other manner.

Antiquated Taxation System

The faults of our present system of taxation were emphasized by the Hon. George H. Moses, United States Senator from New Hampshire, who was the speaker at the informal dinner, at which Mr. Morgan acted as toastmaster. Taxation is based on an antiquated model, according to Senator Moses, developed to meet a wartime emergency. It is unjust and inquisitorial and leads to extravagant appropriation of the public's money. The six states of Illinois, Massachusetts, Pennsylvania, New York, Michigan and Ohio pay 62 per cent of all Federal taxes, the state of New York alone paying 26 per cent. This money is used largely to pay the salaries of an army of Federal office holders who interfere in the life of every citizen. Things which in the past were left to the individual to do are now turned over to some governmental employee. In short, there is altogether too much government, in the opinion of Senator Moses.

The so-called dollar-for-dollar system of appropriations he also condemned. Several illustrations to show how heavily this bears upon a few states were given. A system of taxation which would make every citizen a taxpayer should be developed. A sales tax would be the best method of attaining this object, in the opinion of Senator Moses, although he favors the plan proposed by Secretary Mellon.

Prevention of Automobile Accidents*

By J. J. Sharkey
Claim Agent New York State Railways, Rochester

HOW can transportation companies prevent the volume of accidents which are increasing all the time because of the addition of two or three hundred thousand automobiles in this state every year? The proposed annual licensing law which the Legislature in this state has been asked to enact this year will be, at best, only a minor success. Automobile accidents in Massachusetts, which has had such a law in force for some time, are as numerous as in states that have no such laws. New York City, which has annual licensing, shows about as many accidents, proportionately, as does the rest of the state where no such law applies. Practically all the public utilities in this state and country that are engaged in street car transportation have been asleep at the switch, or, at least, have not acted for their best interests and the public welfare when they have not agitated universal compulsory liability automobile insurance.

According to insurance companies' figures, 50 per cent of all automobile owners have no liability insurance. Seventy-five per cent is the generally accepted number of automobiles that carry no liability insurance. In Rochester, one-third of all the litigation before the City Court, more than 1,000 cases annually, are automobile liability suits. Because the trolley company is an insurance carrier, and the majority

*Abstract of a paper presented at the Midwinter Meeting of the New York Electric Railway Association, New York, Jan. 24, 1924.

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of automobile drivers have no liability insurance, the injured party knows full well that it is useless to sue the latter. But in cases of small damage, if he can, even in a remote way involve the street car in the accident, he is quite likely to get his damage costs.

If a compulsory liability automobile insurance law could be brought about, it would be only just. We ought to have an intelligent, practical working committee whose constant effort should be to obtain compulsory automobile liability insurance, so that the various trolley car companies operating in this state would not be the easy marks they now are. This committee ought to be a standing committee, well versed in legislative matters. At present a number of insurance companies are afraid of a compulsory automobile liability insurance law for two reasons, because it would make them pay claims that are now largely paid by the trolley companies, and because the state might write automobile liability insurance.

The Motor Bus—Keynote of Expansion for Street Railways*

By William P. Kennedy
President Kennedy Engineering Corporation, New York

TO GAIN a true picture of where the street railway business stands with reference to its past and future in the field of public transportation, let us resort to a psychological device used by our college professors. This is a graphic picture in the form of a fluctuating curve showing the progress in the accomplishment of our purposes.

At the beginning of any new undertaking, when we are full of enthusiasm and driving force, our rate of progress is rapid and the curve in the picture goes up steeply. Shortly afterwards when our initial energies become somewhat dampened, the curve of our performance shows some fluctuation, but we continue to progress upward until we reach what is called a flat. In other words, at this point the number of obstacles which hinder our progress has stalled us. Our enthusiasm is gone and we can make no forward movement above this flat until some newly-discovered factor creates renewed energy. Then we go ahead until the next flat is reached.

Curve of Railway Progress Takes an Upward Trend

From this it will be seen that a curve showing vertically the amount of our accomplishment, and horizontally the time spent in attaining it, would be a curve rising sharply at the beginning, but afterwards rising more slowly with a succession of flat places where obstacles were encountered. The street railway industry, for some little time past, has been on one of these flats. Whether it would go upward or downward from that position has been very seriously in question. Fortunately, as has been made known to us through statistics recently collected and issued by the A.E.R.A., the curve has now taken an upward trend. With this encouragement the attitude of managements in the street railway business has been materially altered in favor of adopting new means for stimulating progress.

The purpose of this paper is to lay stress on the following facts: First, that we are still located in the static position represented by the flat in the curve mentioned; second, that the vital issues before the executives of the business are to discover new methods for business expansion; and third, that there is a large volume of new business available to these executives, in new forms of transportation service, if they are progressive and fearless enough to adopt plans somewhat novel, but nevertheless necessitated by changing conditions.

The motor bus appearing in the situation at this time should be seized upon by railway organizations as a means of release from confinement to the limits of rail operation. With the use of the motor bus as the first step in undertaking transportation of a flexible character, they can progress later into a variety of other forms of transportation, which are logically open to them.

It is necessary to dissolve the fixed belief that the public is not willing to pay higher prices for better forms of service. The whole history of our progress in this country proves the contrary. When fast freight was first introduced it was immediately seized upon and liberally supported. When express company service came into being it was sustained. Various forms of Pullman, high-speed, de luxe equipment are patronized to such an extent that the demand seems always greater than the supply.

If, therefore, the public is always willing to pay an increased price for better service, this would warrant railways doing many things which at first sight might appear radical but would be fundamentally sound. If the railway executive changed his present attitude of barring motor buses from all forms of competitive service, regulating them to the outskirts and ragged edges of his system, where he tries to justify their use by admitting that they may prove serviceable as feeders, but incidentally handicapping them with the poorest revenue possibilities in his district, and should parallel some of his best rail lines with a de luxe type of bus service at a double rate of fare, what would happen? It is a fairly safe prediction that a large part of his traffic would be immediately transferred to the better bus service, and he would at the same time accomplish three things.

He would incline his patrons to admit that under changing conditions he should receive more money for a satisfactory transportation service. He would create a disposition to accept a graded rate of fare. He would immediately relieve the congestion which handicaps the operation of all rail systems at the peak-load periods of the day.

As to the type of bus most suitable to the requirements of railways, it is an open question to which as yet very little serious attention has been given.

As to the manner of utilizing the bus there is even more doubt. Positively expressed opinions as to where the bus begins and ends in fulfilling the requirements of street railways are to be accepted with extreme caution.

Opportunity to Develop Motor Freight Service

With the railway company operating motor buses, it would be warranted in doing other things which would tend to expand its business. Conspicuous among these opportunities is freight transportation. There is an urgent need at the moment for the so-called store-door delivery. The steam railroads have repeatedly expressed themselves as standing in readiness to cooperate with any reliable organizations that will execute the freight transfer desired. What would be more logical than an operation of this kind by the railway company? This addition to their present operation naturally suggests the combined use of rail and motor vehicle facilities, and obviously, freight haulage and transfer of other types could be readily be accomplished. These might embrace parcel post, express transfer service, and possibly the conveyance of package merchandise in containers from city centers to outlying distributing districts.

Presumably these departures from current practices may have little appeal to the older men in the business, particularly those who have devoted a lifetime to creating the existing street railway system. There may be others also who will cast them aside as impracticable. But we might quote from Herbert Spencer, "There is a principle which is a bar against all information, which is proof against all argument and which cannot fail to keep a man in everlasting ignorance. This principle is contempt prior to examination."

The railway business of the future will be in the hands of the most alert and aggressive executives that can be picked for the purpose. They will not be too firmly rooted to fixed opinions, but will maintain mobility of viewpoint, together with ability to utilize the experience of others.

*Abstract of a paper presented at the Midwinter Meeting of the New York Electric Railway Association, New York, Jan. 24, 1924.

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One-Man, Two-Man Cars and Train Operation*

By D. L. FENNELL
Superintendent of Transportation
Kansas City Railways

WITHIN the past two or three years many companies have come to the conclusion that many economies of the Birney car can be obtained with double-truck cars. This has led to the adoption of one-man double-truck cars, one-man, two-man double-truck cars, and train operation. Some street railways have so remodeled their equipment that they are now operating exclusively with one-man double-truck cars. There are times when, due to heavy traffic demands, it is thought necessary to have conductors on the cars. With a one-man, two-man car it is easy to add this man temporarily and drop back to one-man operation as soon as the heavy traffic is over.

As a matter of economy, several of the big companies have for years been running during the peak hours two-car trains composed of a motor car and a standard trailer. Such operation is not only more economical but more efficient than the operation of two single units.

Motor car and trailer trains do not make for flexible operation. By using all motored units with train control the handling of the rush-hour cars on and off the line is much simplified.

The Kansas City Railways has developed a car for use as a one-man, two-man car and for train operation. This car, which was described in ELECTRIC RAILWAY JOURNAL, March 10, 1923, and Dec. 8, 1923, is being operated during the off-peak hours with one man. During the rush hours two cars are coupled together as a train. The second car is handled by one man stationed on the front end and the leading car has a crew of two men. The all-day operator of this car becomes motorman and a conductor is placed at the rear. After the rush hour train operation is discontinued and the second car after being cut loose is sent to the carhouse with the two conductors.

This method of operation is in successful use on one of the most heavily traveled lines in the city, without adverse comment or criticism from the public. By the use of the one-man car in non-rush hours and the three-men train during the rush hour a 50 per cent increase in seats is given in the off-peak hours, and 20 per cent more seats during the rush hours. This has been accomplished with a 20.7 per cent decrease in platform cost, although a 5-cent an hour bonus or premium is paid for one-man operation. Man-hours are decreased 23.7 per cent and 16 per cent fewer men are required to operate the schedule.

In making the change from two-man to one-man operation on double-truck cars it has not been necessary to increase to any extent the time per trip. The use of trains during the rush hour does much to decrease congestion in the business district and makes for speedier operation, in that there is only one movement over an intersection. In addition, the time lost by cars being blocked or held back by autos is reduced 50 per cent.

While trains are not yet operating with two men during the rush hour, I see no reason why this cannot be done. One objection to one-man operation in the rush hour is that passengers must board and leave at the front end. This can be overcome, as in Kansas City, by placing a valve on the outside of the car so that the street collector can, by inserting a key, open the rear doors of the car to load passengers at front and rear simultaneously.

ONE-MAN OPERATION BEING INCREASED

The Kansas City Railways has been gradually increasing one-man operation, so that now 24.6 per cent of the car-hours operated are run in this manner. I am personally an advocate of one-man operation during the entire eighteen or twenty-four hours of the day, even on double-truck cars, as a much larger saving can be secured. For example, by operating all cars with one man straight through the rush period it is possible to secure a 44 per cent decrease in platform cost, even though an additional 5 cents an hour is paid. If no increase in service is necessary during the off-peak hours, a 50 per cent decrease can be obtained in the number of men required to operate the schedule.

All cars for one-man operation should be equipped with double doors at the front end, making it possible for passengers to alight while others are boarding. This not only decreases the stopping time but makes a favorable impression on car riders.

Some mistakes have been made in the past in the use of both the Birney type car and the one-man double-truck car, in that instead of dividing the savings with their patrons by an increase in service, particularly in the off-peak period, there has been some disposition on the part of some managements to maintain the same headway formerly in effect with the two-man cars. This has, I believe, been the cause of the criticism on the part of the public, and much of the agitation against one-man cars would have been averted had the service furnished been made more attractive through increased cars and seats.

*Abstract of paper presented before the Mid-West Electric Railway Association, Springfield, Mo., Jan. 17, 1924.

Indiana Utility Men Meet

EXTENDED use of the one-man electric car in heavy traffic streets, using the heavier cars for elevated, subway and suburban service, was prophesied by Robert M. Feustel, president Indiana Service Corporation, Fort Wayne, in an address before the annual meeting of the Indiana Public Utility Association, held at Purdue University on Jan. 15 and 16. Buses will be used more extensively, he said, to investigate the probable amount of traffic for proposed new lines. Due to the low return on investment he believes that municipal ownership is desirable and inevitable.

Electrolysis problems were discussed by Prof. D. D. Ewing of Purdue University, and preventive measures were explained. A number of other topics of interest to utility men were discussed.

Paris Tramway Convention in June

THE date has been set for the convention to be held this year in Paris by the International Tramway Association. It is to be from June 16 to June 24.

A.E.S.C. Special Trackwork Committee

THE third meeting of the sectional committee on specifications for special trackwork materials and design of 7-in. plain girder rails of the American Engineering Standards Committee was held at New York on Jan. 17. It was stated that the report of the sub-committee on scope had been submitted to and approved unanimously by the track committee of the American Railway Engineering Association. There was general discussion concerning the advisability of attempting to include specifications to cover rerolled rails and rails and materials for mine and industrial tracks. The difficulties in the way of standardizing specifications for such materials were emphasized.

Dr. P. G. Agnew, secretary of the A. E. S. C., explained what action had been taken toward securing co-operation with the American Institute of Mining Engineers and American Mining Congress, and what results had been accomplished.

It was decided to omit the tensile test for both grades of gray iron castings. Since suggested specifications call for a very high grade of malleable iron, the sub-committee was requested to formulate a supplementary specification under which parts of trackwork not requiring such high grade may be manufactured. Several proposed rail sections had been considered and it was decided to prepare drawings for 7-in. plain girder rails to weigh 83, 93 and 101 lb. per yard, respectively.

It was decided to hold the next meeting at A.E.R.A. headquarters, New York, on Thursday, Feb. 28, 1924. Those present were V. Angerer, chairman; C. A. Alden, R. C. Cram, E. B. Entwisle, G. L. Fowler, Hess (representing C. D. Young), E. F. Kenney, E. M. T. Ryder, E. P. Roundey, E. C. Schmidt, J. B. Strong, G. C. Hecker and H. H. George.

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Handling Freight on Electric Railways*

By W. A. Clough
Railway Engineer General Electric Company

As a rule, the interurban road laid out twenty years ago was after passenger business primarily, and freight was given very little consideration. Consequently the franchises and physical layout were apt to be unfavorable to the handling of freight. Now, the passenger business has in many cases decreased to a point where these same roads are looking hopefully to their freight business to pay expenses, but in many cases the awkwardness in physical layout and the consequent uneconomical handling allow the motor truck to compete for certain classes of this business.

The outlook is not at all hopeless. To begin with, we have to accept the fact that automotive transportation is here to stay and will continue to take certain classes of both passenger and freight business. There is and will continue to be unfair competition to meet; legislative regulation must be secured and enforced, and, what to my mind is more important, a strong campaign must be waged along lines of educating the public as to the true cost of operating their private cars and trucks.

While just at present the best service is apt to get the largest proportion of the business, in the long run the most economic operation, coupled with adequate service, is bound to win.

In many instances the passenger traffic has been made profitable, and roads slipping into financial quicksands have been put on solid footing by the introduction of sane economies, such as light-weight equipment and one-man operation, coupled with attractive service. To a lesser degree these same roads have benefited by the same sane economics in the handling of freight. It is more sensible to handle 10,000 lb. of net freight in a car that weighs 30,000 lb. and operated by one man rather than in a car that weighs 70,000 lb. and is operated by two men.

Developing Freight Business

From an analysis of the governing conditions it would seem that roads doing a package freight business should develop it along the lines of small units in multiple; that roads doing a general freight business in l.c.l. lots should develop this with heavier motor cars and trail box cars, and the road having a large proportion of carload movement should develop such business with locomotive-hauled trains.

In some places freight service is profitably augmented by pick-up and delivery service by truck, for which the customer pays an extra charge. Where regular customers are served, or where there is regular traffic between businesses in different cities, the use of large and uniform sealed containers should be encouraged, both to prevent loss and damage and also to speed up handling. In the larger terminals freight handling equipment should be developed to replace the use of stevedores.

As a fundamental necessity in the study of freight problems, the true cost of handling freight must be known. The freight revenue is usually segregated, but frequently no attempt is made to apportion cost of operation fairly between freight and passenger business. The customary practice is to prorate costs on a car-mile basis, but obviously ton-miles is a fairer basis. Yet this again is inaccurate because speed and frequency have a bearing on maintenance.

As an illustration of the divergence of results in determining costs, I have secured costs on two or three different classes of freight, and the costs have been allocated on approximately the same basis.

Freight Costs Compared

On a large interurban system, operating a high-grade passenger service, a package freight service and a carload freight business, the cost for the merchandise freight, including taxes, depreciation on way, equipment, power facilities and the apportionment of general expenses on a car-mile basis, is 74 cents per car-mile or 7.5 cents per ton-mile of net freight. The same road operating carload freight with electric locomotives in carload lots does it for a cost of 20 cents per car-mile or 1.7 cents per ton-mile of net freight.

On another road whose freight business is a smaller proportion to the total business and confined entirely to merchandise freight the cost per car-mile is 46 cents. On still another large interurban system the cost of l.c.l. and carload freight is about 41 cents on a car-mile basis, but varies between 1.17 cents per ton-mile of net freight for carload movements and 5.15 cents per ton-mile of net freight for l.c.l. movements.

Allocation of Expenses

In Electric Railway Journal of Sept. 9, 1922, R. S. Drews of the Indiana Service Corporation presented a table showing the net earnings over the period of November, using two different methods of allocation of expense and revenue. By one method, the conclusion is that the net earnings are 5.2 cents per car-mile and by the other method the figures show that there is a deficit of 1.05 cents per car-mile. This table gives an idea of how important it is to make a proper allocation of expense and earnings to determine whether freight business is profitable or not.

Frequently the electric line is an ideal feeder for steam lines. Working agreements for interchange with steam roads and joint tariffs should be diligently sought. Handling costs of different classes of freight should be analyzed and the most profitable class developed. Care should be exercised to develop facilities along with increased business.

And most important of all, there must be an endless search after ways and means to permit one man to handle more tonnage, to permit one locomotive or car to move more tons one mile, and to offer better and more convenient service and facilities to those whose business you wish to secure.

*Abstract of paper presented before the Mid-West Electric Railway Association, Springfield, Mo., Jan. 17, 1924.

Fuel Economy Discussed

Three sessions on fuel economy were held by the Engineers' Club, of Philadelphia, Jan. 15, at which prominent engineers and industrial leaders presented papers. President Robert H. Fernald of the Engineers' Club presided.

Transportation was the topic at the morning session. Papers were presented by Prof. E. C. Schmidt, G. M. Basford, W. G. Bessler, R. M. Smith and J. Keller. The papers dealt with the use of fuel by the railroads and the possibilities of securing greater economy by using improved locomotives and better equipment for pumping stations and power stations. Mr. Basford stated that under present conditions a comparison of the best steam and electric locomotive practice would give an equality in cost at the drawbar. But maintenance conditions, operating conditions and road operations for steam equipment were very bad, as the average steam locomotive worked less than six hours per day and its operating conditions had been fixed by transportation requirements and historical developments. On the other hand electrical systems were installed and operated in the light of the best modern science and new and very efficient operating conditions. The possibilities of using Diesel drive, the still locomotive and other agencies were discussed, but the opinion predominated that the steam locomotive would be the chief agency for transportation.

In the afternoon Morris L. Cooke discussed the Giant Power Survey of Pennsylvania. He outlined its objectives as: (1) Building of large steam stations not less than 600,000 hp.; (2) locating these stations at or near the mines; (3) putting all energy generated into a 220,000-volt statewide transmission system; (4) the practice of by-product recovery in power production; (5) integration of power systems to secure maximum advantages from interconnection; (6) providing abundant power to small users, particularly the farmers; (7) railroad electrification after a national transportation policy had been determined. Some of these objectives are somewhat ideal and how far to go in bringing them about will be determined by the survey.

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Mid-West Association in Lively Meeting

Freight Traffic, Bus Operation, Shop Practice and Kansas City One-Man, Two-Man Car and Three-Man Train Operation Are Discussed

ONE hundred and fifteen strong, the members of the Mid-West Electric Railway Association assembled at Springfield, Mo., on Jan. 17 for their third quarterly meeting. Under the able leadership of President D. L. Fennell, superintendent of transportation Kansas City Railways, the association held a profitable business session.

The entertainment program arranged by A. E. Reynolds, vice-president and general manager of the local property, comprised a series of novel features which began with the presentation by the Mayor of a huge key to the city, and included a luncheon served in the turbine room of the Springfield Traction Company's new power house.

W. A. Clough, railway engineer General Electric Company, read a paper on the subject of electric railway freight traffic, which is abstracted in this issue. In the discussion, C. W. Ford, general superintendent Kansas City, Clay County & St. Joseph Railway, stated that 85 per cent of the freight handled by that road is l.c.l., carried in 60-ft. motor cars and special trail cars designed to take the track curves on the property. This practice, he said, is followed because clearances are not quite sufficient to accommodate the standard box car. Under these conditions hauling costs are 40 to 41 cents per car-mile.

An interesting development of terminal switching business by the Kansas City Railways was described briefly by F. G. Buffe, general manager. The question of pick-up and delivery business was brought up by Mr. Ford. He said that the charge of 7 cents per ton made by truckers for handling freight from railway terminals made it possible for trucks handling materials in intercity hauls and rendering a pick-up and delivery service actively to compete with rail lines for certain classes of business. The handling of l.c.l. livestock was reported to be an attractive business by O. S. Lamb, superintendent Kansas City, Kaw Valley & Western Railway.

W. S. Tuley, secretary and treasurer Kansas City, Clay County & St. Joseph Railway, sounded a warning in connection with interline freight agreements under the jurisdiction of the Interstate Commerce Commission, by calling attention to a possible interpretation of the recapture clause contained in section 15A, Art. 422 of the transportation act, which would affect passenger earnings.

Bus Operation

A paper on bus operation was read by F. S. Welty, assistant general manager Omaha & Council Bluffs Street Railway. He said that bus operation is a live subject at this time and is of interest to all engaged in the business of public transportation. It is now the generally accepted opinion that the bus is a valuable agency of transportation if used in the proper field, that of auxiliary or feeder service to existing transportation systems and service to territory not already provided with adequate rail transportation.

Rail transportation, said Mr. Welty, is cheapest and best where the density of traffic demands short headways, and the gas bus is cheapest for long headways, with the trolley bus intermediate between the two.

In thirty-two states public utility commissions have some sort of jurisdiction over the motor bus and in twenty they are empowered by law to issue certificates of convenience and necessity.

As to the feeling that prevails to some extent that bus operation is more economical than electric car operation, Mr. Welty cited figures collected by the committee on bus operation of the American Electric Railway Association, showing for twelve companies average operating costs of 24.6 cents per bus-mile, compared with an average for ten companies of 25.7 cents per car-mile for safety cars. The corresponding costs per seat-mile are 0.98 cent for the bus and 0.61 cent for the street car, or 60 per cent greater for the bus. Speaking of the gasoline tax, he mentioned that thirty-six states have a gasoline tax. In England the tax on gasoline has been abolished and a tax on licenses substituted. The tax on a bus seating twenty-six to thirty-two passengers is $350 in London and $290 elsewhere in England. Approximately $48,000,000 is raised through this method, he stated, but this amount is only one-fifth the annual road maintenance cost.

The Relation of Bus Operators to Electric Railway Associations

The subject of taxes and operating costs for buses was discussed briefly by M. J. Oswald of the St. Louis Car Company and B. Hilburn, general manager Tulsa Street Railway. F. G. Buffe raised the question of the proper policy for railway associations regarding the bus. That buses are here to stay and that sooner or later many railway companies will use them was considered a well-founded conclusion. Their possible field of usefulness in city transportation, however, was held to be limited to purely an auxiliary de luxe service, for which the public is willing to pay a higher price. Mr. Buffe maintained that the introduction of buses for city feeder or crosstown service would in many cases be followed by a public demand for continuous bus transportation to the business districts. Because of the fact that admission of independent bus companies to electric railway associations would in many cases admit bus operators who were actively competing with existing rail lines, he advocated opposition to such action by the railway associations.

A resolution subsequently was adopted on the subject of bus membership, to the effect that it is the sense of the association that the admission to membership of bus-operating companies in this or any other strictly electric railway association is a recognition of the necessity of duplication of transportation facilities and competition with the street railways, and as such is contrary to the best interests of the industry.

In the afternoon session, John S. Dean, Westinghouse Electric & Manufacturing Company, read a paper on shop practice and the maintenance of railway motors. The paper was illustrated by lantern slides and was discussed informally during its presentation. An abstract will appear later.

"One-man, two-man cars and train operation" was the subject of a paper read by D. L. Fennell, president of the association. This paper is also abstracted elsewhere in this issue. The use of remote exits on one-man cars was brought up in the discussion by J. L. Adams, superintendent of transportation Denver Tramway. Although this practice is followed by some properties with apparent success, it was felt that interchange at the front end under the direct supervision of the operator was the safer practice.

On account of the Midyear Meeting of the American Electric Railway Association at St. Louis on March 4 it was decided to postpone the annual meeting of the Mid-West Association to some time in June, the location being left open.

The final event of the meeting was a dinner. Addresses were given by several prominent men of Missouri, including Judge John S. Farrington and E. E. McJempsey. L. W. Baldwin, president Missouri Pacific Railroad, and a large group of other officials of the road were present as guests. Mr. Baldwin, in his talk to the association, said that the future of the transportation business, both steam and electric, depended on the fullest appreciation of the importance of selling the public a service which they want to buy.

Proposed Standards for Wrench Head Bolts and Nuts

THE first tentative report on standard dimensions for square and hexagon wrench head bolts and nuts has just been completed by a sub-committee on wrench heads, bolts and nuts of the sectional committee working under direction of the American Engineering Standards Committee. The material included consists of seven tables, supplemented by text and charts, to show various dimensions for width across flats of all types. The report is now available in pamphlet form for general distribution. Copies may be had by applying to the assistant secretary of the American Society of Mechanical Engineers, 29 West Thirty-ninth Street, New York, N. Y.

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American Association News

Tentative Program for Midyear Meeting

TRAFFIC problems and the improved financial condition of the industry will be the leading topics at the Midyear Meeting of the American Electric Railway Association to be held on March 4 at the Hotel Chase, St. Louis, according to the tentative program announced by Secretary J. W. Welsh.

President Budd will be toastmaster at the dinner, which will begin at 7:30 p.m. The speeches will include an address of welcome by the Governor of Missouri, Hon. A. M. Hyde, and addresses by Hon. Eliot Wadsworth, Assistant Secretary of the Treasury, and Judge B. F. Brough, Mayor of Toledo.

The program of the technical sessions follows:

The topic of the morning session, "Traffic Problems in Cities," will be opened with an address on this subject by Harland Bartholomew, city plan engineer of St. Louis. This will be followed by a discussion led by men who have studied the problem particularly in five of the large cities of the United States.

At the afternoon session the improved financial condition of the electric railways will be discussed in three addresses.

Following the afternoon session a reception to members and guests will be held.

The program of the business sessions is given below:

MORNING SESSION

10 A.M. to 1 P.M.

ADDRESS OF WELCOME—Honorable Henry W. Kiel, Mayor of St. Louis, Mo.

ADDRESS—President Britton I. Budd.

"Traffic Problems in Cities."

ADDRESS—Harland Bartholomew, city plan engineer, St. Louis, Mo.

DISCUSSION

New York City—Dr. J. A. Harriss, Special Deputy Policy Commissioner, New York, N. Y.

Cleveland—J. J. Stanley, president Cleveland Railway, Cleveland, Ohio.

Chicago—R. F. Kelker, Jr., Kelker, De Leuw & Company, Chicago, Ill.

Boston—Henry I. Harriman, chairman Metropolitan Planning Commission of Boston, Mass.

Los Angeles—G. B. Anderson, manager of Transportation Los Angeles Railway, Los Angeles, Cal.

AFTERNOON SESSION

2:30 P.M. to 5:30 P.M.

"The Improved Financial Condition of Electric Railways."

ADDRESS—J. K. Newman of Newman-Saunders & Company, New York, N. Y.

ADDRESS—H. E. Riggs, professor of civil engineering, University of Michigan, Ann Arbor, Mich.

ADDRESS—B. C. Cobb, Hodenpyl, Hardy & Company, Inc., New York, N. Y.

New Publicity Material

THE advertising section of the American Electric Railway Association has prepared a series of twelve attractive poster advertisements, each under the caption "Who Uses the Electric Car Lines?" Each advertisement depicts in a black and white sketch a different class of street car patron. The association has arranged to furnish cuts or mats for use in daily newspapers.

Power Generation and Conversion

A MEETING of the committee on power generation and conversion was held at New York, Jan. 18, with the following in attendance: L. D. Bale, chairman; C. E. Bennett, H. W. Codding, H. E. Davis, H. A. Kidder, F. W. Peters and V. H. Mueller, representing G. W. Saathoff. G. C. Hecker of the association staff and C. L. Riley, representing the American Society of Heating and Ventilating Engineers, also were present.

Sub-committees selected to handle the several assignments were appointed as follows:

Subject No. 1: R. L. Weber, chairman; C. E. Bennett, W. E. Bryan, H. A. Kidder, N. R. Love and L. J. Turley. It was felt that the committee should limit its activities to the preparation of a method of recording interruption to service, confined to the plants themselves. This would include not only trouble originating within the plant, but would list also troubles elsewhere on the system that when reflected to the plants would cause interruption to service.

Subject No. 2: T. H. Schoepf, chairman; H. W. Codding, F. C. Hanker, G. H. Kelsey, F. W. Peters, A. E. Stierly. It is desired that this committee define the various types of partial automatic and full automatic substations, together with a general analysis of the various service applications. The numerous types of d.c. feeder control system as utilized in various automatic substations are to receive consideration. The application and relative benefits derived from the shunt converter compared with the compound wound converter are to be included. Due to the importance of applications of remote and supervisory control systems it is deemed advisable to cover this subject not only from the standpoint of the control and supervision of the automatic substation but to include applications as applied to power production plants, transmission lines and distribution systems.

Subject No. 3: F. W. Peters, chairman; C. E. Bennett, W. E. Bryan, H. E. Davis, F. C. Hanker, H. R. Love and L. J. Turley. It was thought desirable to seek the services of men to work with this committee who were primarily interested in and intimately acquainted with the subject of ventilation. Accordingly, a request was made for co-operation with the American Society of Heating and Ventilating Engineers, the committee of the A.E.R.E.A. to be responsible for the report.

The committee is to suggest such methods of ventilation as affect the automatic substation, with reference to design of buildings, equipment or both, to bring about desired conditions in the various types of services. These suggestions should cover both natural and mechanical means of ventilation. The necessity on some systems of limiting noises arising from equipment operation will involve consideration of noise-proof substation buildings, particularly for use in residence districts.

Subject No. 4: G. W. Saathoff, chairman; H. W. Codding and H. A. Kidder. The work of this committee involves the review of existing standards.

Engineering Manual

A MEETING of the committee on Engineering Manual of the Engineering Association was held at New York, Jan. 15. Those present were: R. C. Cram, chairman; C. R. Harte, Daniel Durie and G. C. Hecker.

A complete review was made of the entire Engineering Manual, which had been set up in revised form for republication. All of the revisions approved by the committee on standards and the 1923 convention have been incorporated in the Manual sections, and a number of the drawings have been revised so as to eliminate large folded-in pages. Some additional drawings will have to be made in order to eliminate folded pages completely. It is anticipated that by the time these have been received the Manual will be ready for the printer. The committee believes it will be ready for distribution to the membership about April 15.

Coffin Prize

A MEETING of the Charles A. Coffin Prize Committee was held in New York on Jan. 11 with Britton I. Budd, J. N. Shannahan, James H. McGraw, J. G. Barry, R. R. Trench and J. W. Welsh present. The form of the letter to be sent out this year inviting the companies to make presentations for the prize was approved. The proposal to publish the 1923 presentations in book form was considered and tentatively approved provided the Coffin Foundation would take care of the expense. Mr. Barry later advised the committee that the foundation would do this.

The plan of publishing the book will probably be to edit the matter submitted by all companies into eight chapters, one on each of the subjects outlined by the committee in its instructions last year, rather than to publish the reports as such in the book. If the book is printed it will probably be distributed by the association or the foundation to various companies and others who may be interested in receiving it.

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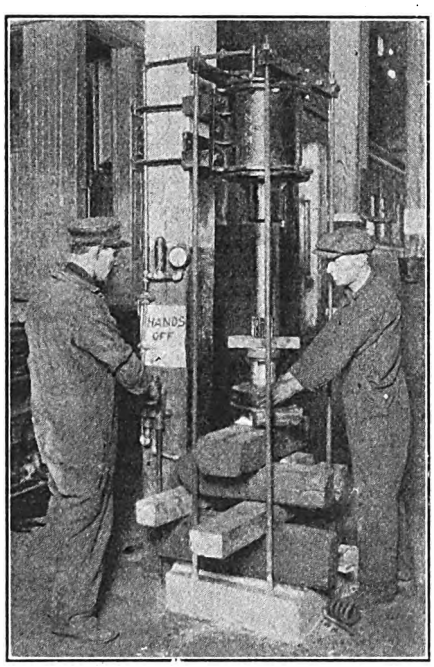
Maintenance of Equipment

Home-Made Bearing Press Prevents Loose Babbitt

ARMATURE bearings are pressed into their housings in the shops of the Connecticut Company, New Haven, Conn., by means of a shop-made press. A 12-in. brake cylinder is mounted on one of the upright posts in the shop at a convenient location and the stroke of the cylinder piston is regulated by means of a straight air brake valve.



Pressing an Armature Bearing Into Its Housing in the Shops of the Connecticut Company

A gage is mounted on the post immediately above the brake valve, so that the pressure can be watched by the operator as the bearing is pressed into the housing. A maximum of 65 lb. is allowed, and this is not exceeded as experience has shown that heavier pressures squeeze the bearings out of shape to such an extent that binding occurs and hot bearings result.

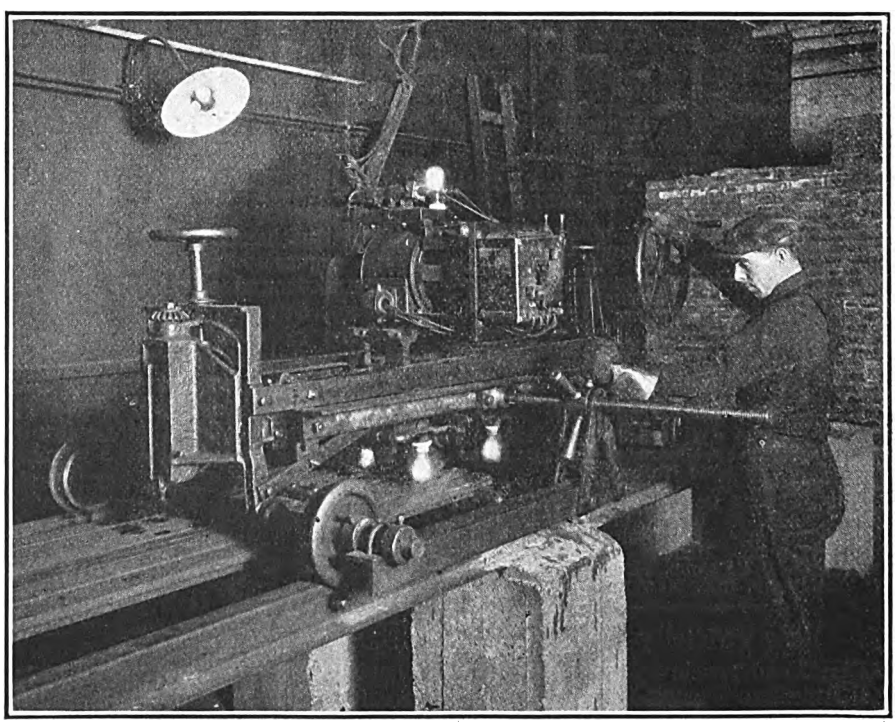
Before this press was devised bearings were pounded into position by using wood blocks and mallets. Bearings were frequently distorted and the babbitt was sometimes loosened by this operation. With the use of the bearing press there are no sudden jars to loosen the babbitt, and there is no guessing of the amount of pressure which is being applied, as this is shown by the gage.

Maintaining Conduit Conductor Rails

THE maintaining of conductor rails by electric railways using the underground conduit system is quite as difficult a proposition as that of maintaining the overhead structure and trolley wire on other roads. As the conductor rails are inclosed in the conduits underneath the street, it is necessary to remove them in order to carry out satisfactory repairs. The rails wear at the ends and breaks occur at these points. Also, sections become burnt, due to improper contact bearing with the shoe or on account of the occurrence of short circuits. In order to make repairs to the conductor rails in an efficient manner, the New York & Harlem Railroad, New York, N. Y., has installed some special equipment in its Ninety-sixth Street shop.

Most of the maintenance repair work consists of building up worn or burned portions of the rails by electric welding, and afterward grinding these smooth. In order to bring the welding and grinding equipment to a convenient height for efficient work, an elevated track has been constructed. The rails are raised about 3 ft. above the floor level and are supported on concrete piers. The welding equipment and grinder have been mounted on wheels so as to operate over these elevated rails. The conductor rails on which work is to be done are clamped firmly between the two operating rails, with supporting cross-members at each pier. The standard length of these conductor rails is 30 ft. Additional space is left at either end so that the welding and grinding equipment can be moved out entirely free of the ends of the conductor rails.

Accompanying illustrations show the welding and grinding equipment in operation. The welding equipment consists of four frames of resistance mounted upon a framework, with control switches and fuses mounted on the side of the carriage, and two car circuit breakers mounted at the end. Two receptacles are provided for plugging in the two leads necessary to connect to the electric circuit for welding. The carriage is con-



Grinding the Built-Up Portions to Give a Smooth Surface

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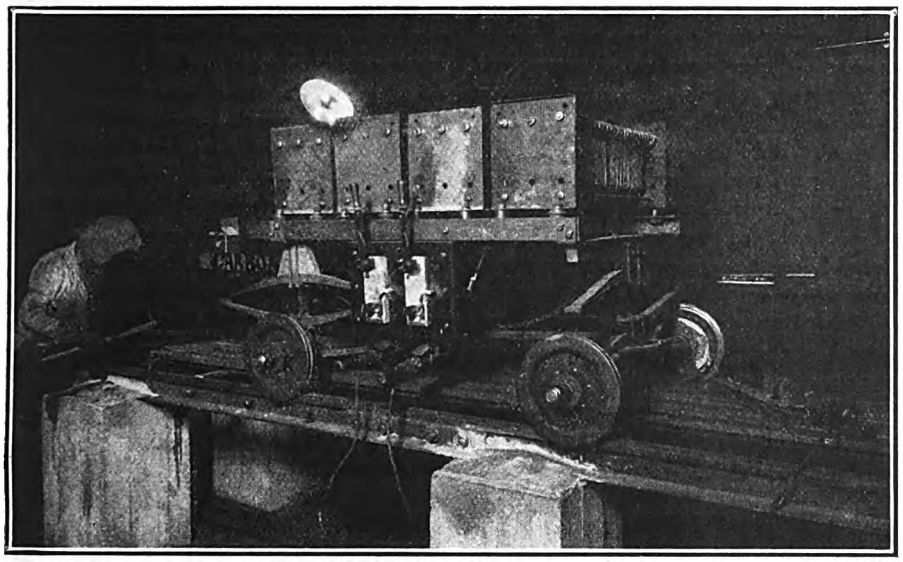


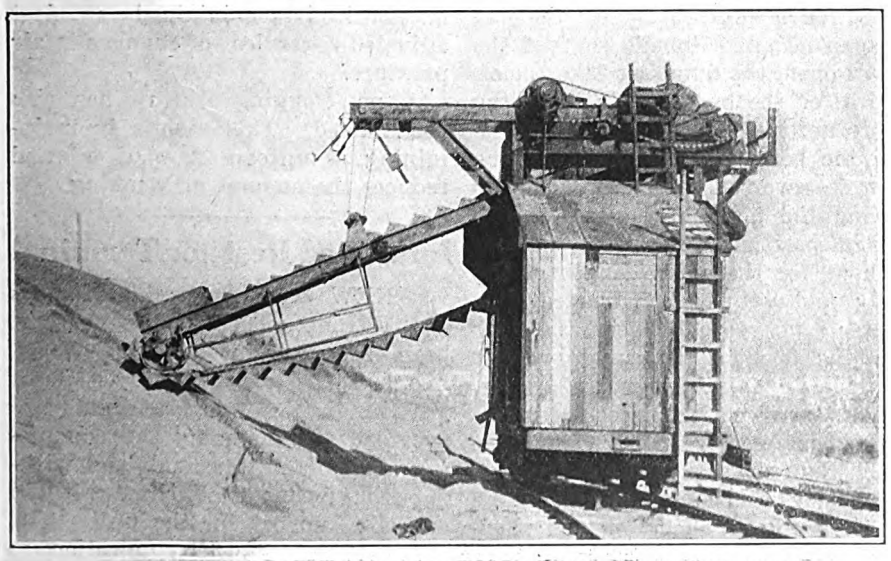
Building Up Worn Ends of Conductor Rails by Arc Welding

structed with two Ford axles having small wheels suitable for track operation mounted on them. The flanges of the wheels are placed on the outside of the rails in order to give additional clearance between the rails, so that six lengths of the conductor rail can be worked on at one time. The ground connection of the welder consists of a large bar of iron of sufficient length to span six conductor rails. It has a handle on top. One end is taken up with a receptacle in which the lead from the welding equipment can be plugged. With this arrangement the welding equipment can be rolled back and forth so as to be in close proximity to the place of welding. One man can then control the equipment and perform the welding operation.

The grinder used consists of standard Atlas equipment with special mounting to suit the conditions. The carriage has the wheels mounted with the flanges on the outside, the same as with the welding equipment. Controls for moving the grinding wheel forward and backward and also across the rails are arranged at the side of the carriage, so that the operator stands on the floor and controls all movements of the grinder. Through the use of this equipment rails are being reclaimed at a cost of less than one-fifth of what would be necessary to purchase new ones.

Handling Construction Sand

ALL sand used by the Market Street Railway in San Francisco in concrete, filling, etc., is obtained from an inexhaustible supply that is constantly being shifted in from the Pacific Ocean by the wind. A portable electric elevator of special construction, working from a spur track that parallels the sand dunes, loads the sand into cars, which are run onto a second spur paralleling the first track. A 20-yd. car can be loaded in this manner in ten minutes, only one man being required to operate the elevator.



Portable Electric Elevator Used for Filling Sand Car in San Francisco

Some Precautions Needed for Good Spray Painting

BY DENNIS O'BRIEN,
Foreman Painter Brooklyn-Manhattan Transit Corporation

WITH the increased use of paint-spraying equipment several troubles have been emphasized that are sometimes attributed to the paint gun or air brush, while in reality their cause lies somewhere else. These include pitting, sags and runs in the paint after it is applied, and excessive vapor fumes that arise during the painting operation. An analysis of the causes for pitting shows that it comes from the condensation of water upon the paint, enamel or varnish film. Pitting of the surface is not only a blemish but it is a menace that will destroy the entire job by decreasing the life of the paint. Pit marks soon accumulate molecules of water, which become blisters when the paint or varnish is dry. A condensation of moisture upon the varnish or enamel film before this has hardened will produce blooming and result in pitting. It is thus apparent that moisture should be kept out of the paint during the spraying operation. Certain paint-spraying equipment includes a water separator, which is attached to the material tank. Where such a separator is not used as a part of the paint-spraying equipment particular precautions should be taken in the shop air supply to prevent water condensation in the air reservoirs or piping, which is used with an air compressor to supply the necessary pressure for the spraying operation.

The most fruitful cause for sags and runs is incompetence of the workmen or unfamiliarity with the proper use of the spraying equipment. If the painter operates too close to the surface being painted an overaccumulation of material will result and sags and runs will occur in these places. This occurs more frequently with a "fugitive" paint; that is, a paint which has insufficient binder, lack of volatile matter, or a drier of poor quality or insufficient in amount. During the period that the paint is drying it is constantly taking on oxygen and giving

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up carbon dioxide. This action causes the paint to contract. If the paint is fugitive, runs and sags will appear due to the pigment deserting the vehicle.

In spraying varnish, an excessive amount of vapor or fumes has occurred in many cases, which takes place while the material is in the process of atomizing. Paint manufacturers have realized that the amount of vapor can be decreased considerably by the combinations used with their paint. Considerable time and expense have been given toward developing a varnish which will not give off an excessive amount of vapor. Apparently the most satisfactory result can be obtained with varnish by modifying the formula to adapt it for spraying. The volatile thinners incorporated in the varnish are needed, but the amount necessary may be cut down, or an "extender," which is not so active, may be used. Proper selection of gum for the manufacture of varnish is another important consideration. The resin gums used in varnish are of the soft or non-fossil type. Hard fossil gum will absorb a greater amount of the volatile matter than will the soft gum. By cutting down the percentage of volatile matter through the use of a neutral gum, which will absorb a large part of the volatile matter, the amount of vapor given off can be reduced considerably.

The oil in the varnish should not be overtreated with driers, as cracks and checks are sometimes caused by an oil medium which is not stable under the progressive influence of oxidation. The use of the air gun tends to impregnate the varnish with oxygen, and as the driers are oxidizing agents, the importance of proper selection of these will be readily appreciated. In addition to the disagreeable effects produced by excessive fumes, there is also an economic objection. The volatile matter leaving the paint gun carries a certain amount of varnish with it, which means a loss of material. Varnishes, as usually constituted, include but little lead drier, so that there is no danger of poisoning.

Some colors used in car painting give more difficulty from clouding than others. This is particularly true of the various yellows, which are now coming into more general use for painting electric cars. Painters find the operation of applying these colors either in japan or varnish with paint-spraying equipment somewhat tedious, and as a result only the best mechanics can be trusted to apply these colors properly.

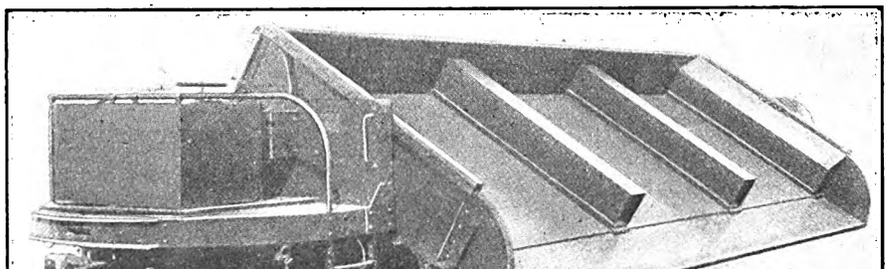
Proper air pressure is an important consideration, as the lower the air pressure the more even will be the flow of materials, so that a better leveling out is the result. The experience of the writer has shown that best results are obtained by setting the material gage at 20 lb. and the air line gage at 30 lb. An allowance is also made of about 1 lb. of pressure on each gage for every foot of height above the floor. Thus, if when a car is to be sprayed it is placed on jacks bringing the point of spraying 10 ft. above the floor, the material gage should show 30 lb. and the air line gage 40 lb. As the height at which the operator works is decreased, the air pressure should be reduced accordingly.

New Equipment Available

Dump Car with Door Chute

A NEW development in dump cars has just been added to the standard construction of cars made by the Differential Steel Car Company, Findlay, Ohio. The sides of the car are hinged at the bottom instead of the top, so that they form a chute when folding down. This extension places the material further from the track when dumped than with the previous type of construction. The operation is controlled from the motorman's control handle so that the doors open, the dumping takes place, and after the body rights itself the doors automatically close. In righting the body the movement of the door is reversed so that it folds up during the horizontal travel to the central position. The doors are continuous for the entire length of the body and are so constructed that there is no space between the door and the floor of the car to permit material to leak through.

This construction places the material about 2 ft. further from the track than the standard construction previously used and is an advantage as it eliminates shoveling and plowing to move the material free of the track.



The Sides of This Dump Car Form a Chute, Thus Placing Material Further from the Track.

New Oil-Burning Torches

A LINE of pressure torches and rivet forges has been placed on the market by the Johnston Manufacturing Company, Minneapolis, Minn. To overcome difficulties from variable air pressure in shops the burners are designed so that the vacuum by which the oil is drawn up varies directly as the air pressure. The relation between the air and oil supply is, therefore, automatically maintained as first adjusted regardless of changes in air pressure.

A non-clogging feature has also been added. This assists in maintaining a uniform flow of oil and reduces the amount of smoking.

Improved Resistor Terminal

A NEW type of terminal for its Vitrohm resistor units has just been brought out by the Ward-Leonard Electric Company, Mount Vernon, N. Y. Two brass nuts are provided for fastening the connecting lead to this terminal, and without other means of attachment it will act as a support for the unit. The terminal permits the connection to be locked firmly and then soldered.

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The News of the Industry

Home Rule Hearing Set

Cities of New York Would Have Permissive Rights Over Utilities Under Proposed Legislation

The enabling act proposed by the home rule commission of New York confers in simple and concise language upon the various cities a reaffirmation of all powers now existing under the constitution or granted by special law or special statute and in addition gives to them the right to adopt such further measures or amendments to existing laws as may be necessary in relation to their property, affairs or government.

The act, in general, makes the legislative government of a city conform as nearly as may be to that of the state. The common council may pass measures, which may be approved or vetoed by the mayor; it may repass a vetoed measure over his objections by a two-thirds vote, and a measure presented to the mayor and in his hands for thirty days without approval or disapproval arbitrarily becomes effective at the expiration of such time. Local laws must all be drawn in the same general form, may embrace but one subject and certified copies thereof must be filed with the Secretary of State at Albany.

Subdivision 2 of Sec. 11 of the enabling act, however, seems to afford assurance against a city plunging haphazard into a program of municipal ownership and operation of public utilities beyond the authority now vested in them by their charters and by special or general laws, as the phrase "not inconsistent with the constitution and laws of the State" can mean only that the city in order to start any such undertaking must proceed as a private corporation in relation to consents, authorization of capital outlay, rates, fares, and charges and the many other details essential to be complied with by a public service corporation before commencing to function.

It would appear that the matter of the extent of this power in relation to ownership and operation of public utilities will no doubt ultimately be a question for the courts to decide. Certain it is, however, that where a city, under the provisions of its charter or by any general or special law, now has such right, it may continue so to do, but in any event before engaging in any such activity in competition with an existing public utility, or otherwise, it must obtain a certificate of necessity from the Public Service Commission.

A public hearing on the proposed act is to be held at Albany on Jan. 30. Subject to such amendment as intelligent discussion may suggest, it will be redrafted and presented to the Legislature for approval.

Transit Commission Appointed

The appointment of a Transit Commission in Philadelphia, Pa., was authorized in a resolution presented by Charles B. Hall and adopted at a recent meeting of the City Council.

The commission will be composed of Mayor Kendrick, City Solicitor Gaffney, Charles B. Hall and Council committee on transportation and public utilities. In addition there will be a representative from the Chamber of Commerce, the Manufacturers' Club, the Operative Builders' Association, the United Business Men's Association, the Real Estate Board and the Builders' Exchange.

The commission, it is expected, will have broad powers in relation to city transit matters and problems concerning the building, financing and operation of high-speed transit lines.

New York Central Loses Buffalo Electrification Case

The city of Buffalo was the victor in the first round of the battle being waged between the municipality and the New York Central Railroad in an attempt to have the railway comply with the provisions of the ordinance adopted by the city some years ago requiring the roads entering the city to electrify their lines within the city. Judge Harry L. Taylor in Supreme Court dismissed the complaint of the New York Central in the action which it started against the city to prevent the municipal authorities from enforcing the electrification ordinance. The New York Central will take the case to the United States Supreme Court. The railroads entering Buffalo were required by the ordinance to file electrification plans by Jan. 1, 1922.

I.C.C. Will Hear Electric Railways on March 19

Consideration of the questions involved in the determination of the electric railways which come within the purview of the interstate commerce act will be taken up at a hearing at the Interstate Commerce Commission in Washington on March 19. The hearing was scheduled for Jan. 23. The postponement was made necessary by the far-reaching character of the commission's opinion in the matter of the valuation of the Washington Railway & Electric Company, referred to in the ELECTRIC RAILWAY JOURNAL previously.

Dynamiters Convicted

Four Former Buffalo Employees Found Guilty of Conspiracy in Connection with Interurban Disaster

Four former platform employees of the International Railway, Buffalo, and members of the Amalgamated Association, have been found guilty before Judge Morris in United States District Court of conspiracy to violate the Sherman anti-trust law in obstructing interstate commerce in connection with the dynamiting of the Buffalo-Niagara Falls high-speed line of the International at Ellwood Station during the early days of the 1922 strike.

The men are Francis Reilley and Healey Breeze, Buffalo; William H. Smith and William L. Vandell, Lockport. Sentence will be imposed on Jan. 28. Under the law, the maximum penalty is one year in jail and a fine of $5,000 or both. Counsel for the Amalgamated Association will appeal the verdict to the United States Circuit Court of Appeals.

Trial of the second group of the eighteen men under indictment in connection with the alleged dynamiting conspiracy will be moved by William J. Donovan before Judge John R. Hazel on Feb. 4. Among the next prisoners to go on trial will be State Senator Robert C. Lacey, John M. Parker, president of the Buffalo local of the Amalgamated; Clarence F. Conroy, business agent of the Amalgamated, and Vincent Tuero, financial secretary of the union.

The trial opened on Jan. 15 and the verdict was reported early in the evening of Jan. 21. None of the defendants took the witness stand and only three witnesses were called by the defense. Mr. Donovan, who conducted the prosecution, was called as a witness by the defense. He was asked to produce certain statements said to have been made by Vandell and Smith before the Federal Grand Jury. He was sustained by the court in his refusal to produce these statements, but added:

"I will testify to this—that Smith told me they got the dynamite to blow up the tracks."

Guy B. Moore, district attorney of Erie County, said he will present the evidence in the alleged dynamiting conspiracy to the County Grand Jury in an effort to seek indictments charging first degree assault with intent to kill and transportation of dynamite without a permit. Conviction on these charges carries a penalty of ten years.

One of the star witnesses for the government was Alvin Heineman, a roadhouse keeper, who confessed on the stand that he took part in the theft of

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dynamite from the magazine of a Lockport hardware store.

Witnesses during the first two days of the trial were passengers on the train that was dynamited. They testified to threats made by alleged strikers at the time they boarded the cars in Buffalo. The motorman of a Buffalo-bound train on the International who rendered first aid at the time of the accident testified that he found a burlap bag containing fifty-five sticks of dynamite wired to the Buffalo-bound tracks.

Virgil P. Jackson, a former International employee, and one of the fourteen men still to be tried, was taken into custody by Federal Secret Service operatives just as the trial of the first four defendants was nearing a close. He had escaped capture for several months. He was committed to jail under orders of the federal prosecutor.

Look and See Public Utilities at Work

"The Open Window" is the name of the new bulletin of public utility information which will be issued from time to time by the Oregon Public Utility Information Bureau. The first pamphlet gives some interesting information on public utility courses which are being conducted in various colleges and schools, and the financial needs of electric railways throughout the country, and tells just what the yearly payroll is for the seven leading utilities included in the Oregon Public Utility Information Bureau. The committee which makes up the bureau is composed of executives of the leading utilities of the state, companies that have $125,000,000 invested in Oregon and that furnish service to 200,000 regular customers. W. P. Strandborg of the Portland Railway, Light & Power Company is director of the bureau, with office in the Electric Building, Portland.

New Companies Take Over Katy Line

The Oklahoma City-Ada-Atoka Railway has been authorized by the Oklahoma Corporation Commission to acquire from H. R. Hudson a line formerly belonging to the Missouri, Kansas & Texas Railway, extending from Shawnee, Okla., to Coalgate, approximately 77 miles, together with equipment and other property. Another order authorizes the Oklahoma City-Shawnee Interurban Railway to acquire from H. R. Hudson a line formerly belonging to the Missouri, Kansas & Texas, extending from Oklahoma City to Shawnee, approximately 39 miles. The orders are dated Jan. 7. No information is contained in the orders as to what persons constitute the companies named in the order. Recent newspaper accounts, however, state that these two sections of the old Katy line, which extends from Oklahoma City to Atoka, are to be operated by the companies mentioned in the order, the section extending from Oklahoma City to Shawnee to be electrified and the section extending from Shawnee to Atoka to be operated as a steam railroad.

Electrification Under Way

Contracts Awarded for Material for Dallas-Denton Line—Completion Expected in Fall

Work has commenced on the electrification of the steam line of the Missouri-Kansas-Texas Railway from Dallas to Denton, Tex., a distance of 47 miles. It is under the direction of Richard Meriwether, vice-president and general manager of the Dallas (Tex.) Railway and vice-president of the Texas Construction Company, which has been organized to carry out the electrification project.

The Dallas-Denton line, when electrified and put in operation, will be a duplicate of the Dallas-Terrell line, which has been in operation one year on Jan. 13 of this year. Similar overhead construction will be employed, similar trolley poles and trolley wire used, and the automatic substations on the Dallas-Terrell line will be duplicated on the Dallas-Denton line.

Orders have been placed for most of the material to be used, and it is expected that this material will begin arriving in Dallas by April 1. In the meantime grading and other construction work will be carried forward. The overhead construction will be of the catenary type. Contracts for copper feed lines and copper trolley wire have been awarded to the Southwest General Electric Company.

There will be three automatic substations, each a dulpicate of the stations built and in operation on the Dallas-Terrell line. One of these substations will be located near Farmer's Branch, about 13 miles out of Dallas. A second will be located just beyond Carrollton, about 24 miles out of Dallas, and the third will be located about 2 miles from Denton. Contracts for the equipment for the substations have been awarded to the General Electric Company.

Current for operation of the line will be supplied by the Texas Power & Light Company. That company now has several feed lines within 10 to 15 miles of the interurban line. A connecting transmission line will be built to deliver current to the interurban company's feed lines at 60,000 volts.

New tracks must be laid for connection of the tracks of the Dallas Railway in Dallas with the main line of the steam road near Hudnall, a station just outside the city limits near the Love Field Industrial District north of the city. This will require construction of about 1½ miles of trackage. Seventy-pound standard A.S.C.E. rail for this construction and for the extension in Denton from the point where the cars will leave the steam line to the interurban station uptown has been ordered from the Bethlehem Steel Company.

Six passenger cars will be used, exact duplicates of the cars in service on the Dallas-Terrell line. They will be lightweight cars, built by the American Car Company. Each car will be 45 ft. in length over all and will seat fifty-four passengers. The cars are designed so they may be operated either by one man or two men. Motors and control will be supplied by the General Electric Company.

The Dallas-Denton Katy electrification project is being carried out by the Dallas Railway interests in fulfillment of commitments made at the time the present franchise was granted the railway interests in Dallas in 1917.

As stated previously, Mr. Meriwether will have active charge of all details of the electrification project. B. R. Brown is chief engineer and will have charge of engineering details of the electrification. B. F. Cook is electrical engineer and will have charge of the installation of the three substations and other electrical installation on the line.

Receiver Talks Direct to Riding Public

Something unusual has again been done by the New York & Queens County Railway, Long Island City. General Lincoln C. Andrews, the receiver, has reported direct to the riding public in a statement issued on Jan. 18 in which he summarized the accomplishments of the management during the year with the defunct railway. Just a year ago from the date of the statement the New York & Queens County Railway went into receivership by order of Supreme Court Justice James C. Van Siclen.

It was a very serious question at first, General Andrews explains, whether the road would be able to function more than a few weeks without the continued financial assistance which had for years been given by the Interborough Rapid Transit Company. Car-mile earnings were and still are the lowest of any company in the entire city of New York. The receiver started in the dead of winter, when receipts are lowest and expenses highest, because of fighting snow storms and heating cars. However, the new management saw enough opportunities for improving the operations of the company to justify the determination to make the road go, and to go better for all concerned.

General Andrews says that the daily passengers are the best judges of what has been accomplished in that line, and although there is still much room for improvement, it seemed appropriate at the end of the first year to call attention to the more important changes that have been made. He then proceeds to tell about the new direct service installed, the bonus for employees, the twelve new one-man cars, the track rebuilt, the cars repainted and repaired, the decrease in accidents, etc.

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Dr. Maltbie Retained by Chicago City Administration

A study of Chicago's transportation problem will be made by the city administration under direction of Dr. Milo Roy Maltbie, New York, who has been engaged temporarily at the rate of $100 a day and personal expenses. Dr. Maltbie, it is expected, will complete the analysis of the many reports and valuations of the traction lines in Chicago within sixty days, and thus at an expenditure of only $7,000 Corporation Counsel Busch hopes to effect a saving of $100,000 to the city through elimination of duplication of effort. Moreover, Dr. Maltbie's findings are expected to give the Mayor the figure at which he should effect a settlement with existing surface and elevated lines. His report will also serve as a guide for the administration in fixing its subway construction policy. Headquarters have been established by Dr. Maltbie at the office of the Board of Supervising Engineers.

Wage Bonus Arranged for Men on Toledo Suburban Lines

New wage agreements involving a profit-sharing plan have been completed between representatives of the employees and the managements of the Maumee Valley Railway and the Northwestern Ohio Interurban Railway at Toledo.

The Northwestern Ohio men in passenger service will receive an increase of 5 cents an hour and men in freight service an advance of 7 cents an hour. A minimum ten-hour day is provided. The new agreement dates back to Jan. 1, 1924.

If the passenger revenues increase 10 per cent during the first six months of this year as compared with the first six months of last year the men will receive an additional raise of 2 cents an hour.

The new scale on the Maumee Valley lines is 53 cents an hour for the first three months' service and 55 cents an hour thereafter. There is a provision in this contract whereby the men receive an additional 2½ cents an hour on each $1,000 increase a month in the gross earnings of the company above $11,000 a month. This plan was in effect in December and the men received 60 cents an hour by the bonus arrangement.

This company is operating its new equipment on the one-man plan with helper.

Rules Are Adopted to Govern Buffalo Co-operative Wage Fund

Regulations governing the Co-operative Wage Fund of the International Railway, Buffalo, have been adopted by the Co-operative Council. The fund will be administered under the direction of the council by a board of trustees consisting of four members, the president, vice-president, secretary and treasurer of the co-operative association. The wage increase granted to employees on Jan. 1, 1924, has been turned into the fund by 99 per cent of the company's employees and the trustees are authorized to use this fund to purchase securities of the International Railway.

The trustees will issue to members of the fund, non-transferable participation certificates in amount equal to the wages deposited in the fund by the individual members.

Girard Passes Ordinance—Service Continuance Up to Niles

The Girard City Council recently granted the West End Traction Company, a subsidiary of the Pennsylvania-Ohio Electric Company, a new franchise calling for increased fares between Girard and Youngstown. This action follows close upon the decision of the Warren City Council in authorizing increased rates.

The new franchise which expires in January, 1948, provides for a cash fare of 15 cents between the two cities, with the privilege of purchasing ten tickets for $1. Between the northerly limits of Girard and Stop 7 the cash fare will be 10 cents, or six tickets for 50 cents. There is no provision in the ordinance for service between Girard and Niles. The ordinance as proposed stood for a straight 10-cent fare in the city and the company agreed to the ticket concession and also to a concession providing for six "owl" cars between 11 p.m. and 5.30 a.m. to take care of the men going to and from their work.

A settlement on the continuation of electric railway service in Trumbull County, between the easterly limits of Girard and Warren, is up to Niles and a final decision is awaited. The controversy between Niles and the West End company started over the Robbins Avenue paving work.

News Notes

Public Trustees Reappointed.—Governor Cox of Massachusetts has reappointed Arthur G. Wadleigh, Frederick J. Crowley, Earle P. Charlton, Isaac Sprague and George M. Bryne as public trustees of the Eastern Massachusetts Street Railway.

Will Reduce Pay.—The Selma Electric Railway, Selma, Ala., has notified its employees that their salaries will be reduced on Feb. 1. This is a last resort to keep the cars running. It is said that the Selma railway has been operating at a loss for the past three years.

Property for Depot Acquired.—The last property needed to complete the site of the new depot of the Louisville & Interurban Railway, Louisville, Ky., was recently acquired. No definite information has been given as to when the construction of the new interurban depot will be started. Some of the buildings at the far end of the block have already been wrecked, to make room for the depot, and others are to be wrecked shortly, as most of the tenants have vacated.

School for Supervisors Started.—A semi-annual school for supervisors has been started by the Los Angeles Railway, Los Angeles, Cal. The course consists of five lectures on various features of electric railway service given by department heads. The subjects announced are "discipline and deportment," "rules and their interpretation," "forms of transportation," "emergency action in handling accidents," "legal highlights of accidents," "schedules," "maintenance of regular service," "mechanical and electrical equipment." For the last meeting arrangements were made for demonstrations at the shops, conducted by the engineering department.

Tie-Up Delays Commuters.—Power was off the electrified lines of the entire Pensylvania system from Manhattan Transfer to Long Island City on Jan. 21 from 5.15 until 6.48 p.m. As a result not a train moved during that time. The shutdown of train service was caused by an accident to the rotaries in the substation supplying this section of the line.

Wages Advanced.—The Commission Council of Monroe, La., has increased the pay of operators of the Monroe Street Railway, owned by the municipality, to a schedule amounting to 45 cents an hour. Increase in pay was granted according to a statement issued by the Commission Council because of the faithfulness of employees during the preceding year, and because the earnings of the company have increased and are continuing to increase.

Wage Demands Made.—During his appeal before a special Council committee for better operating conditions for the cars of the Georgia Railway & Power Company, H. M. Atkinson, chairman of the board of directors of the company, stated that the employees had already demanded a 25 per cent increase in pay. He said that at the expiration of the 1923 labor contract the men had presented their demands, which had been submitted to arbitration. He said that the company told the men that not even the merits of the increase could be considered until the railway end of the business was placed on a paying basis.

New Subway Proposed.—Legislation is proposed in the Massachusetts House of Representatives for a new subway in Boston to run under the aristocratic Commonwealth Avenue and under the Public Garden and Boston Common, to connect at Park Street with the present subway system. The novel feature is the provision for automobile parking spaces on both sides of the new subway, to relieve congestion on the surface. Warren E. Locke is the sponsor for this proposition.

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Financial and Corporate

New Chicago Company

Chicago Rapid Transit Company Is the Successor Under Reorganization to the Elevated Railways There

Following the recent sale of the common stock of the Chicago Elevated Railways pledged as collateral to secure a note issue, the plan to reorganize the properties proceeded without further interruption. In accordance with the plan the Northwestern Elevated Railroad, the South Side Elevated Railroad and the Metropolitan West Side Elevated Railway have been consolidated as the Chicago Rapid Transit Company with the approval of the Illinois Commerce Commission. Another step to be taken will be the sale of the Oak Park Elevated Railroad by Samuel Insull as receiver to the Chicago Rapid Transit Company. This move only awaits the formal approval of the court. The sum of $7,700,000 is the reported price to be paid for this property.

The officers of the Chicago Rapid Transit Company are: Samuel Insull, chairman of the board of directors; Britton I. Budd, president; R. Floyd Clinch and E. C. Noe, vice-presidents; B. J. Fallon, vice-president and general manager; W. V. Griffin, secretary-treasurer; E. A. Brion, comptroller, and T. B. MacRae, auditor. These men all held offices with the separate companies corresponding with those to which they have been elected with the successor organization, except that Mr. Fallon, who was general manager, has in addition been made a vice-president.

The sale of the properties has been referred to previously in the ELECTRIC RAILWAY JOURNAL and mention has been made before, also very briefly, of the financial set-up of the successor company. Under the reorganization the capitalization will be scaled down $34,700,000, from about $121,895,000 to $87,196,500. This has been accomplished by wiping out the preferred and the common shares of the Chicago Elevated Railways, which were pledged to secure the notes.

The capitalization of the new company will be:

CAPITALIZATION OF SUCCESSOR TO CHICAGO ELEVATED RAILWAYS

First lien and refunding mortgage gold bonds, Series A, 6 per cent (due July 1, 1953)	$1,600,000
Adjustment debenture bonds (due July 1, 1963)	18,563,000
Common stock (par $100)	20,329,500
Underlying securities, which remain undisturbed	46,704,000
Total capitalization	$87,196,500

In consideration for the surrender and cancellation of the stocks and indebtedness of the three subsidiary companies it was proposed to deliver to the reorganization committee $1,400,000 of first lien and refunding mortgage bonds, $16,380,000 of adjustment debentures and $10,150,000 of common stock. In consideration for the surrender and cancellation of certain indebtedness it was proposed to deliver to the holders of claims of indebtedness $200,000 of first lien and refunding mortgage bonds, $2,183,000 of adjustment debentures and $10,179,500 of common stock.

The holders of certificates of deposit representing the secured gold notes as extended to July 1, 1919, were to be entitled to receive for each $1,000 of notes $100 of first lien and refunding mortgage gold bonds, $1,170 of adjustment debentures and $350 of trust certificates for common stock. Holders of similar certificates of deposit representing the secured gold notes due July 1, 1916, but not extended were to be entitled to receive for each $1,000 of notes, $100 of first lien and refunding mortgage gold bonds and $1,170 of adjustment debentures. The holders of the Chicago Elevated Railways ten-year 6 per cent debentures were to be entitled to receive for each $100 of debentures $70 in trust certificates for common stock of the consolidated corporation.

Purchase Offer Renewed at Boston

There will be a renewal this year of the proposition for the Boston Elevated Railway to take over a part of the property of the Eastern Massachusetts Street Railway in Chelsea and Revere, so as to extend the 10-cent fare to Revere Beach.

Representatives of the cities of Revere, Chelsea and Malden have conferred with Mayor Curley of Boston about the subject and the Mayor has ordered the Boston Transit Commission to investigate the merits of it and the finances involved. If the Boston Elevated acquired a line to Revere the 10-cent fare would automatically follow, as it is a charter provision for the Elevated to charge only a single fare in any one direction.

This proposition has been up for many years, at times before the Massachusetts Legislature, and at other times before special commissions and before conferences between the Boston Elevated Railway and the Eastern Massachusetts Street Railway officials.

Inability to agree upon the price that the Elevated should pay the Eastern Massachusetts for the section that would have to be taken is one reason why so little progress has been made in the past. There is a marked difference of opinion, also, regarding what part of the Eastern Massachusetts should be annexed to the Elevated, since there is more than one route from Boston into Revere.

Receivers to Be Discharged

Court Indicates that Formal Order Will Be Entered for Restoring Pittsburgh Railways to Owners

Formal order will be entered very shortly lifting the receivership of the Pittsburgh Railways. This was indicated in a statement made public by Judge Thomson of the United States District Court, on Jan. 24, in discussing the petition requesting such action. The opinion of the court reviews at length the situation affecting the company since the appointment of receivers in 1918. The court says that to deny the petition for the lifting of the receivership would probably result in the abrogation of existing contracts and also result in the parties concerned resorting to their respective rights and remedies under the law. Creditors have been patient, and have greatly aided the receivers in preserving the property from disintegration. The court's concern is that the property shall continue to be operated as a whole in the future.

In its decision thus to preserve the system in its entirety the court follows the advice of the special master in his conclusion that it is in the interest of the petitioner as well as the public that the receivership should be terminated as soon as possible so that the proposed reorganization may be permitted to proceed without delay.

The terms of the proposed reorganization have been reviewed previously in the ELECTRIC RAILWAY JOURNAL at considerable length. One of the most important provisions is the arrangement made for rehabilitating the property. The Philadelphia Company owns nearly all of the stock of the Pittsburgh Railways and many of its bonds and notes as well as obligations of the underlying companies and much of their stock. That company and the Pittsburgh Railways have entered into an agreement with the Union Trust Company, Pittsburgh, whereby the proceeds of two loans amounting to $5,000,000 will be available in the reorganization, $3,000,000 for the purchase of new cars and $2,000,000 for the erection of carhouses and the carrying out of other improvements. So far as the general creditors of the Pittsburgh Railways are concerned they have agreed to the extent of nearly 97 per cent in amount to defer payment of their claims over a period of from one to ten years after a discharge of the receivers.

The court says that perhaps there is no system of railroad transportation in the country that is more involved and complicated than the Pittsburgh system. It is made up of more than 200 incorporated companies brought together through lease, agreements and stock ownership. In reviewing the recent earnings of the company the court says that the report of the special master for the year 1922 shows that there is a net income of $329,329 from all sources in the hands of the receivers after the payment of all operating expenses, taxes, etc. This the

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court indicates as a propitious sign for the future.

The court refers to the exception taken by Receiver Fagan to some of the findings of the special master and says that while it is not entirely satisfied that the facts warrant all the optimistic views of the petitioners and their counsel, the court itself has been governed by the fact that the plan seems to meet with the approval of the great majority of those most vitally interested, and appears to be for the best interest of all concerned.

Are Income Taxes an Operating Expense Under Service-at-Cost?

Commissioner Paul H. Maloney of the Department of Public Utilities at New Orleans and the officials of the Public Service, Inc., are in disagreement over a ruling made by City Attorney Kittredge as to what constitutes "operating expense." The officials of the Public Service, Inc., hold that money paid out by the public utility for income taxes is an operating expense.

With this view of the matter the City Attorney coincides. Commissioner Maloney, however, thinks differently. He holds that if this be true, it will seriously affect the rate base upon which the corporation is permitted, under its agreement with the city, to figure its income and would hence necessitate additional earnings of the company before the railway, power and gas rates could be reduced.

Commissioner Maloney admits that the earnings of the company this year did not permit the corporation to make its permitted rate of 7.5 per cent, but speaking for the future he said it would be establishing a precedent that he doesn't approve to allow the tax item in operating expenses.

Successor to San Francisco-Oakland Organized

Permanent organization of the board of directors and election of officers of the Key System Transit Company, which has acquired all of the property of the San Francisco-Oakland Terminal Railways, Oakland, Cal., was effected on Jan. 10.

C. O. G. Miller was elected president. W. R. Alberger was elected vice-president and general manager. W. W. Garthwaite was elected vice-president.

An executive committee, consisting of John S. Drum, P. E. Bowles, W. W. Garthwaite, Warren Olney and W. I. Brobeck, was elected, of which John S. Drum was appointed chairman and Mr. Bowles vice-chairman.

The directors elected are: W. W. Garthwaite, John S. Drum, H. C. Capwell, Warren Olney, J. F. Carlston, A. Crawford Greene, W. I. Brobeck, J. K. Moffitt, C. O. G. Miller, Robert G. Hooker, P. E. Bowles, Samuel Knight, Miles Standish, B. H. Dibblee and W. R. Alberger.

Hartford & Springfield Property Discontinues Certain Lines

The Hartford & Springfield Street Railway discontinued service Jan. 24 on the stretch between the Massachusetts State line and Windsor Locks, Conn., installing in its place a bus service. For some weeks the company has run a Fageol thirty-passenger bus as auxiliary service. Additional buses are being procured. Buses run from Court Square, Springfield, to Windsor Locks. Until further notice, however, one round trip will be made on the electric road between Windsor Locks and the State line in the early morning, making connections for Windsor and Hartford, but the fare is increased from three tokens for 15 cents to three tokens for 25 cents.

The stretch of road on which service has been discontinued consists of two sections under different ownership. The section from the State line to Kent's Corner in Suffield is owned by the New York, New Haven & Hartford Railroad and was for some time operated by the Springfield Street Railway under a lease and recently has been operated by the Hartford & Springfield. The section from Kent's Corner to Windsor Locks is owned by the Hartford & Springfield. No announcement has been made respecting disposition of properties that may be no longer needed by the company.

$120,000 Loss in Louisville After Expenses, Including Dividends

Complete figures for 1923 operations of the Louisville Railway are not yet available, but the approximate figures indicate that the necessary expenditures for operation, taxes, fixed charges and dividend payments, as set out and provided in the ordinance under which the company is operating, are approximately $120,000 more than were the earnings of the company from all sources.

The barometer fund stood at $350,000 on Jan. 1, 1923, and at approximately $230,000 on Dec. 31, 1923. There had been credited to the fund all earnings of the company and deducted from the fund all legitimate expense of operation, the net result being a decrease of $120,000 in the barometer fund.

During the early part of 1923 programs for economies were incomplete, and it was known that they could not be completed until later in the year. It was, therefore, expected that the withdrawals from the barometer fund would be larger than normal. This is borne out by the fact that for the month of December a net increase in the barometer fund is indicated and a very considerable improvement is anticipated as soon as the powerhouse consolidation now under way is effected. This consolidation will put all power-generating facilities at the High Street plant.

President Barnes of the company has felt called upon to try to correct the impression which prevails locally that the ordinance under which the Louisville Railway is at present operating guarantees on the part of the city the fixed charges and dividends of the railway company.

This is not the case. He says the company can meet these obligations only if the earnings are sufficient to do so. No fare increase is possible during the years 1924 and 1925, and after that the fare cannot under the ordinance be increased beyond 7 cents straight, no matter how large the expansion may be to the company in the items of operating expenses, taxes and fixed charges.

Conspectus of Indexes for January, 1924

Compiled for Publication in this Paper by

Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Street Railway Fares* 1913 = 4.84	Jan. 1924 **6.91**	Dec. 1923 **6.89**	Jan. 1923 **6.94**	May 1921 **7.24**	May 1923 **6.88**
Street Railway Materials* 1913 = 100	Dec. 1923 **156**	Nov. 1923 **158**	Dec. 1922 **174**	Sept. 1920 **247**	Sept. 1921 **156**
Street Railway Wages* 1913 = 100	Jan. 1924 **219**	Dec. 1923 **218**	Jan. 1923 **207**	Sept. 1920 **232**	Apr. 1923 **207**
Steel—Unfilled Orders (Million Tons) 1913 = 5.91	Dec. 31 1923 **4.45**	Nov. 30 1923 **4.37**	Dec. 31 1922 **6.75**	July 31 1920 **11.12**	Feb. 28 1922 **4.14**
U.S. Bank Clearings Outside N. Y. City (Billions)	Dec. 1923 **15.90**	Nov. 1923 **15.30**	Dec. 1922 **14.94**	Mar. 1920 **18.54**	Feb. 1922 **10.65**
Business Failures Number	Dec. 1923 **1,862**	Nov 1923 **1,644**	Dec. 1922 **1,862**	Jan. 1922 **2,722**	Sept. 1923 **1,280**
Liabilities (millions)	**80.37**	**67.54**	**47.81**	**105.7**	**27.50**

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Eng. News-Record Construction costs 1913 = 100	Jan. 1924 **217.9**	Dec 1923 **217.3**	Jan. 1923 **191.7**	June 1920 **273.8**	Mar. 1922 **162.0**
U.S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Dec. 1923 **151**	Nov. 1923 **152**	Dec. 1922 **156**	May 1920 **247**	Jan. 1922 **138**
Bradstreet's Wholesale Commodities 1913=9.21	Jan. 1 1924 **13.27**	Dec. 1 1923 **13.44**	Jan. 1 1923 **13.70**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
Dun's—Wholesale Commodities 1913 = 120.9	Jan. 1 1924 **189.9**	Dec. 1 1923 **190.9**	Jan. 1 1923 **185.6**	May 1 1920 **263.3**	July 1 1921 **159.8**
U.S. Bur. Lab. Stat. Retail food 1913 = 100	Dec. 1923 **150**	Nov. 1923 **151**	Dec. 1922 **147**	June 1920 **219**	Mar. 1922 **139**
Nat. Ind. Conf. Bd. Cost of living 1914 = 100	Dec. 1923 **165.0**	Nov. 1923 **165.3**	Dec. 1922 **158.9**	July 1920 **204.5**	Aug. 1922 **154.5**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials.

Wages index is relative average maximum hourly wage of motormen and conductors on 105 street and interurban railways in the United States, operating more than 100 passenger cars each, and weighted according to number of cars.

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Talk of Merger of New York and Chicago Bus Lines

John A. Ritchie and John Hertz, representing the Chicago Motor Coach Company, conferred on Jan. 15 with General O'Ryan and Commissioner Harkness of the New York Transit Commission about the possible acquisition by them of the Fifth Avenue Coach Company. They stated that negotiations were under way but would not be consummated by them unless their plans met with the approval of the Transit Commission. They stated that, aside from any question of the legal powers of the commission in the premises, they would not care to enter the New York bus field unless such a course were agreeable to the commission.

If, on the contrary, that course did not meet with the approval of the commission they would immediately drop all negotiations. The matter was gone over at length and at the end of the conference the commissioners informed Messrs. Ritchie and Hertz that the matter would be taken under consideration by the commission and that a definite reply would be made shortly, when the deliberations were completed.

The Fifth Avenue Coach Company has been controlled by the New York Transportation Company, but with some 46 per cent of the stock in the hands of the Fifth Avenue Bus Company, organized subsequent to the collapse of the Interborough Consolidated. The company is supposedly controlled by Interborough Rapid Transit interests.

Service Suspended in Amarillo

The city of Amarillo, Tex., has again discontinued operation of the car lines of that city, having found such operation prohibitive on account of its cost. George S. Seideman, Houston, Tex., started a bus service to meet the transportation demands of the city, but this service was found unprofitable and has also been discontinued. The city now is without transportation facilities. The city officials are looking about and hope soon to announce completion of details by which the city will be given an adequate transportation system.

The Amarillo Traction Company suspended operation in 1920. Since that date and up to July of last year the city operated the railway under lease from the owners because the owners, unable to pay operating costs, proposed junking the line. When the contract expired in July of last year the city manager was instructed by the City Commission to notify the owners of the property that the city would not care to renew its lease or to undertake to operate the property longer. However, when the commission's decision became known a committee of business men got the city's approval of a plan for operation of cars for another sixty days by the city. A little while later the city resumed operation of the line, charging a fare of 5 cents instead of 10 cents, with the result that business picked up and it appeared that the property could be made to pay operating expenses. The plan failed, however, and the city has again discontined the operation of the line.

Street Tax Is a First Lien

The United States Circuit Court of Appeals has reversed the decision of Judge Robert E. Lewis while he was sitting in the District Court at Denver. Judge Lewis ruled that a franchise tax was an ordinary debt. The ruling was made in the case of the Denver Tramway. In 1906 that company agreed to pay a street tax of $5,000 monthly and this it did up to the time of the 1920 strike. The company later went into the hands of a receiver. It then argued that money due for the tax—agreed to as owed—was, like the rest of its debts, to be paid in routine. The city disagreed and the case went before Judge Lewis in the Federal District Court. He decided in favor of the company. The amount due is $205,000.

Three Ohio Roads Seek Permission to Abandon Service

The Cleveland, Alliance & Mahoning Valley Railway, Ravenna, Ohio; the Cleveland & Chagrin Falls Railway, Cleveland, and the Cleveland & Eastern Traction Company, Cleveland, all have applications pending before the Public Utilities Commission of Ohio for permission to abandon operation.

A hearing was held on Jan. 16 on the petition of the Cleveland, Alliance & Mahoning Valley Railway. That company operates from Alliance to Ravenna, with a branch from Ravenna to Warren. Fred S. Clingman, president, told the commission that the company is operating at a loss; that he is unable to pay taxes, and that banks will not loan him money. The road has been in receiver's hands since 1920. He said passenger receipts had fallen from $186,000 in 1920 to $143,000 in 1923. The company is in default of interest on its bonded debt of $1,116,000. It operates 45 miles of line.

The Cleveland & Chagrin Falls Railway runs from Lynfield Wye in Shaker Heights near Cleveland to Chagrin Falls, a distance of 12 miles, and the Cleveland & Eastern Traction Company operates a main line from Lee and Mayfield Roads, Cleveland Heights, to Chardon, a distance of 25.5 miles, and a branch line from Warrendale Junction through Burton to Middlefield, a distance of 14.23 miles.

Successor to Orange County Traction Seeks Approval

No opposition developed at the hearing before the Public Service Commission at Albany on Jan. 16 on the matter of the reorganization of the Orange County Traction Company into the Newburgh City & Suburban Railway, Inc., to operate transit lines in Newburgh, N. Y., and immediate vicinity. It was stated in the evidence that the new company proposes to take over all the franchises and property of the traction company, which except for one line has gone over to bus operation.

No Action on Abandonment. — The City Council of Toledo, Ohio, has taken no action yet on the abandonment of the Indiana line of the Community Traction Company, which has been before it for several weeks. This step was recommended by the commissioner nearly two years ago.

Terminal Line to Be Sold by Montreal Tramway.—The Montreal Tramways, Montreal, Que., has announced that it intends to apply to the Legislature at its next session for permission to sell that part of its system known as the Terminal Railway. Approval of the Montreal Tramways Commission to the sale will also have to be obtained. The right-of-way parallels the Canadian National lines through a large part of Montreal. Its purchase by that company will give the tramway a good amount of cash. The sale will be made to the Canadian National Railways, which requires the line to bring the right-of-way up to the standard width.

Increase of $10,000,000 in Indebtedness Proposed.—At the annual meeting of the Philadelphia Rapid Transit Company on March 19 stockholders will vote on the question of increasing the indebtedness to $25,000,000 from $15,000,000. Among other business that will come before the meeting is a proposed renewal of the contract with Mitten Management, Inc.

Extension Granted for Transfer of Properties.—An extension of time has been granted by the California Railroad Commission until Feb. 1, 1925, to the Sacramento Northern Railroad, Sacramento Northern Railway and the Western Pacific Railroad in which to complete the transfer of properties from the former two corporations to the latter, and for the Western Pacific Railroad to purchase outstanding bonds of the Sacramento Northern Railroad and capital stock of the Sacramento Northern Railway. The Sacramento Northern Railroad operates 214 miles of electric line. It is at present a subsidiary of the steam railroad.

Authority Sought to Buy Eleven-Mile Road.—The Visalia Electric Railroad, Exeter, Cal., has applied to the Interstate Commerce Commission for authority to purchase from the Frank G. Drum interests 11.68 miles of the standard gage Chowchilla Railroad.

Conference on Abandonment.—Following the hearing held on Jan. 15 at Albany before Public Service Commissioner Parsons on the petition of the Kingston Consolidated Railroad for authority to increase its present fare to 10 cents cash and 8-cent ticket, there was a postponement until Feb. 5, during which time there will be a conference attended by railroad, city and other officials as to abandonment of that part of the road known as the Colonial Division. Abandonment was

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suggested in lieu of any change in fare. Representatives of the civic association suggested a conference. Unless some agreement is reached at the coming conference, Commissioner Parsons will take the testimony at the next hearing and a determination of the matter will be made by the commission.

Petition for Sale Confirmation Approved.—The Board of Public Utility Commissioners of New Jersey has approved the petition of the Central Passenger Railway, Atlantic City, N. J., for confirmation of the sale of the Venice Park Railroad in 1912 and for the compromise of taxes for 1922 and 1923.

Default in Interest by Line in Connecticut.—The Groton & Stonington Street Railway, Groton, Conn., failed to pay the Jan. 1 interest on the 5 per cent first mortgage gold bonds due July 1, 1924. A committee has been formed in the interest of holders for protective action. The property on which the bonds are secured was formerly a part of the Shore Line Electric Railway, but it was sold to the Groton & Stonington Traction Company, organized specially to operate this part of the road. The Groton & Stonington Street Railway first 5s are outstanding to the amount of $375,000.

May Sell Line for Scrap. — Bondholders of the Phoenixville, Valley Forge & Strafford Electric Railway, Phoenixville, Pa., have been informed a buyer for the road cannot be found, and that the creditors' committee had decided it was best for the bondholders to purchase it and sell it for scrap.

New Directors Elected.—Robert A. Taft and Samuel Assur, directors of the Cincinnati Street Railway, have been elected directors of the Cincinnati & Hamilton Traction Company, which property is under lease to the Ohio Traction Company, Cincinnati. They succeed J. W. Bullock and Edward Goepper, resigned.

Defaulted in Sinking Fund Payment.—The holders of the Mesaba Railway, Virginia, Minn., first mortgage 5 per cent twenty year gold bonds have been notified that the company on Jan. 1 defaulted in making the payment to the sinking fund provided for in the mortgage securing these bonds and that default in the payment of the interest installment due on March 1 is likely to occur. A committee for the holders of the bonds has been appointed under an agreement dated Jan. 14. This committee tells the holders that the bonds may be deposited on or before Feb. 15 with the depositary.

Sale of Line for Scrap Approved.—The Missouri Public Service Commission on January 16 officially approved the junking of the St. Louis & Jennings Electric Railway, which ran from Jennings, Mo., to Robin and West Florissant Avenues, St. Louis, with a branch line on Helen Avenue. Wayne J. Stedlin, St. Louis real estate operator, who bought the line at auction more than a year ago, has been authorized to sell the material in the line for scrap. Jitney competition proved the undoing of the road.

$200,000 Increase in Bus Subsidiary Capital.—The Rochester Railways Coordinated Bus Lines, Inc., a subsidiary of the New York State Railways, operating trackless trolleys and bus lines in Rochester, N. Y., has filed notice with the Secretary of State at Albany of an increase in its capital stock from $50,000, divided into 500 shares of $100 par value, to $250,000, divided into 2,500 shares of $100 par value.

New Director Named.—Judge Charles H. Mayer was recently elected a director of the St. Joseph Railway, Light, Heat, & Power Company, St. Joseph, Mo. He replaces R. A. Brown.

Wants Line Discontinued. — The Huntington Traction Company, Huntington, L. I., has applied to the Public Service Commission for leave to abandon that part of its road between Huntington Station and Siding 7, alleging that it is operated at a loss and that it is no longer necessary for the public convenience. The petition says the highway from Huntington Station to Siding 7 is to be improved in the near future. If the company is permitted to remove its tracks the entire highway can be improved.

City Protests Valuation Items Totaling $33,000,000.—Items amounting to more than $33,000,000 should be stricken from the valuation figures of the International Railway, Buffalo, it was said by the city law department in the proceedings before the Public Service Commission in the rate investigation. The figures presented by the International, it was claimed by witnesses for the city, are "imaginary," based upon certain hypotheses that have no relation to actual experience. The figures which the city asks the commission to strike out of the company's valuation are: Promotion costs prior to construction, $805,295; administration, legal and miscellaneous expenses, $2,065,688; taxes during construction, $515,000; interest during construction, $151,000; loss of interest during early days of operation, $5,179,266; brokerage and bond discount, $7,631,556; going value, $12,592,068.

Hudson River Tunnel Line Declares Another Dividend.—The Hudson & Manhattan Railroad, New York, has declared a semi-annual dividend of 2½ per cent on the preferred stock payable on Feb. 15 to holders of record of Feb. 1. An initial dividend of the same amount was paid on this issue six months ago. The directors also declared the regular semi-annual interest of 2½ per cent on the 5 per cent adjustment income bonds, payable April 1.

Offers Made for Railway Continuance.—Pelham, N. H., has offered a bonus of $1,000 for the continuation of the 14 miles of car track from Nashua, N. H., to Pelham, which is to be abandoned by the Massachusetts Northeastern Street Railway. The Public Service Commission offered the tracks, over the 14-mile section, to the Nashua Street Railway at the scrap price of $3,000 per mile. The town of Hudson has offered $20 a week for the thirty-six weeks of school for the transportation of the school children, to any company that will operate that section. To date no agreement has been made relative to these offers.

Approval of $2,098,000 Issue Sought.—The Boston Elevated Railway has petitioned the Department of Public Utilities for approval of an issue of $2,098,000 of thirty-year 6½ per cent bonds, to be used for refunding a bond issue of $1,150,000, due March 1, and for construction and equipment.

Reported Purchase Price Agreed.—The sum of $16,164 is said to have been agreed upon as the purchase price for the Athol & Orange division of the Northern Massachusetts Street Railway, for which community ownership is projected. A gang has been put to work tearing up the tracks on the line between Baldwinsville and Winchendon.

Hearing on Partial Abandonment Set.—There will be a hearing before Commissioner W. R. Pooley of the Public Service Commission at Buffalo on Feb. 1 on the proposal of the International Railway to abandon part of its lines in Niagara Falls. Hearing had been delayed at the request of the Niagara Falls authorities because of the recent change in administration in that city.

$1,062,237 Net in Chicago in December.—For December the Chicago Surface Lines reports gross of $5,007,901 and balance after expenses and taxes $1,062,237. The surplus after joint account expenses and 5 per cent interest on purchase price was $263,627, of which the city gets 55 per cent and the company 45 per cent.

Another Hearing on Consolidation Set.—A hearing was held recently on the application to the Board of Public Utility Commissioners of New Jersey for permission to consolidate electric railway lines, an electric company and a water company on the Jersey shore. Another hearing on the application is scheduled for Feb. 7 at the commission's office in Newark, N. J. The trolley lines to be merged are the Seashore Electric Railway, the West End & Long Branch Railway, the Seacoast Traction Company and the Asbury Park & Sea Girt Railroad.

$2,000,000 of Gold Bonds Offered.—A syndicate headed by E. H. Rollins & Sons, New York, is offering $2,000,000 of the first mortgage and refunding gold bonds of the Potomac Edison Company. The bonds, known as Series B, 6½ per cent, are offered at 97 and accrued interest to yield 6.75 per cent. They are dated May 1, 1923, and are due May 1, 1948. In addition to its lighting properties the company also operates or controls electric interurban railways in western Maryland and a part of Pennsylvania.

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Traffic and Transportation

Eight Cents in Toledo

Filing of Higher Tariff Follows Commissioner's Rejection of Power Rate —Subsidy Considered

Posting of the second notice of a fare increase in the month of January by the Community Traction Company at Toledo, has brought the railway situation there to a crisis in which city officials, representatives of the company and citizens are taking part. The new raise will be effective on Sunday, Jan. 27, and will bring the fares to 8 cents cash, four tickets for 30 cents and 1-cent transfer charge. The increase was announced immediately following the breakdown of conferences between the Community Traction Company and Street Railway Commissioner W. E. Cann on the question of a new rate for power.

RATE FOR POWER IN DISPUTE

At the conclusion of the conference the company had offered through President B. C. Adams, who is also vice-president of the Toledo Edison Company, which furnishes the power, to reduce the rate from 1.6 to 1.4 cents per kilowatt-hour and modify coal clause provisions. These, it is estimated, would save the traction lines about $90,000 to $95,000 in its annual power bill. This had been rejected by the Street Railway Commissioner on the grounds that the traction company should have a better rate than the large industries of Toledo because of its long-term contract, steady demand and credit position.

Commissioner W. E. Cann has stated that under the sinking fund plan, intended as a means of long-term purchase of the traction properties by the city, the purchase of the lines would take 100 years. He says the sinking fund should be eliminated from the plan. The fund so far amounts to $650,000. If this amount had been split between the stabilizing fund and maintenance he argued that fares would be lower and the property in better condition.

As another way out, but a radical one, the commissioner has suggested the city take over the lines under its option in the ordinance and operate them with a 2½-cent fare. The annual deficit from such operation would be about $1,000,000, and this could be regarded as a ready-to-serve charge against the city to be raised by general taxation.

Present difficulties are attributed to the low-fare period at the beginning of operation under the ordinance, the slump in riding, the competition of buses and privately driven automobiles, rising labor costs and heavy maintenance necessary to keep the property in fair operating condition. The stabilizing fund is now slightly in excess of $60,000. The amount in the fund at the inception of the ordinance was $400,000.

Bus Fares Increased in Milwaukee

Because of heavy increases in state and municipal taxation of buses, together with the cost of maintaining continuous high grade service, a readjustment of the bus fares by the Milwaukee Electric Railway & Light Company between Waukesha and Milwaukee became effective on Jan. 17. The cash fare between these two cities is 45 cents with a ticket rate of 43 cents. The ten-ride ticket with inbound transfer privilege in Milwaukee sells for $3.50 and the ten-ride ticket with both inbound and outbound transfer privilege in Milwaukee at $3.75. Effective that date, also, all forms of Waukesha-Milwaukee "Green" bus tickets were accepted on the Milwaukee Electric Railway & Light Company interurban cars between Waukesha and Milwaukee. A 40-cent ticket is also sold on the Milwaukee Electric Railway & Light Company interurban cars between Waukesha and Milwaukee. Formerly the cash fare on all buses between these two cities had been 40 cents, while a ten-ride ticket with inbound transfer privilege was $3. The interurban ticket has been selling for 43 cents and is now reduced to 40 cents.

Railway Wants to Run Concourse Buses

The Third Avenue Railway, New York City, applied on Jan. 19 to the Board of Estimate, through S. W. Huff, its president, for the right to operate a bus line on the Grand Concourse, the Bronx, on a 10-cent fare, with free transfers to its crosstown surface lines in the Bronx. The application was made in the name of the Concourse Transportation Company, of which Mr. Huff is president.

The Third Avenue Railway now operates all the surface lines in the Bronx. It explains that in making the application in the name of the Concourse Transportation Company it is seeking an opportunity to give the people of the Bronx what will in effect be a single surface transportation unit "such as the borough is entitled to."

In justification of its application for a 10-cent fare the company says that it feels that the Leindorf bus operation, recently discontinued, must have demonstrated to the satisfaction of every one that a 5-cent fare will not sustain a satisfactory bus service on the Concourse, or, in fact, a bus service of any kind, satisfactory or otherwise.

Former Rates Restored

Wage Increase and Lack of Response by Riding Public Reduce Revenues of Connecticut Line

Specific figures have been made public by the Connecticut Company showing the need for the proposed increase on Feb. 1 in fare on its 500 miles of lines, referred to briefly in the ELECTRIC RAILWAY JOURNAL for Jan. 19, page 127. From June 1 to Dec. 31 the net income decreased $585,000, or at the rate of $1,000,000 a year. This decrease is attributed to the reduction in the token fare from three for 25 cents to two for 15 cents and the increase in the payroll charges.

As a matter of fact, the wage increase of last June has a most important bearing on the situation. The advance in pay at that time increased the payroll from June 1 to Dec. 31 by $459,000 over the similar period in 1922. In percentages, this is a 9½ per cent increase over 1922, and amounts to a payroll increase of $2,150 a day. The loss in revenue during last December as compared with December, 1922, was $2,800 a day. This, coupled with an increase in payroll of $2,150 a day, shows the condition before the company.

In 1922, after relief measures had been put into effect, particularly the regulation of severe jitney competition, the company was able to pay $360,000 to the state on its back taxes, and in 1923 $655,000 was paid on this particular item. In addition to this, current state taxes of $840,000 were paid during the two-year period. In the matter of back taxes, due since the war period, there still remains to be paid to the state, however, about $800,000.

In an effort to keep fares at the lowest possible point, the company made a voluntary decrease in the then existing rate of fare of 10 cents in March, 1922, by the introduction of the token fare, selling three tokens for 25 cents. At the time this was put into effect the trend of revenues under the 10-cent fare was upward, and the trend of wage rates and other costs of operation was downward.

Continued increase in riding and a reduction in rates of wages, together with numerous economies of operation, made possible another voluntary reduction in rate by the company, when, in April, 1923, the token rate was reduced to two for 15 cents. Since the latter date material increases in wage rates were made in June, 1923. This marked increase in payroll costs has resulted in an upward trend in expense of operation. The rate reduction of 10 per cent in April has resulted in a steady downward trend in revenues.

From June 1, the date of the wage increase, to Dec. 31, 1923, the decrease in revenue compared with the same period of 1922 was $197,000, or 2 per cent. More passengers were carried than in the 1922 period, but not enough to offset the reduction in the token fare. If the decrease in revenue by months

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is considered, however, the trend is readily perceived. The loss in revenue for November, 1923, compared with November, 1922, was $41,000, or 4 per cent, and the loss for December, 1923, compared with December, 1922, was $86,500, or 7 per cent. The decrease in December was at the rate of $2,800 a day.

As more passengers were carried than during the same months of 1922, the company regards it as undesirable to economize any further by reduction in service.

The proposed change in fare is from the rate of two tickets for 15 cents to three for 25 cents.

Railway Presents Its Side at Atlanta

The Georgia Railway & Power Company, Atlanta, had its innings, on Jan. 15, at the second public hearing before the special committee appointed by the City Council to inquire into the plea of the company for a 10-cent fare. H. M. Atkinson, chairman of the board of directors of the company, told of some of the troubles confronting his company. He said that the New York banking interests, with which the company had always done business, had notified the company that they cannot advance another dollar for investment in the local railway until that department of the company had been put upon a stable and paying basis. He said:

> This means that no more extensions can be built. Unless these extensions can be made, the city cannot expand, for no city will ever grow beyond the limits of its railway system. If the city cannot grow beyond the present limits of its railway, Atlanta can never reach its hoped-for 500,000 population. Unless we can get $25,000,000 additional capital, the necessary extensions cannot be made. And unless we can show a reasonable return on capital now invested we cannot get that $25,000,000. That much is evident.

According to Mr. Atkinson the company has actually been rendering railway service at less than cost for seven years. At last it has reached the end of its resources. He said that with a 7-cent fare, the company was only getting 2.7 cents per passenger in purchasing power as compared with 4.03 cents on a 5-cent fare in 1914.

Mr. Atkinson repeated his request for a 10-cent cash fare, a 2-cent charge for transfers, and the elimination of jitneys from the streets on which cars are operating as the means of putting the company on a paying basis, permitting the extensions to be made, and helping the growth of the city.

Five-Cent Fare Before General Assembly

The fight which was waged in Baltimore some time ago in an effort to force the United Railways & Electric Company to reduce its fare to 5 cents has been carried to the Maryland General Assembly. A bill has been introduced in the State Senate which provides 5 cents as the maximum fare. It seeks to add a new section to the law dealing with the Public Service Commission.

Weekly Pass and 10 Cents Cash in Pensacola

The Florida State Railroad Commission has granted the Pensacola Electric Company a revised fare schedule, effective Feb. 1. The 8-cent cash fare will be replaced by one of 10 cents, the price of the token will be kept at 7½ cents but on the basis of six for 45 cents instead of two for 15 cents, and an unlimited-ride transferable weekly pass will be added at $1.25. The same pass will be valid on the Bay Shore division for which workmen's non-transferable tickets are provided at twelve for $1.20; commutation tickets at ten for $1.25; round-trip tickets for 30 cents and one-way cash for 20 cents. School tickets good only on school days remain at half the cost of adult fares provided they are purchased in books of ten tickets. The commission said:

> The commissioners are of the opinion that a flat increase in fares is of doubtful expediency. We are impressed with the fact that a considerable amount of travel is being diverted from the railway by private automobiles, and it would seem that some schedule of fares that would encourage the more frequent riders to use the railway regularly and provide a more equitable charge for the casual or infrequent rider might increase riding and revenue. After investigation and consideration we have concluded that the so-called weekly pass, coupled with a proper token and cash fare, gives promise of affording additional revenue through stimulating travel, and at the same time prove more satisfactory to the public.

Jitneys Abolished in Houston—Railway to Spend $1,500,000

At an election held on Jan. 19 an ordinance abolishing jitneys in Houston, Tex., effective on April 1, was carried by a vote of 9,238 to 4,594. This election was called as a result of a plan to settle Houston's transportation problem formulated by a group of citizens and accepted by both the Houston Electric Company and the city.

Jitneys came into existence in Houston in 1914. At one time their number reached 500, but recently there have been not more than 150 in service. The present jitney lines, except on one route, parallel the street railway lines and take care of only the short haul riders. The Houston Electric Company has been endeavoring to obtain relief from jitney competition in order that it might expand and improve its system. Failing to obtain such relief, the company carried its case to the federal courts.

John A. Beeler, New York, was employed by the city to make a thorough study of the Houston situation in order to defend the rate case in the federal court. In his report he stated that dual transportation was unfair and that the railway could not expand if throttled by such competition. He recommended that the jitneys be abolished and that the railway make certain changes in its system in order better to handle the traffic. After his report was made public a group of citizens formulated a plan embodying Mr. Beeler's recommendations, the principal provisions of which were the abolition of the jitneys and the expenditure by the Houston Electric Company of approximately $1,500,000 in the next three years.

This agreement was accepted by both the city and the Houston Electric Company. The Council then passed an ordinance abolishing the jitneys and submitted it to a vote for ratification. Three of the leading newspapers supported the proposition. The Citizens' Committee also carried on an extensive advertising campaign and held meetings in various sections of the city in order to explain the agreement and show the people the advantages of a railway system augmented by bus lines.

More Bus Lines Proposed for Philadelphia.—An ordinance was presented to the Council of Philadelphia on Jan. 17 authorizing the Philadelphia Rapid Transit Company to extend its bus service on Broad Street and from Frankford to Somerton, with an extension of the Roosevelt Boulevard line. The company also wants approval of an increase in its funded indebtedness to the amount of $1,000,000 so as to finance the extension. The additional equipment needed will be 130 buses.

Increased Rates in Effect.—The Detroit United Railway, Detroit, Mich., recently filed with the State Public Utilities Commission a fare schedule increasing rates on three of its divisions from 2 cents a mile to 2½ cents. The change, which became effective on Jan. 10, is in accordance with a recent authorization by the commission. The company increased its fare on the line between Detroit and Toledo and between Detroit and Jackson from 2 to 2½ cents on Jan. 15.

Buses to Replace Railway.—The Wallkill Transit Company, Middletown, N. Y., operating the Middletown-Goshen trolley system of 13 miles, plans to replace all cars with buses in the spring. Seven buses will probably be purchased.

Independent Licenses Will Not Be Renewed.—At a hearing on Jan. 17, attended by independent bus owners, Mayor E. F. Leonard of Springfield, Mass., informed the bus men that he did not intend to renew bus licenses other than for the Springfield Street Railway after May. 1. He explained that he did not believe independent buses could compete against the railway without injury to the latter and consequent detriment to the public.

Six-Cent Fare Continuance Sought.—The Binghamton Railway, Binghamton, N. Y., has applied to the Public Service Commission for authority to continue the 6-cent fare in that city until Jan. 15, 1925. The Binghamton city authorities, by ordinance, have approved the extension of the 6-cent fare rate. The receiver claims that if the company had been compelled to operate on a 5-cent fare in 1923 it would have operated at a loss of $80,000. One-man car operation has resulted in economies, but the employees have recently petitioned for an increase in wages.

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Personal Items

Alexander McIver in Charge of Heavy Traction

Alexander McIver has been made supervisor of heavy traction developments of the Westinghouse Electric & Manufacturing Company.

He received the degree of bachelor of arts from the University of North Carolina, and then took the electrical engineering course at John Hopkins University, which he completed in 1895.

Mr. McIver assisted in the early work on the Sprague multiple-unit control and later helped to install this system on the South Side Elevated Railroad, the Brooklyn Rapid Transit Company and the Boston Elevated Railroad.

He was connected with the Chicago, North Shore & Milwaukee Railway as master mechanic. From this position he transferred to that of superintendent of equipment of the New York Railways—the consolidated surface lines of New York City.

Mr. McIver joined the Westinghouse forces in December, 1909. The electrification of the New York Terminal was then under way and Mr. McIver supervised the execution of Westinghouse contracts for this work. While making his headquarters in New York he supervised Westinghouse activities on the Long Island Railroad and the rapid transit and surface railroads in New York City as well.

At the inception of the Norfolk & Western electrification, Mr. McIver was appointed resident engineer in charge for the Westinghouse Company. Upon the completion of this important work he was appointed to a similar position on the Chicago, Milwaukee & St. Paul electrification.

Mr. McIver will make his headquarters at the East Pittsburgh works of the Westinghouse Company.

F. R. Phillips General Manager Pittsburgh Railways

F. R. Phillips has been made general manager of the Pittsburgh Railways to succeed the late P. N. Jones. Mr. Phillips is well known in the electric railway field. He was appointed acting general manager for the receivers at Pittsburgh in the early summer of 1923. At that time his career was briefly reviewed in the ELECTRIC RAILWAY JOURNAL. In December of last year, when Mr. Phillips was made head of the Pennsylvania Street Railway Association, a portrait and a biography of him were published in the JOURNAL.

George F. Atkinson has been reappointed assistant director of the Department of City Transit, Philadelphia. This announcement was made by Mayor Kendrick. Mr. Atkinson held the post under two former mayors.

H. B. Shaftoe

H. B. Shaftoe Vice-President and D. L. Waters Comptroller at Providence

The United Electric Railways, Providence, R. I., recently announced the election of H. B. Shaftoe as vice-president and the appointment of D. L. Waters as comptroller. Mr. Shaftoe will have charge of the financial, commercial and accounting departments of the company. He has risen steadily through the ranks of the company, having joined the property as a stenographer in 1902, when it was known as the Rhode Island Company. In 1920 he was made comptroller. He was holding this post when he was elected vice-president. The other vice-president of the company is E. J. Dickson. A sketch of his career was published in the ELECTRIC RAILWAY JOURNAL at the time he joined the company last summer.

Mr. Waters, the new comptroller, joined the United Electric Railways from the United States Railroad Administration offices in Washington, where he was chief accountant in the comptroller's office. He began his career in 1903 with the Baltimore & Ohio Railroad, which company he served for nine years. While with that company he held the position of chief clerk to the division engineer, and later was accountant in the office of the auditor of disbursements. From 1912 to 1918 Mr. Waters was connected with the Delaware & Hudson Railroad, in the capacities of special accountant and chief clerk. He joined the United Traction Company, Albany, N. Y., in 1918 as auditor and assistant secretary. This position he resigned last year to accept the post of chief accountant in the comptroller's office of the United States Railroad Administration. There he remained until Jan. 1 of this year, when he left to go to Providence as comptroller of the 350 mile system in that city and adjourning territory.

D. L. Waters

C. O. G. Miller has been elected president of the Key System Transit Company, Oakland, Calif., the successor under reorganization to the San Francisco-Oakland Terminal Railways. Mr. Miller has long been connected as an officer and director with important business enterprises in Oakland, of which city he is a native.

Gordon Campbell, who terminated his fifteen-year presidency of the York Railways with the year 1923, as noted recently in ELECTRIC RAILWAY JOURNAL, intends to remain actively interested in public service, including the electric railway branch. This is said to correct any possible misinterpretation of the words "Gordon Campbell Retires" as used in the caption over the previous item, in which their use was intended to apply in a strictly local sense. As has been pointed out previously, Mr. Campbell's career has covered a wide range of activities in the public utility field and at York included the direction of a company that combined railway, electric light and power, steam heating and other activities.

W. R. Alberger has been elected vice-president and general manager of the Key System Transit Company, Oakland, Calif., the successor under reorganization to the San Francisco-Oakland Terminal Railways, with which he served in a similar capacity.

Obituary

Arthur W. Field, for nearly twenty years general sales agent of the Standard Motor Truck Company of Pittsburgh, died on Jan. 12, of pneumonia Mr. Field was born in Providence, R. I., and early in his life was connected with the operating department of the Union Railway in that city. Then he was appointed Eastern sales agent and later vice-president of the Peckham Motor Truck & Wheel Company. He joined the forces of the Standard Motor Truck in 1905.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Rattan Used Extensively for Car Seats*

By Bertram Berry
Manager Sales Car Seat Department,
Heywood-Wakefield Company

Rattan is a vine growing sometimes more than 500 ft. long and is from ½ in. to 2 in. in diameter. It has a long drooping leaf, similar to a palm leaf, and a thin bark covered with sharp thorns.

There are more than one hundred varieties of rattan. The best grades are gathered from higher altitudes and the greater part comes from Dutch Borneo. Rattan cut for the first time is always better quality than later cuts. Where the jungle has been cut over several times the sticks are likely to contain short joints. In a year the vine will grow about 10 ft. and will be about ¼ in. in diameter.

When harvesting rattan the natives first cut the vine about 3 ft. from the ground. After cutting over a small area the vine is allowed to dry for several days to permit the bark to loosen and the leaves to fall off. It is then pulled down and cut into lengths of 10 to 20 ft. so that it can be conveniently handled. These pieces are later pulled through a crotch or around the trunk of a tree to remove the bark and thorns. After the bark has been removed the rattan has a glossy appearance. This is caused by the enamel which covers the stick and is known as sega.

The rattan is carried to rivers and floated to the nearest trading post, where it is sold to Chinese merchants. River steamers take the rattan to Singapore. There it is washed with sand and water, graded and bundled.

After reaching the United States the rattan is prepared for commercial purposes. Some of it is sold in cut lengths to the electric railways for snow sweepers, its toughness and elasticity lending itself admirably to this purpose. It is used also in a much smaller degree in schools for pointers and in other ways by some of the more aggressive teachers, the rattan resisting an impact when sometimes a wooden rule would break.

The bulk of the stock is split up into reed and cane by running the material through a machine fitted with a special knife which has radiating blades. The core, which is called "reed," passes through the center of the knife and the strands, which are split from the outside of the rattan, are called "cane." These strands are then run through a shaving machine, which planes the bottom and sides, thereby making the strand even in thickness and width. They are then counted and measured and the cane is put up in bunches to contain 1,000 ft. The reed is used in the manufacture of reed furniture, while the cane is used in the seats and backs of chairs as well as for furniture decorative purposes.

A large proportion of the cane, however, is woven into webbing for railway coach, electric car and bus seats. It is furnished with or without canvas lining and comes in rolls of approximately 200 lineal feet and in any width up to 48 in.

Before covering a seat or back cushion, the rattan car seat webbing is first placed in lukewarm water for about fifteen minutes to make it pliable. The canvas backing is not disturbed by wetting as the glue sets again when the webbing dries. The springs of the cushions are slightly compressed when upholstering, and after the rattan dries a neat job is the result.

When rattan is discolored from use, soap and water may be used to advantage and without damage. New strands may be woven in by hand where wear or burns have caused a break in the webbing. These strands should be inserted an inch or two away from the break and over the original strand. This is quite similar to and about as easy as the paper mat weaving taught children in kindergarten schools. After all of the new strands have been woven into place they should be pulled tight and then cut off close to a cross-strand. Rattan webbing is durable, cool, comfortable and sanitary.

*Abstract of a paper presented at the Mid-winter Meeting of the New York Electric Railway Association, New York, Jan. 24, 1924.

Improvement Planned for Ottawa

The new franchise agreement recently approved by the people of Ottawa, Canada, for the Ottawa Electric Railway calls for the purchase of fifteen new cars during the first year, erection of a new carhouse, construction of about 5 miles of single track and a new substation, the whole entailing an expenditure of about $600,000. Further improvements and extensions are arranged for each year during a five-year period in accordance with recommendations made to the city in 1922 by R. M. Feustel, traction expert. None of the work will be undertaken until the contract has been signed by the city and ratified by the Provincial and Dominion houses of Parliament. The total expenditure to be made for improvements under the five-year program is $1,500,000.

Improvements to Cost $685,000

A program of improvements for 1924 in St. Joseph, Mo., totaling $685,000, is proposed by the St. Joseph Railway, Light, Heat & Power Company. Eighteen one-man cars will be put in service on the various lines, at an approximate cost of $60,000. These cars will be rebuilt from a number which the company now has and will be equipped with modern devices. The company expects to spend between $300,000 and $350,000 for paving and new track construction. Improvements will be made at the carhouses costing about $10,000.

Extensive improvements will also be made in the electric department involving an expenditure of from $150,000 to $200,000. An extension of the Wyatt Park car line to the municipal golf links will cost $26,000, including paving.

Railways Use Fewer Castings

The total bookings of steel castings for 1923, according to the Department of Commerce, amounted to 868,019 tons, or 74.6 per cent of the capacity of the principal manufacturers. Of this amount, 380,000 tons were railway specialties and 488,019 tons were miscellaneous castings. Although in 1922 the total production was smaller, being only 785,059 tons, or 67.5 per cent of the production capacity, railway specialties were greater than last year, being 399,174 tons. In 1922 the bookings of miscellaneous castings amounted to 385,885 tons.

Study of Trade Catalogs

A study is now being made by a special committee of the Special Libraries Association of the United States, pertaining to trade catalogs, and information is desired as to what firms in this country keep a historical collection of trade catalogs. Information regarding this subject would be gratefully received by Lewis A. Armistead, librarian, Boston Elevated Railway, 31 St. James Avenue, Room 711, Boston 17, Mass.

Metal, Coal and Material Prices

Metals—New York	Jan. 22, 1924
Copper, electrolytic, cents per lb	12.425
Copper wire base, cents per lb	15.125
Lead, cents per lb	8.025
Zinc, cents per lb	6.82
Tin, Straits, cents per lb	50.00
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.70
Somerset mine run, Boston, net tons	2.125
Pittsburgh mine run, Pittsburgh, net tons	2.00
Franklin, Ill., screenings, Chicago, net tons	1.95
Central, Ill., screenings, Chicago, net tons	1.55
Kansas screenings, Kansas City, net tons	2.25
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$6.65
Weatherproof wire base, N.Y., cents per lb	17.00
Cement, Chicago net prices, without bags	$2.10
Linseed oil (5-bbl. lots), N. Y., per gal	$0.94
White lead, in oil (100-lb. keg), N.Y., cents per lb., carload lots	11.60
Turpentine, (bbl. lots), N. Y., per gal	$1.03

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Rolling Stock

Bellows Falls & Saxtons River Street Railway, Bellows Falls, Vt., suffered by fire on Jan. 21 the loss of six cars, carhouses, electrical equipment, snowplow and all machinery and stock for repair work. The main generator and two dynamos were made unfit for use and all cars burned except two that were in service on the road hauling freight. Rush orders have been put in for new equipment and service will be restored as soon as possible.

New Orleans Public Service, Inc., New Orleans, La., includes an expenditure of $808,000 for new cars in its $7,500,000 budget for 1924.

Altoona & Logan Valley Electric Railway, Altoona, Pa., in 1923 rebuilt nine double-truck cars into one-man cars.

Richmond Railroad, Staten Island, N. Y., has just ordered from the Osgood-Bradley Car Company twenty-five one-man, two-man, double-truck passenger cars with seating capacity of forty-four, built to the railway company's specifications. General Electric equipment will be supplied.

Los Angeles Railway, Los Angeles, Cal., as indicated previously in the ELECTRIC RAILWAY JOURNAL, has included in its expansion program of 1924 the purchase of 100 cars. The cars will be of the so-called "H" type, for operation in single units and two-car trains. These cars seat fifty-two passengers and have an inclosed section in the center and open sections on both ends. The company will construct twenty additional cars in its own shops. These cars will be of the so-called type "K," similar to the "H" type cars. The completion of the 1924 program will give 1,248 passenger cars.

Connecticut Company, New Haven, Conn., contemplates the purchase of four buses in the near future.

Houston Electric Company, Houston, Tex., in accordance with the ordinance agreement recently approved by the voters, will purchase fifteen double-truck cars during 1924. The cars will cost approximately $12,000 each.

Texas Construction Company, Dallas, Tex., formed to electrify the Missouri, Kansas & Texas Railway from Dallas to Denton, has awarded contracts for six passenger cars and one express car to the American Car Company. The rolling stock will be built to specifications drawn by Richard Meriwether, vice-president of the Dallas Railway and vice-president of the Texas Construction Company. The passenger cars will be designed for either one-man or two-man operation.

Track and Line

Columbus Electric & Power Company, Columbus, Ga., plans improvements costing $100,000 to be completed by March 1. The work includes the moving of the double tracks on Broadway between Twelfth and Fourteenth to the center, the trolley wires to be supported by one iron pole. It provides for the elimination of two long rows of old wooden poles. The street, which is the main thoroughfare of the city, is to be widened 6 ft. so as to make room for additional traffic. Following the completion of this improvement a similar program is scheduled for the lower Broad Street section, the two projects to cost near $200,000.

Dallas Railway has been granted permission to construct an extension on the Eway and Seventh Street lines. The Eway Street line extension will be double-tracked at a cost of $36,440 and the Seventh Street line will be extended at a cost of $9,060.

Southern Indiana Gas & Electric Company, Evansville, Ind., plans to spend $600,000 during 1924 for improvements. Of this amount $185,000 will be used on expenditures in connection with trackwork. The program will be entered upon in the spring.

Trenton & Mercer County Traction Corporation, Trenton, N. J., has extended its service from Harney's Corner to Slackwood by laying an additional track. The company is also laying new switches, curves and other special work at the carhouse on Second and Davies Streets.

Altoona & Logan Valley Electric Railway, Altoona, Pa., in 1923 laid 8,341 ft. of new track, rebuilt 3,321 ft. and repaired 3,400 ft., laying 12,000 new ties.

Madison Railways, Madison, Wis., plans to build an extension of three or four blocks on University Avenue beyond Breese Terrace to handle extra cars for the accommodation of the increasing crowds at the University of Wisconsin football stadium and the stock pavilion.

Power Houses, Shops and Buildings

Louisville Railway, Louisville, Ky., has been busy for the past several months, in moving boilers, generators, turbines, etc., from its old power plant at Logan Street, to the big Riverside plant on the Ohio River, a comparatively new plant, in which its entire power equipment will be located.

Atlantic City & Shore Railroad, Atlantic City, N. J., is erecting a $5,000 passenger station at Margate City.

Seattle, Wash. — Appropriation of $2,583, one-half each from the water and railway department funds for installation of a negative feeder from the James Street substation to the new steel pipe line from Cedar Lake, the source of Seattle's water supply, is proposed by Superintendent George F. Russell of the water department. The experiment is planned to prevent disintegration of the steel from stray current from the municipal railway lines.

Trade Notes

Westinghouse Electric & Manufacturing Company, Pittsburgh, has announced the appointment of the Mann Electric Supply Company of Columbia, S. C., as its representatives in distributing electrical apparatus. With an increase of 11,000 sq.ft. in warehouse floor space, the new agent-jobbers are prepared to furnish reliable and efficient electrical service in South Carolina. They will carry a complete stock of motors, meters, transformers, line materials and other electrical equipment of Westinghouse company manufacture.

Hyman Michaels Company, Chicago, dealers in new and relaying rails, has placed Al Michaels, assistant treasurer, in charge of its Pittsburgh offices, located in the First National Bank Building. Mr. Michaels was formerly located in Chicago.

General Electric Company, Schenectady, N. Y., has created a Southwestern district to handle its apparatus business in Texas, Oklahoma, southern New Mexico and southeastern Arizona. The Southwest General Electric Company, as such, will continue to act as distributing jobber in the Southwestern district. C. W. Hobson has been appointed Southwestern manager, in general charge of General Electric business in that territory, and L. T. Blaisdell, district manager.

Harold F. Marshall, until recently advertising manager for Dwight P. Robinson & Company, Inc., engineers and constructors, left New York early in January to take up his new duties as advertising manager for Warren Webster & Company, engineers and manufacturers of steam heating systems.

New Advertising Literature

Ohio Brass Company, Mansfield, Ohio, has issued a pamphlet enumerating the five points of value in the new Ohio Brass ear. The pamphlet shows various sectional views of the trolley ear.

Chicago Motor Coach Company has issued an attractive booklet, "Place of the Motor Coach in a General Comprehensive Plan for Transportation in Chicago." The text was prepared by John A. Ritchie, president of the company, to show the importance of proper development of the use of a motor coach in Chicago.

American Insulating Machinery Company, Philadelphia, has issued a new catalog on Aimco electric railway signals and crossing bells "for safety and efficiency."

Griscom-Russell Company, New York, N. Y., has issued Bulletin No. 1216, describing the U-fin air cooler to be used for cooling the air from generator windings by the use of turbine condensate.

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New York, February 2, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 63
Number 5

Which Bus Companies Should Have Membership in the A.E.R.A.?

THIS paper has advocated the admission of bus operating companies to membership in the American Electric Railway Association, but with certain very definite restrictions as to qualifications for membership. In view of the fact that this matter is again under consideration by the executive committee of the American Association and that some opposition is being expressed which it is believed would be answered by these restrictions, it may be well to repeat them.

The JOURNAL believes, as was expressed in these columns in the issue of Nov. 3, 1923, page 766, that such membership should be limited to those bus companies which are *well established, permanent, dependable, legally authorized carriers operating non-competitively.* Inasmuch as each application must be passed on and approved by the membership committee and the executive committee, any member company would have ample opportunity to voice its objections if any local bus company did not, in the opinion of the railway, measure up to the qualifications for membership. It is believed that these limitations meet most of the objections that are raised to admitting bus companies.

The manner of handling memberships might be to provide a new class of membership known as bus members. Such membership would include the privilege of engaging in the activities of the American and affiliated associations, namely, the Engineering, Accountants', Claims and the Transportation and Traffic Associations, which are the fundamental divisions into which the transportation business naturally falls. The association now has railway members, manufacturer members, individual members, etc., and the privileges of each are prescribed, there being some limitations on the memberships other than railway. So a new "bus member" classification would not be inconsistent.

Or, there might be formed the American Bus Association, affiliated with the A.E.R.A. and having its own standing committees on accounting, claims, engineering and transportation and traffic. This suggested affiliation identifies the bus in its proper relation to the railway, which is the main transportation agency in most communities and territories. However, we may look ahead to the time, not many years hence if the American Electric Railway Association grasps the opportunity now open to it, when it will dominate all local and interurban transportation, and become in name as well as in fact the American Transportation Association.

But some raise the question: Why take in bus companies at all? Several reasons were set forth in the editorial previously referred to. Two other reasons should be mentioned here. The first is that if the railways are to take hold of the bus and maintain the principle of monopoly, which should prevail, they need all the knowledge and experience they can get with respect to bus operation, and bus companies can contribute something in this respect as well as gain much from the counsels of the railways. Their presence in railway counsels will also tend to temper a tendency to bring about unnecessarily severe regulation and taxation of the bus that will later come back upon the railway. There is furthermore the wider community of interest in which bus and railway might to mutual advantage join forces.

The second reason is that it is only a matter of time until there will be a strong national association of bus operating companies. Attempts in that direction have already been made, though the result is rather feeble to date. It seems obvious that it would be better from the railway standpoint to have such an organization affiliated with or a part of the railway association than to have it conducted as an independent and probably more or less antagonistic association. And certainly it would be to the advantage of the bus companies to be affiliated with a strong, going transportation association such as the A.E.R.A.

Transportation Development Should Not Be Limited by State Boundaries

ANOTHER instance of the tendency to consider matters of benefit to the public at large from the political angle is seen in the objections that have been raised to the proposal to extend the New York City subways across the Hudson River into New Jersey. This project, as explained in a recent issue of this paper, would make possible more intensive use of the existing subways in Manhattan Borough, and thus increase the net earnings that could be obtained from the rapid transit investment of the city of New York. It would relieve congestion on the streets of Manhattan, and also permit the elimination of many ferryboats now using valuable harbor space on the North River and congesting navigation. Furthermore, it would not affect adversely the finances of the subways, since the proposed plan provides that the construction cost would be borne by New Jersey interests, and the additional operating costs would be charged against the new riders in the form of additional fares.

With the existing great need for residential areas in the vicinity of Manhattan Island, it is clear that the demand cannot be satisfied by the space available for housing accommodations in the five boroughs of the city. The real objection is summed up in one sentence in an editorial in a New York financial paper:

"The result would needs be to enhance the convenience of those people who earn their money in New York, but spend it in New Jersey and pay taxes there." Of course, the answer to that is that the residents of New Jersey who commute to New York are going to do so anyway. And also, while a Jerseyman may spend a

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large part of his earnings outside of New York, his work in New York creates more wealth for this State than he takes out of it.

Local prejudices of this nature obviously should not be allowed to prevent the expansion of local transportation along the lines that will represent the greatest service to the people as a whole and also result in lowering the burden to the citizens of New York City. There is no good reason why communication across the North River should not have been developed in a manner similar to that across the East River. Since the North River is a State boundary line, it has been an artificial barrier which has been permitted to stand in the way of the development of a most convenient and much needed residential area close to New York. Thus there are sixteen street railway and rapid transit tracks over bridges and ten through tubes connecting Manhattan to Long Island, but no bridges and only four such tracks in tubes to New Jersey. These four tube lines to New Jersey were built by private interests, while nearly all the tubes and bridges over the East River were public works.

The Claim Agent Naturally the One to Direct the Safety Movement

TO SOME the immediate direction of the safety campaign on an electric railway system by the claims department seems somewhat inappropriate. Accident prevention, they argue, is largely in the hands of the trainmen, and the superintendent of transportation is much closer to them than is the claim agent. It is the transportation department which trains the men, issues the rules under which they work, and disciplines them in case the rule is not followed. Moreover, the transportation superintendent is closer than the claim agent to the public; he has to study their habits as regards transportation, and he has opportunity through his inspectors and supervisors to know how best to avoid accidents. On the other hand, the work of the claim agent is largely of a legal nature. Let him attend to the settlement of accidents after they occur, but put the direct responsibility for accident reduction on the superintendent of transportation.

This, however, is a partial view of the situation. Undoubtedly, in any safety campaign, active sympathy and hearty co-operation on the part of the superintendent are required, just as they are necessary from all connected with the company, from the president down. But, unless there is a special official, such as a safety engineer, to carry the responsibility of the safety movement, the claim agent is logically the one to do it. Even on the large road, where the engagement of a special safety engineer is warranted, he should work in very close accord with the claim agent.

There are many reasons which point to the claim agent as the one whose duties logically direct his attention to the need of safety and whose experience is invaluable in promoting any safety movement. In the first place, his main duty, broadly speaking, has always been to reduce by every legitimate means the amount of money which the company has to pay out for accident claims, and a common measure of his efficiency is the percentage which the amount so paid out bears to the gross receipts of the company. It is obvious, therefore, that if he can reduce this percentage by preventing accidents, he is working at least as effectively as if he was making the same reduction in court awards—and, of course, actually the work is more effective.

Again, from his study of accident cases, the claim agent is in a peculiarly advantageous position to know the causes of accidents, particularly the causes of accidents for which the law holds an operating company responsible. He knows, for instance, perhaps better than any one else on the property, the time and distance required at different speeds to stop a car under various conditions of rail, the precautions which the conductor or a one-man car operator should take to see that the passenger has safely boarded or left the car before the start is made, and those which should be taken at grade crossings with steam railroads or on his own line, and the time and place at which the warning whistles should be given and the length in seconds of the blast, before the grade crossing is reached.

The consequence of this specialized knowledge is that the claim agent can often see dangerous practices which would not be apparent to the superintendent of transportation. It is natural that this should be so because his mind is constantly on ways and means to reduce accident claims, and his thoughts in this respect are quickened by a recollection of testimony in the court relating to the neglect of precautions, which might have prevented an accident. Of course, it is the aim also of the superintendent of transportation to reduce accidents, as part of his main duty of increasing the transportation receipts and decreasing the transportation expenses, but of these objects, the reduction of accidents, although an important factor, is but one of many.

Luxury Travel May Pay Now Where It Formerly Failed

IN TIMES long past, some electric railway men have tried certain kinds of luxury travel accommodations such as club, parlor and dining cars, which were not then patronized to a sufficient extent to make them profitable. They rather naturally use this as a precedent for not undertaking anything of the sort today. But there is plenty of evidence that times have changed.

People are spending dollars freely now where in pre-war times they were unwilling to part with an extra dime. They may "crab" about an 8-cent street car fare (or their politicians may) but they are perfectly willing to pay the extra price for a parlor car seat or space in a Pullman when traveling even comparatively short distances.

Both the Chicago-Milwaukee and the Indianapolis-Louisville electric lines, which have installed extra-fare parlor or club car service during the past year, have found that the better comfort was well patronized almost from the very start. Both these lines have neighbors which tried something that approximated the same service in pre-war times but was abandoned for lack of patronage. It merely goes to show again that people nowadays demand (and are willing to pay for) something better in transportation than just the ride between two points. They want to make their journey faster and in greater comfort than was formerly expected.

Of course, the main advantage in such luxury service is not in the profit from the chair-car charge or from the meal served en route, which is small if any, but in the fact that it attracts additional passengers to the railway. It is believed that many interurban railways which connect good terminal cities two hours or more apart may now well consider the installation of these various means of providing additional comforts in travel.

Make it easier to travel and more will travel.

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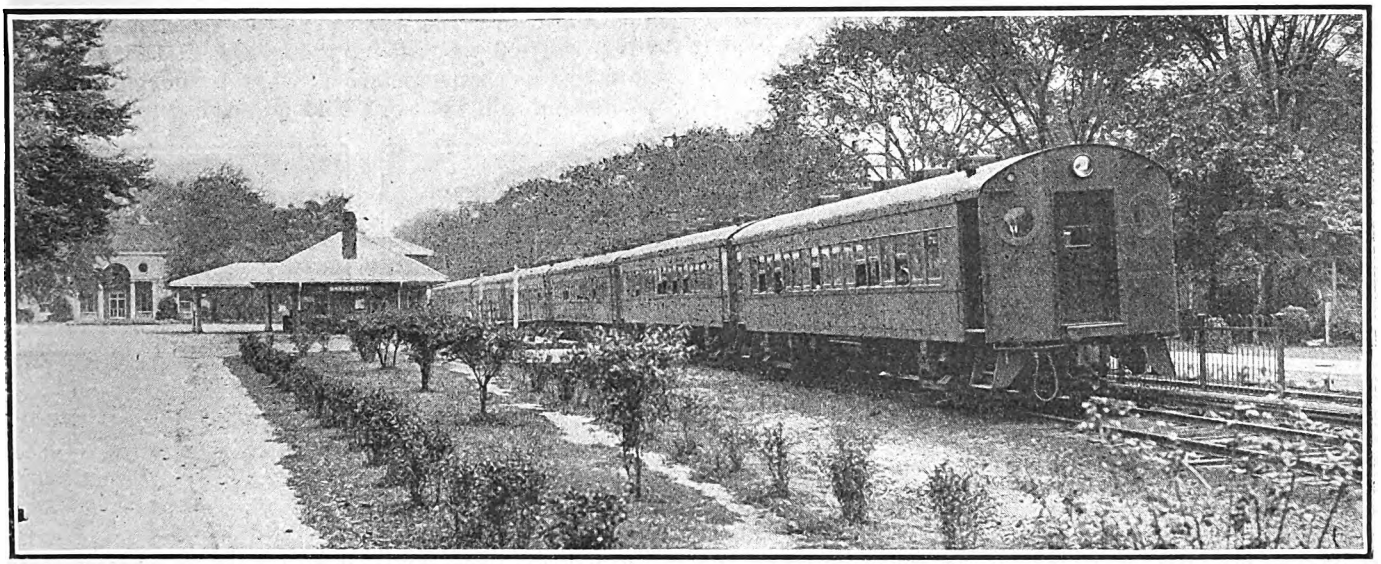
Features of New Long Island Cars

Framing Is Designed to Resist Collapse in Collision and Facilitate Repairs When Damaged — Clasp Brakes and Other Improvements in Trucks and Air Brake Equipment Assist in Operation of Long Trains — Two Motors per Car Are Arranged for Tap Field Control



Train of New Multiple-Unit Motor Cars on the Long Island Railroad

SIXTY additional motor cars, pictured herewith, have recently been ordered by the Long Island Railroad for its electrified train service out of New York City. These are being built by the American Car & Foundry Company. With other cars of the same type ordered in 1923 there will be a total of 140 cars of this new type in service.

The new cars follow steam railroad practice closely. They are 64 ft. 5¾ in. long and seat seventy-eight passengers. The weight, fully equipped, is 57½ tons, or 1,474 lb. per seat. The accompanying table gives the principal data.

The construction of these cars follows closely the design of the Class T-54 trail cars used by this company, with such modifications as are necessary to adapt them for motors and control.

GENERAL DATA OF LONG ISLAND CARS

Length over buffers	64 ft. 5¾ in.
Width over all	9 ft. 10 7/8 in.
Seating capacity	78
Weight	115,000 lb.
Diameter wheels	36 in.
Maximum speed	54½ m.p.h.

A box girder made up of two 9-in. channels spaced 16¾ in., back to back, with a top and bottom plate, form the center sill or stress member. The top cover plate extends the entire length of the channels. The platforms are made of diamond pressed plate. The bottom cover plate extends the entire length of the channels between the platform and end casting. An additional bottom cover plate is used on each end of the car as a reinforcement and this extends from the front end of the draft gear past the center casting to about 2 ft. beyond the cantilevers.

Each end of this box guide is framed in a large steel casting which forms the end of the car. This casting is designed with recesses to accommodate the spring buffer. There are also framed in at this point two 12-in. I-beams which form the diaphragm posts and extend to the roof. The roof purlins are riveted to the tops of these. This center sill takes all bumping strains and prevents buckling of the car, while the large 12-in. I-beams prevent telescoping.

The end construction of the cars is of flat sheet steel. This type of construction was adopted due to the ease with which repairs can be made after damage. Experience of the railway indicates that the ends of steel cars are the parts most frequently damaged. With flat plate construction, repairs can be made very quickly and it is not necessary to wait for specially curved or shaped sections ordered from the car manufacturers nor to keep on hand a large stock of special replacement parts.

The cars have single outside sheets, lined with three-ply Salamander, with inside finishing sheets. The roofs are of the arch type and are constructed of single sheets, lined with three-ply Salamander, with an inside finish sheet.

The trucks are a one-piece cast steel type, manufactured by the Commonwealth Steel Company, St. Louis, Mo. This is an equalizer type. All wearing surfaces are provided with detachable wearing plates. All parts are very liberally designed in order to reduce maintenance repairs. The trucks are provided with clasp brakes and the brake rigging is very substantially constructed. A particular feature is the method of taking up slack. Instead of the usual screw and nut or turnbuckle arrangement, a split collar clamps over two rods. The rods have a succession of rings, and the inside of the split clamp has projections which fit between these. Slack is taken up by loosening the clamping nuts of the collar and sliding this along to a new position on the rod. The slack is automatically taken up by an air slack adjuster, and with the type of con-

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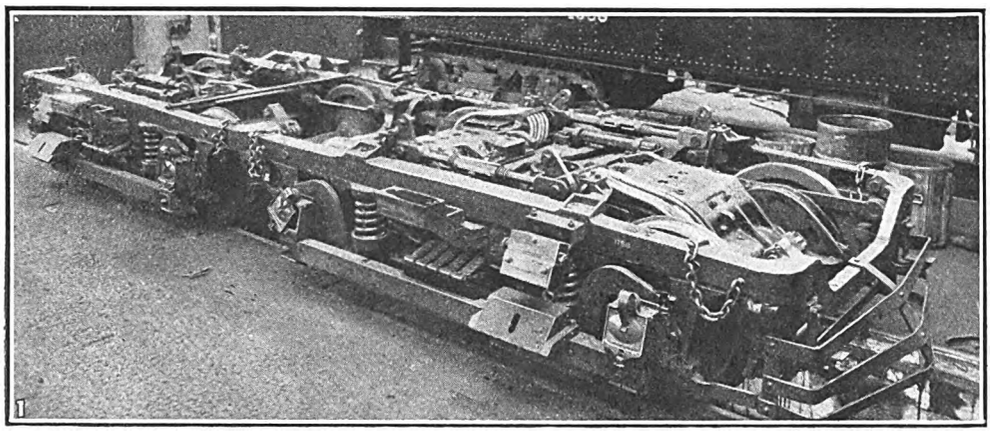
struction used it is found possible to wear out a set of brake shoes without hand adjustment.

Some improvements have been made in the air brake equipment over that used on older type cars. The Long Island Railroad operates many ten-car trains in its electrified service, and the time at terminals for making up and getting these trains into service is quite limited during rush hours. Difficulty was experienced in some cases where cars were coupled to others with low reservoir pressure. The coupling to these cars usually caused the brakes to go into emergency, and considerable time was taken for the compressors to pump up sufficiently to allow the brakes to release.

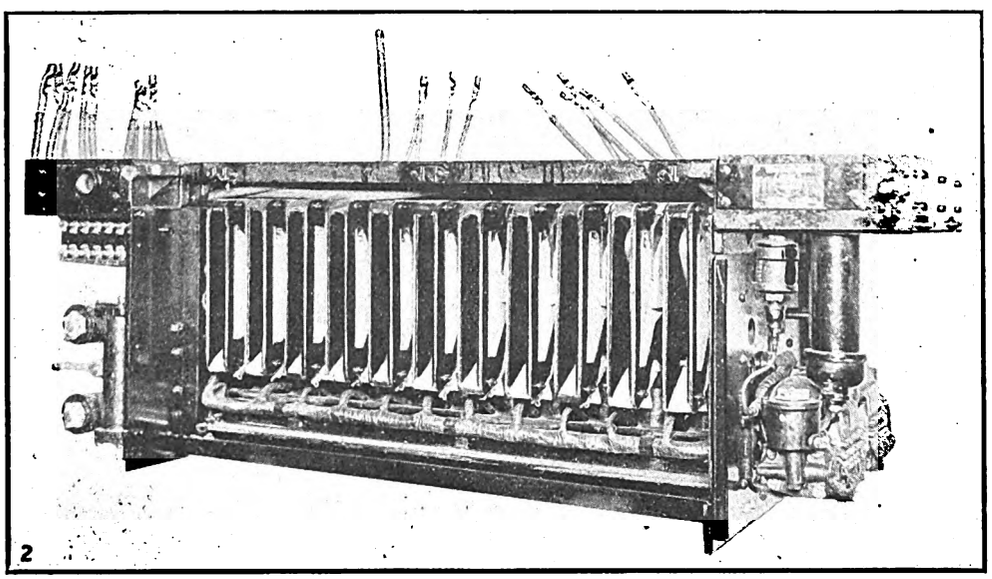
equipment includes the U-12 Universal valve, M 19 C brake valve, and D 3 F compressor of 35-ft. capacity.

The lighting of the cars is from twenty-five lamps, each of 23 watts capacity. These are arranged in two rows on either side of the aisle. The lamp sockets are mounted on the purlins and the lighting wires run inside these.

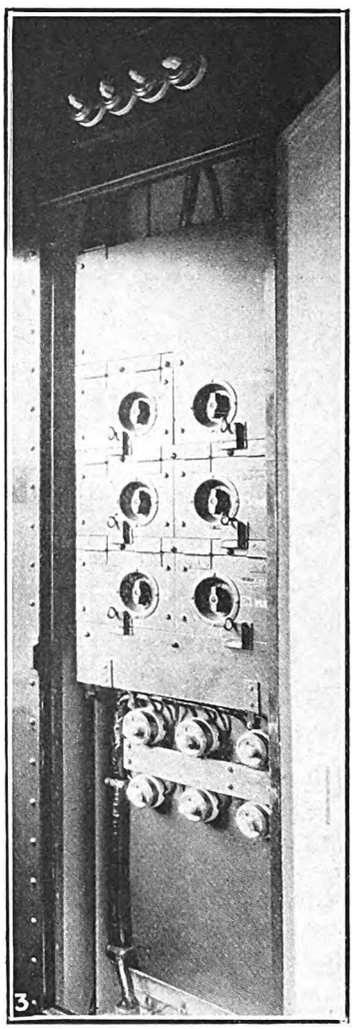
A new feature of the auxiliary equipment is the provision of a safety switchboard for the light, heater and compressor circuits. In this construction the switch controlling each individual circuit is inclosed in an insulated compartment, so that a short circuit in one portion will not spread to adjacent circuits. Pro-



No. 1. The Trucks Are of the One-Piece Cast Steel Type, with Clasp Brakes and Detachable Wearing Plates



No. 2. New Type Switch Group Used on Long Island Cars with Covers Removed



No. 3. The Compartments of This Safety Switchboard Panel Cannot Be Opened with the Circuits Energized

It was also found desirable to shorten the time of release of brakes after an ordinary emergency application.

The main reservoir line was increased from ¾ in. to 1 in. and the branch pipe to the motorman's brake valve was also increased to 1 in. A new feed valve was designed for this service, which is much larger, has larger ports and a larger piston. The air pressure which acts on the diaphragm is brake pipe pressure from the motorman's brake valve. Through the improvements made in piping and air brake equipment the time of releasing brakes after an emergency application was reduced greatly.

The air brake equipment is Westinghouse type AMU. In addition to the changes just described, the

vision is also made so that the covers of the switch compartment cannot be opened until the switches are in their "off" position. This is accomplished by a slot in the pocket surrounding the operating handle. To open the box, the handle must pass through this slot, and this can only take place with the switch in the off-position. This type of switch construction also permits of an improved arrangement of switchboard connections. These are all of flat copper strips and the main feeder and load side of the switches are in inclosed compartments.

The motor equipment for each car consists of two Westinghouse type 308-G-1 motors of the standard box frame type. The main field windings of the motor are arranged for tap field connections on the last run-

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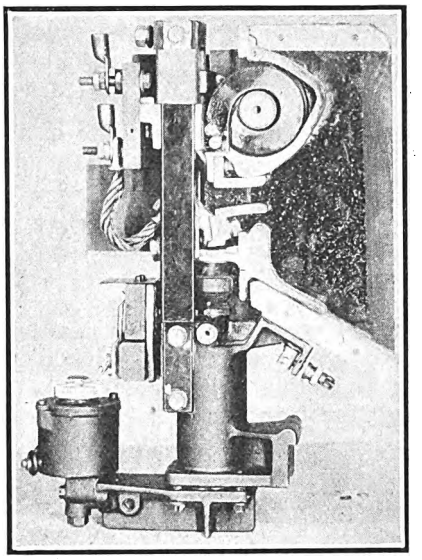
ning point. The housings and gear cases are especially designed to permit the use of clasp brakes. These motors are very similar to the Westinghouse type 308 motors, which have been previously used by the Long Island Railroad on all its motor cars.

The control equipment is Westinghouse type ABF, arranged for automatic acceleration and field control of the motors. This control will operate with all existing equipment of the company. Electro-pneumatic switches are used and energy for operating the control apparatus is furnished by 14-volt storage batteries, two of which are provided per car, so as to be charged and used on alternate days.

The main motor control consists essentially of thirteen unit switches of the HL electro-pneumatic type. Automatic acceleration is accomplished by the use of the usual current limit relay, which regulates the movement of a sequence drum, which in turn energizes the magnet coils of the electro-pneumatic unit switches in the required sequence.

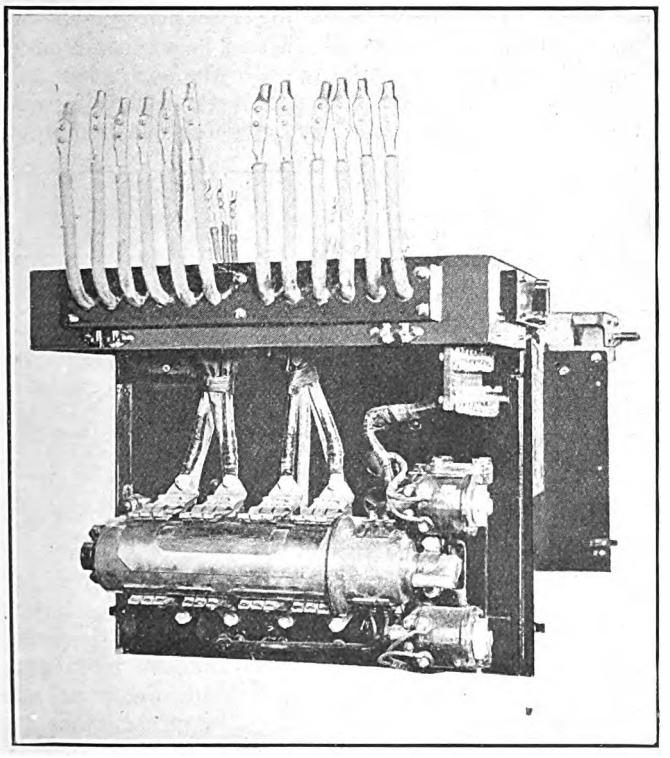
The main control circuits are arranged with a total of twelve steps. Seven of these are for series operation and five for parallel operation. Bridging method of transition is used between series and parallel. The normal or tapped field connection for the motors is effective only on the last full parallel running point. In addition to the control group, a line switch or circuit breaker is used which has parts interchangeable with those in the switch group. The use of two overload relays to operate the line switch, one connected in each leg of the motor circuit, provides for more sensitive operation than the usual type of single overload trips, since each is set at approximately one-half the current value required for a single relay. Either or both of the relays can be reset by a single reset coil, which is energized from a plug switch located in the master controller.

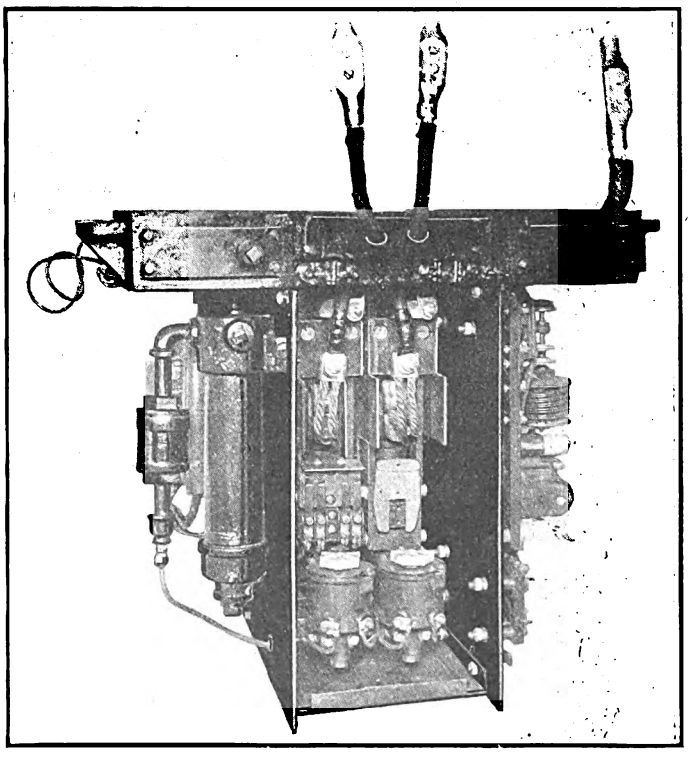
The main control is mounted in a skeleton frame completely inclosed by removable covers. On one end of the group is the sequence switch and limit relay,



Unit Switch with One Side of Arc Chute Removed to Show Construction

while the other end contains an electro-pneumatically operated drum type reverser. The sequence switch, which energizes the magnet coils of the controller in the proper order, consists of a drum which is operated by air cylinders through a rack and spur gear with teeth cut at an angle of 45 deg. Entrance of air into the operating cylinders is controlled by two magnet valves, one for "on" and the other for "off" motion. The operation is on the balanced air principle. If both "on" and "off" magnets are energized at the same time, movement of the drum takes place, since the air pressure on the piston is unbalanced by air being admitted through the "on" valve and released through the "off" valve. Movement is stopped by de-energizing the "off" magnet, which will then admit air and cause the pressure on the piston to become balanced. To move the drum in successive steps, it is only necessary to energize the "on" magnet from the supply circuit and the "off" magnet through the limit relay contact. When both magnets are de-energized, as when the master controller is in the "off" position, the air in the "on" magnet cylinder is exhausted to atmospheric pressure, while that in the "off" magnet valve is at reservoir pressure, thus moving the drum to the "off" position and holding it there.





At Left, the Drum-Type Reverser Is Mounted on One End of the Switch Group. At Right, Type of Line Switch Used on New Cars

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The control circuits of the magnet coils are so interlocked that rotation of the drum is permitted unless the line switch is closed, and as the line switch when once opened cannot be closed until the drum returns to the first operating position, independent operation of either is eliminated.

Bargain Sale of Passes Proves Profitable

Reduced Rates on the Lines of the Beaver Valley Traction Company During August, 1923, Produced Higher Revenue than Normal Rates During the Same Month in 1922

FOR five weeks beginning Aug. 6, 1923, the Beaver Valley Traction Company, New Brighton, Pa., sold the all-zone pass, normally costing $2, for $1.50. At the same time the price of the two-zone pass, normally $1.60, was reduced to $1.50. The purpose of this bargain sale of passes was to stimulate passenger traffic, which is ordinarily at a low ebb during that season. That considerable success attended this effort of the company is shown by the fact that the gross revenue for August, 1923, was approximately 15 per cent greater than for August of the year before.

A somewhat similar experiment had been made by the Beaver Valley Traction Company during the previous spring. At that time free tickets were given as a bonus to those who bought the weekly pass. With an 85-cent pass two free tickets were given, with a $1.60 pass three free tickets, and with a $2 pass five free tickets. During the weeks from May 4 to May 25 this scheme was in effect. Financially the result was inconsequential. That is to say, the gross revenue remained about the same. The extra riding on the free tickets was apparently about balanced by the extra riding for cash. As a whole, however, the pass-buying public was pleased to get this appreciation of its patronage and the company profited on the score of public relations if not in the matter of revenue.

Probably the reason why the free ticket scheme was not more popular was that the saving was contingent upon the buyer of the pass having a companion. His own pass was sufficient to take him anywhere at any time, and unless he desired to pay the fare of some other person he would have no use for the free tickets. It was thought, therefore, that a more favorable reaction would be obtained if a method were devised to give a direct saving to the buyer of the pass. To this end the reduced rate sale of passes during August was tried with price reductions as stated at the beginning of this article.

	Four Weeks July 9 to Aug. 5	Four Weeks Aug. 6 to Sept. 2	Four Weeks Sept 10 to Oct. 7
$0.85 passes	1,153	985	1,096
$1.60 passes	412	.....	385
Universal passes	1,805	3,414	1,889
Total passes	3,370	4,399	3,370
Adult passenger revenue	$5,248	$5,944	$5,423

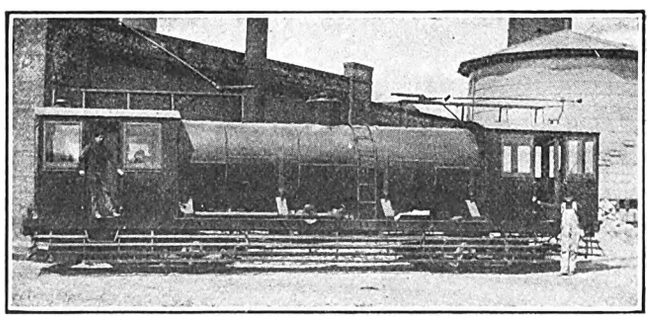
A comparison of the three periods of four weeks each, that preceding the bargain sale, that during the bargain sale, and the one immediately thereafter, shows that the revenue was considerably greater during the bargain sale.

It is seen from the figures in the accompanying table that the number of one-zone passholders was materially reduced during the period of the bargain sale, and even after its ending the number did not increase to its former size. The number of two-zone pass holders was of course reduced to nothing, because the price was made the same as that for the universal pass. A great increase occurred in the number of people buying the universal pass, and to some extent this increase appears to have been retained after the passes returned to their normal price. It was noticeable also that although August is usually the poorest month of the year the total number of pass buyers and the gross revenue were higher during the four weeks from Aug. 6 to Sept. 2 than during the four weeks just before or after.

The beneficial effect on the income of the Beaver Valley Traction Company and the Pittsburgh & Beaver Street Railway, operated by the former company, can be seen from the fact that in July, 1922, the gross revenue was $53,707, and in July, 1923, $57,815, or an increase of 9½ per cent. In August, 1922, the gross revenue was $48,448, while in August, 1923, it was $55,490, or an increase of 14½ per cent over the preceding year. Thus August, 1923, almost equaled July in revenue, whereas the year before August was considerably lower than July, showing the value of the pass sale. It may be noted that the pass is responsible for approximately 10 per cent of the total revenue and for 10 per cent of the increase in revenue, so far as its influence may be directly accounted for. It is probable that the pass, or more particularly the general merchandising methods employed by the Beaver Valley line, has been a factor in the healthy increase in gross revenue shown.

Making Use of an Old Tank Car

MANY years ago the Market Street Railway, San Francisco, Cal., built a tank car to supply oil to various power houses equipped with oil-burning boilers. This car has a cylindrical tank with a capacity of 4,410 gal., and is equipped with an electrically driven pump for discharging the oil. There is no longer any use for the tank car in carrying oil to the power houses, but the railway has found it useful for supplying oil to tanks in various parts of the city for use in oiling track curves and switches. The oil is pumped into the tank at the Market and Valencia Yard from a large underground storage tank which is supplied by tank trucks of the oil companies. The tank car is in use only about two days a month, but inasmuch as no expense was necessary to put it to its present use it has been found practical and economical.



This Tank Car Equipped with Electric Pumps Is Used to Carry Oil for the Market Street Railway of San Francisco

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Energy Consumption of Interurban Cars

Tests Made to Allocate Energy Used Between Cars of Detroit United Railway and Detroit Municipal System When Operating on Tracks of the Latter Indicate Average Consumption of 120.4 Watt-Hours per Ton-Mile—Heater Energy Also Measured

AN ABSTRACT was recently published in this paper of the report of the committee appointed to fix compensation for the right to operate interurban cars of the Detroit United Railway in the city of Detroit. In determining this question, the board of arbitration had to make a study of the energy consumption of the interurban cars on city lines, and a report on the subject by Alfred H. Lovell and James F. Fairman of Ann Arbor, Mich., is included as an appendix in the report of the board. This appendix contains so much information on this interesting subject that it is abstracted below:

Fig. 1 gives the results of tests of energy consumption in kilowatt-hours per car-mile and watt-hours per equipment ton-mile of D.U.R. interurban cars on city runs, made by the Detroit United Railway. In a very large proportion of these runs the energy consumption was lower on the incoming run than on the outgoing run. This was explained by the company as due to the condition that the interurban car often had to follow a city car which made a large number of stops. In consequence, the interurban motorman did a great deal of coasting and running on the series position of the controller, with a consequent saving in power. There were seventy-nine tests averaging 8.87 car-miles each.

The Department of Street Railways of Detroit also submitted results of tests made by the department on cars of its own and also on some Detroit United and some Michigan United cars. The runs for the six department cars tested totaled 13,021.31 car-miles and the tests of the twelve outside cars totaled 437.35 miles. Some of these tests were made with the heaters on, but an estimate was made of the energy taken by them and the amount was deducted from the consumption figures. The results are given in Fig. 2. Then all the cars were grouped in several weight classifications, beginning with 7.5 tons, then 17.5 tons and by 2.5-ton increments to 45 tons. The average energy consumption by groups is given in Fig. 3.

Commenting on these tests, the report says that the points are obviously closer together in the department tests than in the D.U.R. runs. One reason is the much longer run of the D.S.R. tests. The points on Fig. 3 are very consistent, and as a variety of motor equipment and gear ratios was represented, these values of kilowatt-hours per car-mile are recommended as a basis for energy consumption in city travel for all of the passenger equipment, i.e., both D.S.R. and D.U.R.

The curve of averages drawn in Fig. 3 may be very closely approximated by the formula:

Kilowatt-hours per car-mile equals $1.6 + 0.002\ (\text{tons})^2$

The data shown in Figs 1, 2 and 3 were also plotted with the unit for the ordinate changed from kilowatt-hours per car-mile to watt-hours per ton-mile. While these points showed a wider dispersion and lack of uniformity than the results in the test just mentioned, the report considers the board is warranted in holding that the average of 120.4 watt-hours per ton-mile, of all the tests on passenger equipment traveled over city lines by both D.U.R. and D.S.R. cars, may properly be accepted.

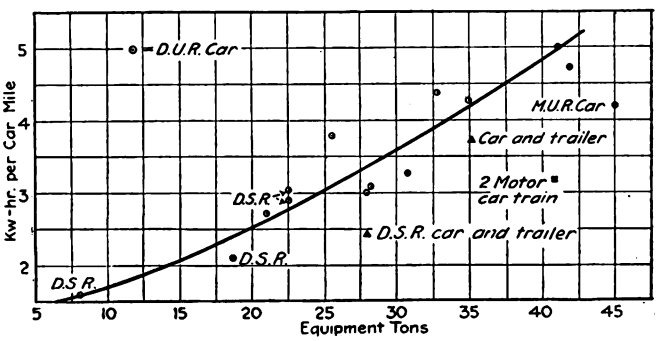

Fig. 2—Energy Consumed on City Passenger Runs, D.S.R. Tests

DAYTON TESTS

In addition to the Detroit tests mentioned, the report refers to energy tests for city runs made in Dayton for the local companies by the Economy Electric Devices Company and described on page 41 of the ELECTRIC RAILWAY JOURNAL for July 8, 1922. The data from these tests were plotted in reference to car weight on both a kilowatt-hours per car-mile and watt-hours per ton-mile basis. The results are shown in Figs. 4 and 5.

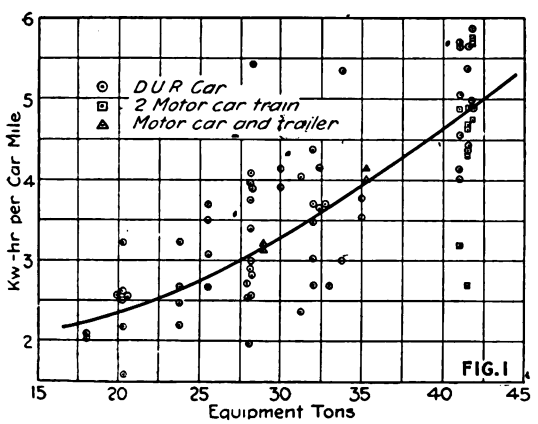

Fig. 1—Energy Consumed on City Passenger Runs, D.U.R. Tests

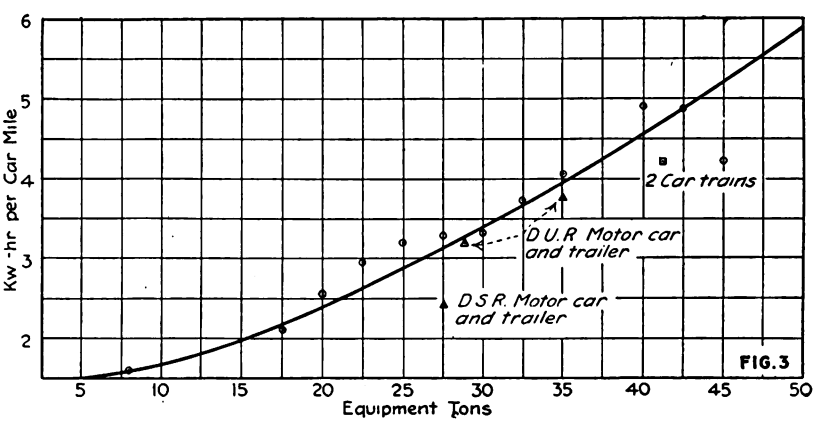

Fig. 3—Energy Consumed on City Passenger Runs, Averages of D.U.R. and D.S.R. Tests

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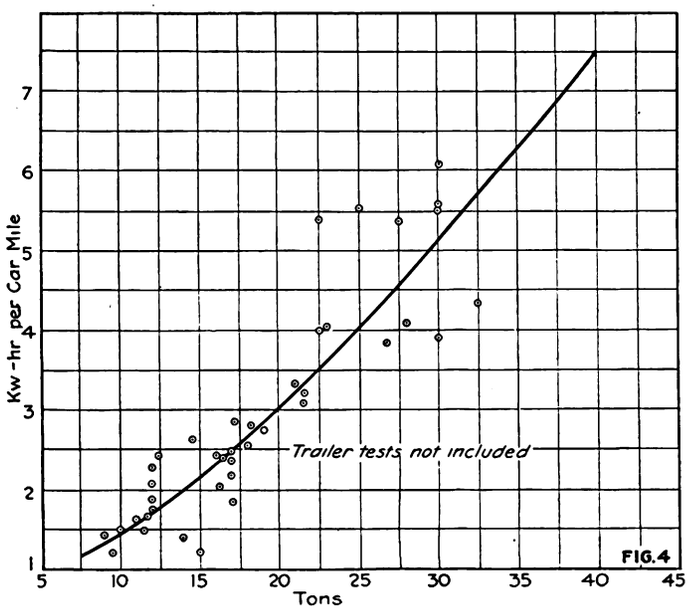

Fig. 4—Energy Consumed on City Passenger Runs on Kilowatt-Hours per Car-Mile Basis, Dayton

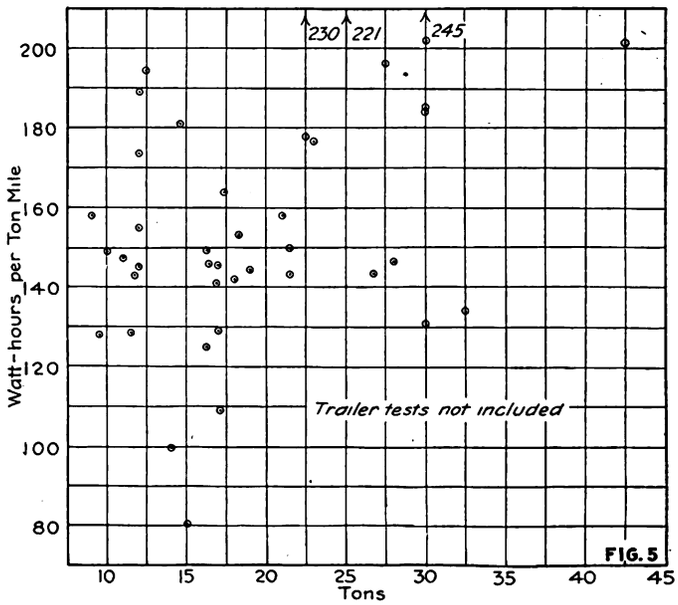

Fig. 5—Energy Consumed on City Passenger Runs on Watt-Hour per Ton-Mile Basis, Dayton

The report considers that these results are distinctly comparable with the Detroit tests, though the figures on the watt-hours per ton-mile basis are more widely scattered and less uniform on the average than those for similar plottings in the Detroit tests. There is also a steeper slope to the average curve in Dayton, as shown in Fig. 8, probably due to the operation being in the downtown district with a stop at every corner.

To determine whether there was any closer agreement in the test results for unit consumption on the longer country runs than in the city runs, a tabulation and plot were made of the passenger car tests on the Flint and D. J. & C. divisions of the D.U.R. These data, which were taken from the railway exhibit, are plotted in Fig. 6, which show conclusively that there is just as much variation on the runs in the country as in those in the city.

Tests on Freight Cars on City Runs

The report also gives the results of tests of the energy consumption of freight motor cars hauling trains of different lengths varying (with the load on the motor car and its weight included) from a motor car with two trailers and weight of freight carried of 27,449 lb. to a motor car and seven trailers with a load of freight carried of 183,311 lb. The average running

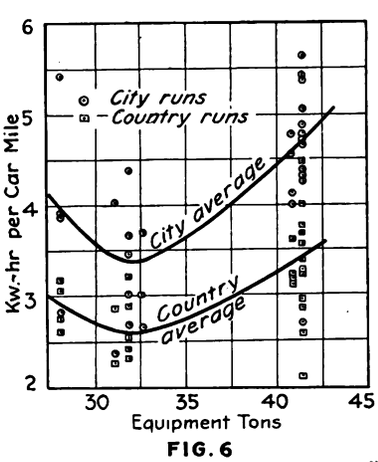

Fig. 6—Comparison of Energy Consumption Tests in City and Country Runs, D.U.R.

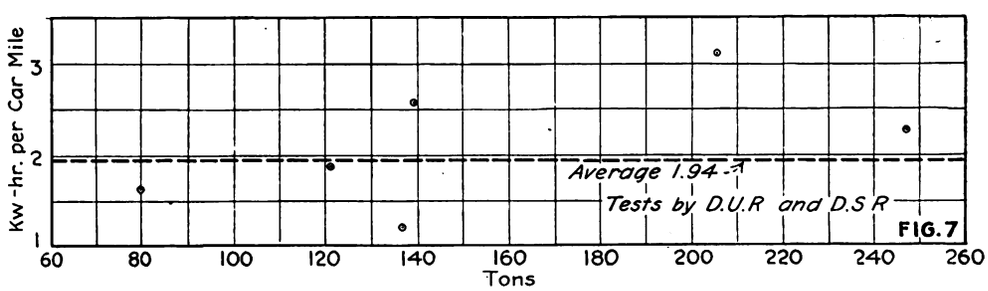

Fig. 7—Energy Consumed on City Runs by Freight Cars in Kilowatt-Hours per Car Mile.

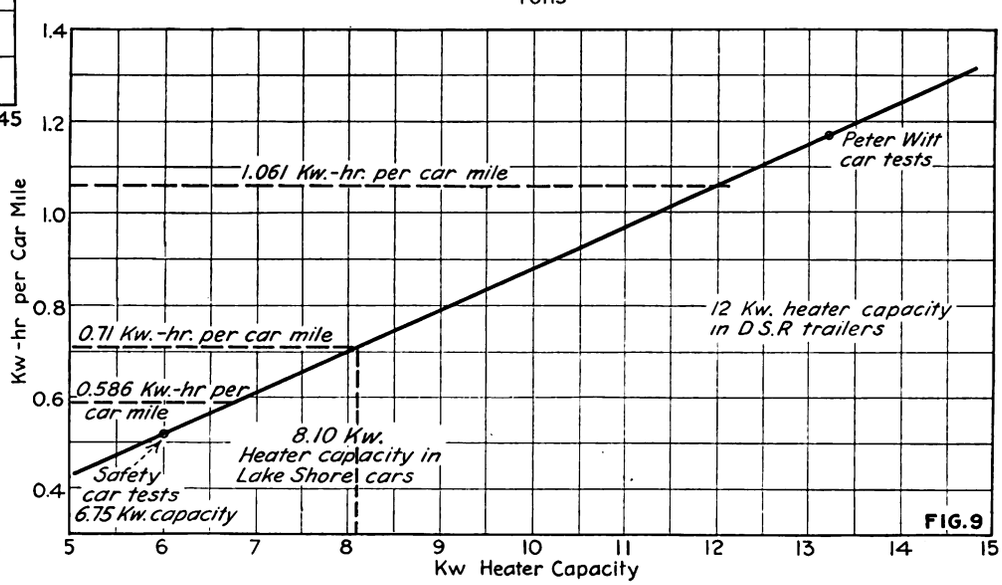

Fig. 9—Energy Consumption of Heaters on Passenger Cars.

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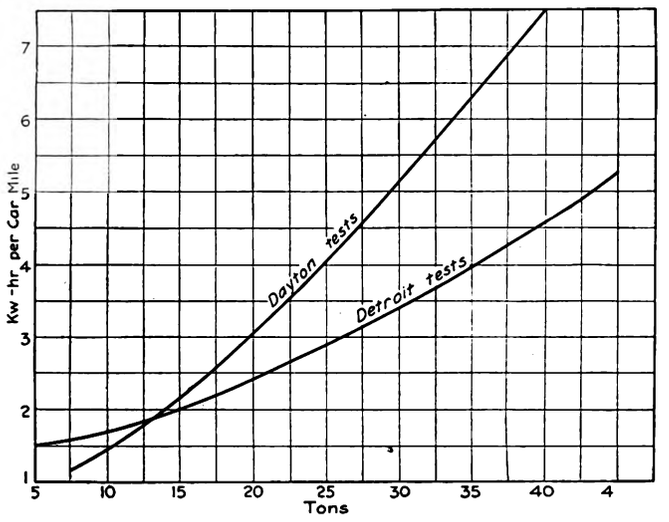


Fig. 8—Comparison of Curve on Figs. 3 and 4

consumption of all these tests, including the energy used in switching during the trip, was 61.6 watt-hours per ton-mile and 1.94 kw.-hr. per car-mile. The latter figures are plotted in Fig. 7.

TESTS ON HEATERS

The report also gives the results of some tests made by the Department of Street Railways on energy consumed in car heating. One series of tests was made with an 8-ton safety car for ten days in November, 1922; thirty days in December, 1922, and January, 1923, and one day in March, 1923. The mean outside temperatures during these three periods were respectively 38.6 deg., 27.4 deg. and 22 deg., all Fahrenheit. The car-miles aggregated 3539.5 and the average consumption was 0.52 kw.-hr. per car-mile.

The tests on the Peter Witt cars were one test of fifty-three days in December, 1922, and January, 1923, and three tests of one day each in March, 1923. During this time the car-miles amounted to 6722.7. The average outside temperatures for these periods respectively were 22.1 deg., 22 deg., 22.3 deg. and 46 deg., and the average consumption was 1.17 kw.-hr. per car-mile.

The report points out that the heater capacity of the 8-ton safety cars is 6 kw. and of the 18.66-ton Peter Witt cars is 13.2 kw., so that if the heater installation is based on the same unit of kilowatts per cubic foot, it might be expected that the energy consumption of the larger cars would be approximately 13.2 divided by 6, or 2.2 times that of the 8-ton cars. Actually, $2.2 \times 0.52 = 1.144$, which is very closely in agreement with the 1.17 kw.-hr. per car-mile average of the Peter Witt car tests. The report points out also that there were a great many variables which entered into the determination of heater energy consumption, and gives for each of the tests the average stop per run, average time that the doors were open, the average total passengers, on and off, and the average car temperature.

The report points out that about 100 thermostats were destroyed on the system of the Detroit Department of Street Railways by car crews, who wanted the cars warmer than the thermostat cut-out temperature, and there were other thermostats whose adjustment had been tampered with so as to bring the cut-out temperature up to 70 to 75 deg. With such variations in the car temperatures, it would seem impossible to establish uniform energy consumption for the heaters without frequent rigid inspection of the thermostats and season-long tests with a graphic car thermometer in conjunction with the kilowatt-hour meter on each type of equipment. However, the report believes that the figures given are fairly representative of average conditions as they actually prevail in Detroit and recommends the listed average as the basis which the board might choose for the determination of heater energy consumption.

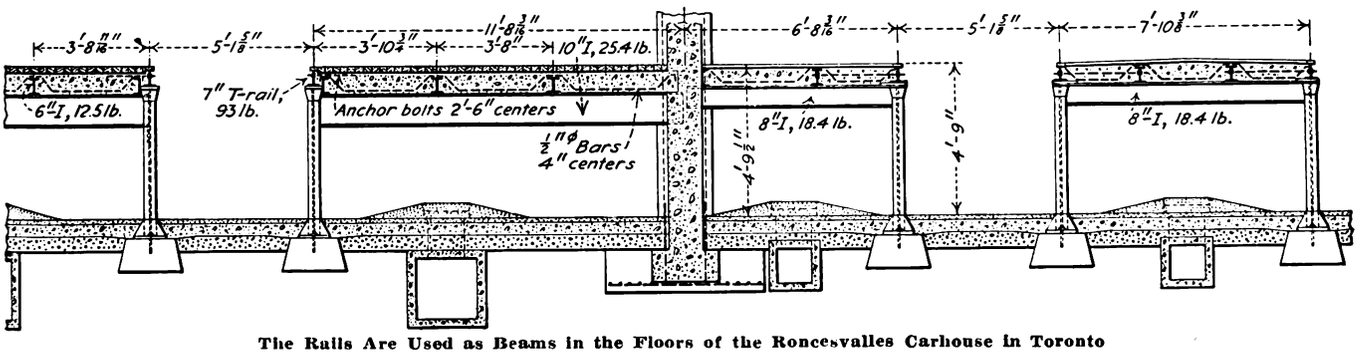
Track Rails Used as Floor Girders in Carhouse

AN INTERESTING type of floor construction has been installed in the Roncesvalles carhouse of the Toronto Transportation Commission. This carhouse was described in ELECTRIC RAILWAY JOURNAL for May 4, 1923, page 791. A general illustration of the carhouse is shown in that article.

In ordinary floor construction where pits are used in carhouses, the track rails are independent of the floor framing. This necessitates the use of girders of sufficient strength to carry the entire floor, the track rails either being set on top of the floor or at the edge of the floor section but structurally independent of it. In this construction the rails are used as girders and assist in supporting the floor.

The arrangement is shown in the accompanying drawing. Girder T-rails, 7 in. high, are used. These are supported on vertical columns of I-section. The rails are connected with intermediate I-beams by means of tie rods, and the floor is constructed with concrete. In one section the wearing surface of 2½-in. wood block is laid on top of the concrete, the surface being flush with the head of the rail. In another section a cement flooring is used, which is laid with a hardener to make it wear-resisting.

Several different arrangements are shown, whose application depends on the width of the span and the load to be supported. All of them, however, depend on the use of the rail as one of the beams.



The Rails Are Used as Beams in the Floors of the Roncesvalles Carhouse in Toronto

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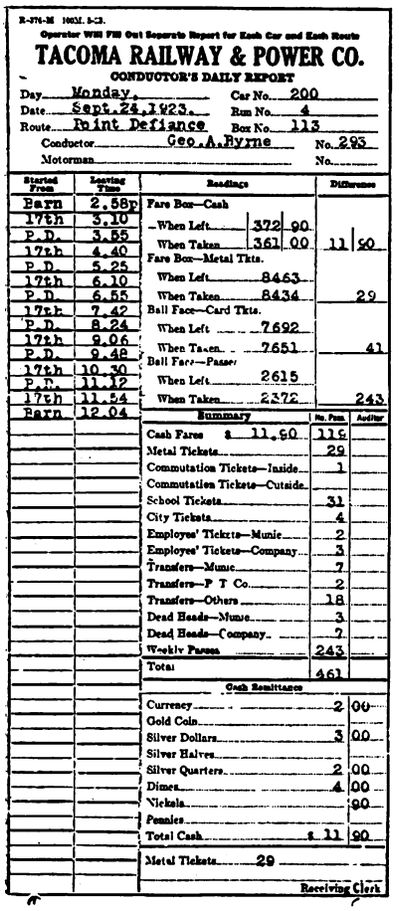
New Trip Envelope Saves Time

A SIMPLIFICATION in the method of handling conductors' trip sheets inaugurated in the early part of the year, has proved satisfactory on the Tacoma Railway & Power Company's system. The number of forms that it is necessary to use has been reduced from four to only one. Under the old system, an operator was required to make out a daily report card on which was shown the number of passengers, the beginning and ending fare-box readings for both cash and tokens, the number of tickets and the number of transfers for each half trip. At the end of his run, he was required to turn in to the receiver an envelope containing the transfers, a second envelope containing his report and all tickets collected, and a small card stating the amount of cash he was delivering. One envelope now does the work of all these forms. Fare-box readings, however, are taken only at the beginning and ending of the day's work, instead of at the end of each half-trip. The saving of time accomplished is an important item, especially at periods of the day when it is difficult to maintain the schedule speed. Another advantage is that the simplification increases the likelihood of the conductors making correct reports and aids the receiver in detecting arithmetical mistakes. Under the old system, it frequently happened that the operator neglected to turn in one or more of the various forms required.



Operator Will Fill Out Separate Report for Each Car and Each Route

TACOMA RAILWAY & POWER CO.

CONDUCTOR'S DAILY REPORT

Day Monday. Car No. 200
Date Sept. 24, 1923. Run No. 4
Route Point Defiance Box No. 113
Conductor Geo. A. Byrne No. 295
Motorman No.

Started From	Leaving Time	Readings		Differences
Barn	2.58p	Fare Box—Cash		
17th	3.10	When Left	372 90	
P. D.	3.55	When Taken	361 00	11 90
17th	4.40	Fare Box—Metal Tkts.		
P. D.	5.25	When Left	8463	
17th	6.10	When Taken	8434	29
P. D.	6.55	Ball Face—Card Tkts.		
17th	7.42	When Left	7692	
P. D.	8.24	When Taken	7651	41
17th	9.06	Ball Face—Paper		
P. D.	9.48	When Left	2615	
17th	10.30	When Taken	2372	243
P. D.	11.12			
17th	11.54			
Barn	12.04			

Summary	No. Pass.	Audited
Cash Fares $ 11.90	119	
Metal Tickets	29	
Commutation Tickets—Inside	1	
Commutation Tickets—Outside		
School Tickets	31	
City Tickets	4	
Employes' Tickets—Munic	2	
Employes' Tickets—Company	3	
Transfers—Munic	7	
Transfers—P T Co	2	
Transfers—Others	18	
Dead Heads—Munic	3	
Dead Heads—Company	7	
Weekly Passes	243	
Total	461	

Cash Remittance		
Currency	2	00
Gold Coin		
Silver Dollars	3	00
Silver Halves		
Silver Quarters	2	00
Dimes	4	00
Nickels		90
Pennies		
Total Cash	$ 11	90
Metal Tickets 29		

Receiving Clerk

New Envelope Which Simplifies Accounting for Tacoma Conductors

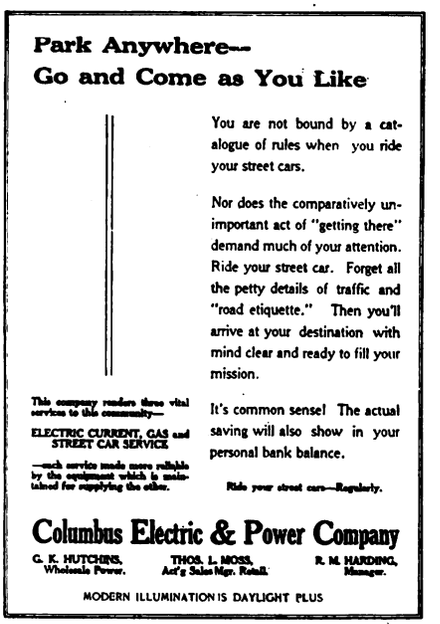
Reducing Fire Risk in the London Tubes

GREAT care is exercised to avoid any fire in the "tubes" of the Underground Railways of London. Journals are frequently packed and are watched carefully. A hot box might cause a panic and a panic at "crush hour" might have serious consequences. Great care is exercised in keeping the tubes clean. A certain amount of inflammable material is dropped at stations and in cars by passengers. Certain amounts of foreign material also find their way into the tubes by way of the elevator shafts and stairways, as well as through the shafts in which the ventilating fans are operated. In addition, a mysterious fluff accumulates. It is highly inflammable and is disposed of with much difficulty, as it is sucked along with the trains. The source of this material is in doubt, but it is believed to be lint from the clothing of the passengers. When millions of people crowd on and off cars, there is bound to be some brushing off of the fabrics of which clothing is made. In the aggregate this amounts to a surprising quantity.

Contest Produces Good Advertisements

ELECTRIC railway interests figured actively in a recent advertising contest among employees of properties managed by Stone & Webster, Inc., Boston, Mass., designed to stimulate the production of "copy" calculated to "sell" the idea of utility service. Two classes of advertisements were embodied in the contest: Material for a series of not less than six newspaper advertisements designed to sell any of the service of appliances offered by the Stone & Webster companies, and ideas which could be used in utility advertisments.

C. L. Greer, superintendent of overhead, Galveston-Houston Electric Railway, Houston, Tex., won the first prize in the second part for a group of ideas for increasing popular appreciation of the value of electricity. The second prize (tied) went to G. C. Harvey, clerk in the track department, El Paso Electric Railway, El Paso, Tex., on the use of electric appliances in the home, and to L. K. Hawson, assistant superintendent gas department, Nova Scotia Tramways & Power Company, Ltd., Halifax, N. S., on the same subject.



One of a Series of Six Prize-Winning Advertisements in Contest Conducted by Stone & Webster

The railway material which won the second prize is now being featured by the Columbus Electric & Power Company, Columbus, Ga. It is composed of six advertisements emphasizing the comfort, time-saving features, freedom, independence of weather conditions, safety and service availability of electric transportation. Each one is illustrated in the simplest possible manner by a drawing of the two parallel rails of a single straight track, thus emphasizing the direct, speedy service of the street railway. Contrast is drawn between the removal of responsibility from the passenger and the burdens of automobile driving "in traffic"; between the low cost of trolley service and the expensive luxury of motoring in areas served by electric railway lines.

Throughout the set the readiness-to-serve policy of the railway and the convenience and comfort of car travel are featured. It is expected that other railway systems operated by Stone & Webster, Inc., will shortly utilize these advertisements in their own traffic and good-will seeking activities.

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Unusual Terminal Layout Facilitates Passenger Movement

New Interurban Station of the Bamberger Electric Railroad and the Salt Lake & Utah Railroad at Salt Lake City Has Waiting Room on the Street Level and Train Platforms Underground—Separate Ramps Are Provided for Incoming and Outgoing Passengers

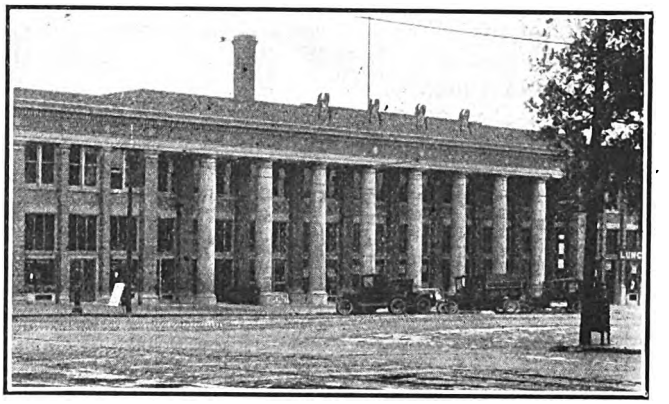
THE new interurban station for electric railroads recently completed at Salt Lake City, Utah, is a good example of up-to-date terminal design from a traffic standpoint as well as being of pleasing appearance. Convenience and comfort have been effectively combined in its construction.

This station is the terminus of the Bamberger Electric Railroad and the Salt Lake & Utah Railroad, two interurban lines serving the territory adjacent to Salt Lake City. It is the outcome of the merging of the terminal interests of the two railways, and has been achieved after much effort on the part of former Governor Simon Bamberger and A. J. Orem, the respective presidents of the two roads.

The building is of reinforced concrete construction faced with gray vitrified brick. It is Colonial in style and is three stories high. The use of the basement as a passenger concourse, however, has the effect of an extra story.

The track level is 12 ft. below the sidewalk grade and is reached by carborundum finished ramps of easy inclination, as well as by stairways at both ends of the waiting room. In this story are situated the express and baggage accommodations, the trainmen's comfort station, and the mechanical equipment of the building. There is also a spacious concourse with outlet gates to the various train platforms and approximately 12,000 ft. of floor space available for commercial purposes.

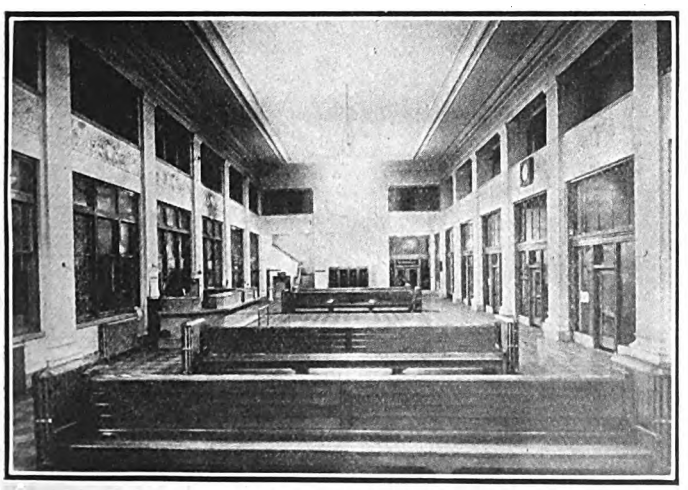
The main waiting room is on the street level and is accessible directly from the sidewalk without steps or inclines of any sort. Its windows overlook the incoming and outgoing train yards. The station faces toward the north on South Temple Street. The entrance is at the east end of the waiting room because the major part of the railway patronage comes from that direction. On the south side of the waiting room are the ramps leading to the track level. Directly in the line of passenger movement is situated the ticket office. Announcement boards occupy the wall opposite the entrance, where they can be seen at a glance by hurrying patrons.



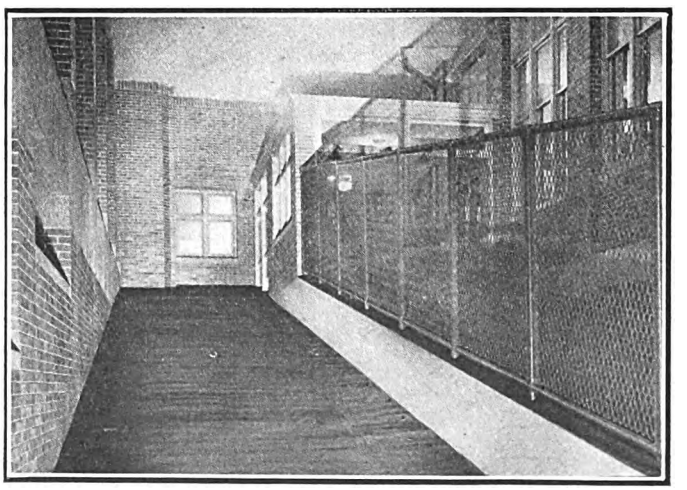
Combined Terminal of the Bamberger Electric Railroad and the Salt Lake & Utah Railroad

The principal exit from the waiting room is at the west end, directly opposite the ramp leading up from the incoming tracks. This movement is, therefore, entirely separate from the passenger movement in the other direction, which is at the east end. The separate and direct lanes of passage which are thus created for incoming and outgoing traffic tend to eliminate confusion and facilitate the movement of the crowds without congestion. These travel lanes, together with the designation of exits to trains and the one-way communicating doors automatically guide the unfamiliar travelers along their way and without confusion.

By virtue of a southerly exposure the waiting room



The Waiting Room Is Two Stories in Height and Overlooks the Train Yards



Separate Ramps Are Provided for Incoming and Outgoing Passengers

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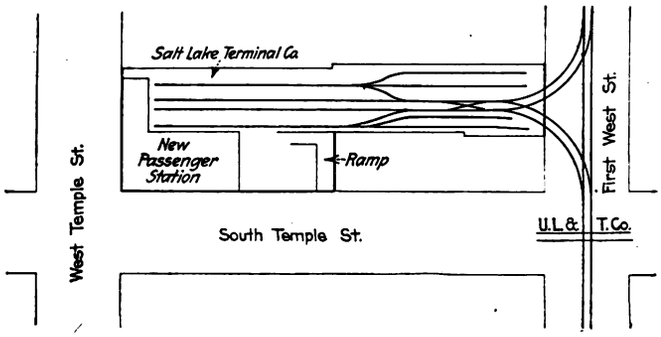
is brilliantly day lighted during the heavy traffic hours. The ceiling is two stories high, as shown in the accompanying illustration. Convenient ladies' retiring room and men's smoking room are provided. The main waiting room is finished in imitation of Caen stone, with a marble travertine floor. The woodwork and roomy seats are of natural quartered oak.

Adjoining the waiting room on the west is situated a modernly equipped kitchen and dining room, where excellent meals are served at popular prices. Here also are telephone and telegraph accommodations. Along the north side of the waiting room are several small stores catering to passengers as well as to the general public. Entrances to these stores from both waiting room and street are provided. A drug store occupies the corner location. A barber shop is located in the wing having street frontage on the east. Dining, lunch, news, refreshment, tobacco and drug concessions are under lease and are handled by the Walsh News Company, of which John W. Walsh, a director of the Bamberger road, is the head. Additional stores occupy the street frontage on the east side of the building. General dispatcher's offices are reached through a corridor from the waiting room or by a stairway from the track level for the convenience of trainmen. These occupy the west exposure overlooking the yard trackage. The second story, with the exception of the offices of the traffic departments of the two roads, and the area embracing the waiting room, is devoted to public office space. It is planned at some future time to have all the general offices of the two railroads located in the new building.



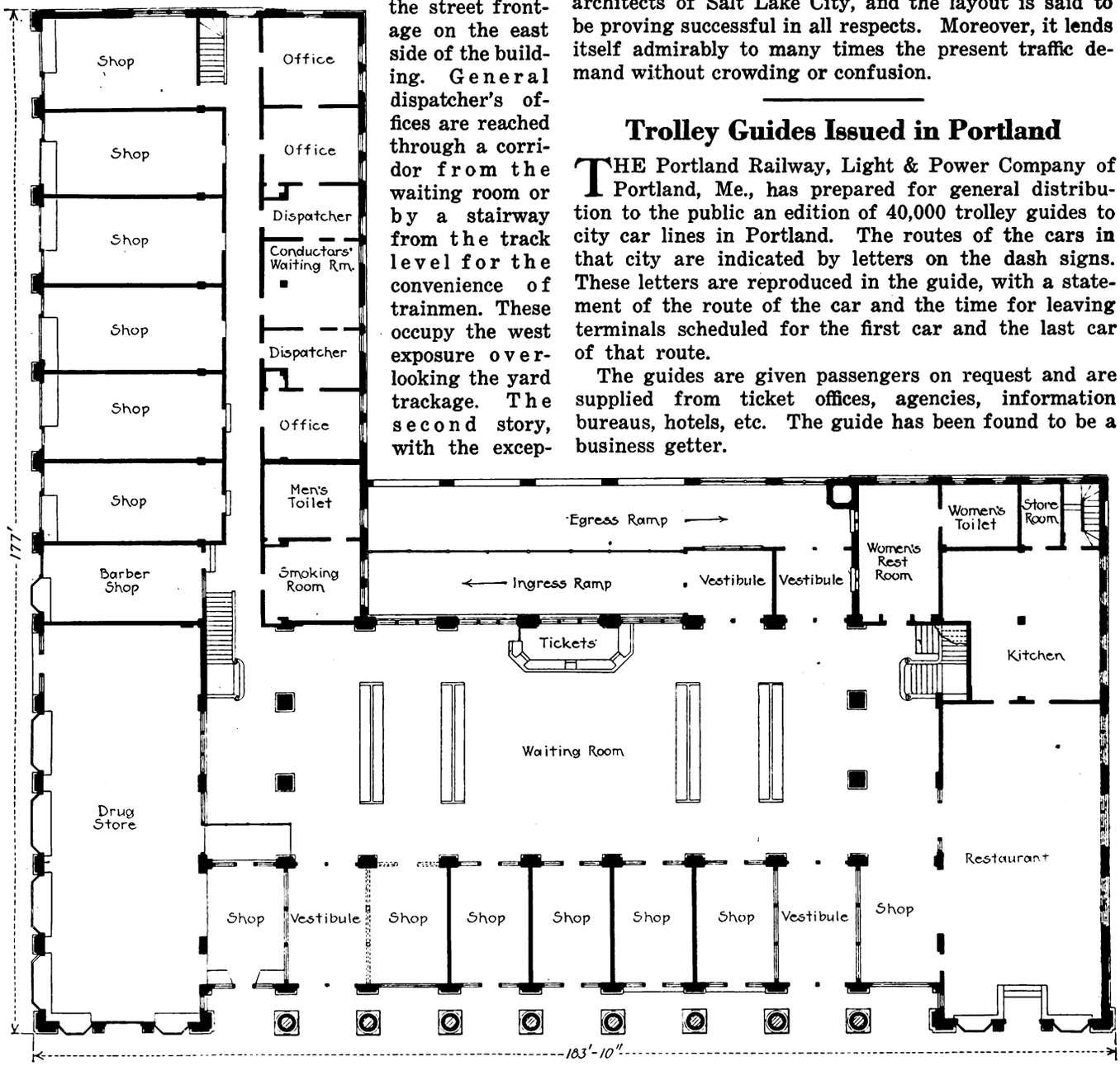
The Tracks Enter the Station 12 Ft. Below the Street Level

The building was designed by Young & Hansen, architects of Salt Lake City, and the layout is said to be proving successful in all respects. Moreover, it lends itself admirably to many times the present traffic demand without crowding or confusion.

Trolley Guides Issued in Portland

THE Portland Railway, Light & Power Company of Portland, Me., has prepared for general distribution to the public an edition of 40,000 trolley guides to city car lines in Portland. The routes of the cars in that city are indicated by letters on the dash signs. These letters are reproduced in the guide, with a statement of the route of the car and the time for leaving terminals scheduled for the first car and the last car of that route.

The guides are given passengers on request and are supplied from ticket offices, agencies, information bureaus, hotels, etc. The guide has been found to be a business getter.



Inbound and Outbound Passenger Movements Are at Opposite Ends of the Station, Entrance Being at Left and Exit at Right

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Employees Organization Begins Safety Campaign

Kansas City Railways Will Direct Safety Activities Through Committees Developed by Employees' Representation Plan—Investigation of All Accidents to Be a Feature

A NEW safety organization has been effected on the Kansas City Railways which is the first step toward what is hoped to be a widespread campaign for the prevention of accidents and of injuries to the general public. The company is beginning with its own men, training them to notice in every way how accidents occur and how they may be prevented, and to take steps to see that they do not recur.

The organization of the employees' "representation plan" described in ELECTRIC RAILWAY JOURNAL Jan. 12, 1924, page 63, forms the nucleus for the safety organization. By adding men in some departments and divisions an organization for handling the safety-first campaign was completed. Committees are definitely appointed on safety work, so as to have an explicit objective in this direction.

The general manager of the company, F. G. Buffe, is the chairman of the central committee, which handles specific problems designated by him, and Egbert B. Sanders, publicity manager of the company, is the secretary. This central committee meets regularly every two weeks at stated times, receiving reports from division committees, from the general transportation committee, or the general mechanical committee. It passes on suggestions for the installation of safeguards where such suggestions cannot be handled directly by the division committee. It also studies and passes on all accident report records submitted by the division committees. If the suggestions are adopted they are acted on at once, while if rejected they are sent back to the division submitting them with reasons for the rejection. If the adoption of any suggestion seems imperative either the division superintendent or the department head will act upon it without waiting for a meeting of the central committee.

The personnel of the division committees under the employees' representation plan forms the next step in the safety committee organization. In the case of the transportation department and the general mechanical department, reports of the divisional committees would go through the general committee for these departments before going to the central committee, whereas in the power plant, way and structures department, and electrical distribution the reports would go directly to the central committee. The number of persons serving on these divisional committees is small, and except in a few instances the membership of the representation plan committee was sufficient to carry on the safety work.

Each of these committees has two sub-committees appointed by its chairman; one to make inspection of its particular plant or division once every two weeks; the other to investigate every accident no matter of what nature, inquiring into every detail. These committees meet regularly every two weeks at a stated time, so far as possible just previous to the meeting of the central committee. They pass on suggestions and recommendations for safety, which if approved are forwarded to the central safety committee. All members of these committees are expected to report all unsafe conditions in their departments and careless practices among fellow workmen; to look after new employees, showing them hazards to be avoided in their work, and to make definite reports to the central committee.

It is planned that mass meetings of workmen will be held, possibly at the noon hour, for the purpose of hearing addresses by outsiders, possibly having also moving pictures and other features.

The company has designed and constructed in the shops some new safety bulletin boards, which are electrically illuminated and will display bulletins furnished by the National Safety Council and by the company. These bulletins will be placed in all divisions of the company's plant. The idea is to protect the men on the cars, in the shops, and on the tracks. Whenever an accident occurs, the result of an investigation on it will be placed on every bulletin board. A description of the accident will be given, how it occurred, what damage resulted and how the accident might have been avoided.

A program for the safety organization and work was outlined by the Kansas City Safety Council, of which Julian Harvey is director. Mr. Harvey was connected with the Kansas City Railways several years ago when it undertook safety work, and is familiar with the company's personnel and operations.

"Cheapest Taxi in the World" Featured in Boston Elevated Motion Pictures

UNDER the title "Boston in Motion," a motion picture film that was prepared for the Boston Elevated Railway has been exhibited this winter in some twenty-five movie houses in Greater Boston. After this theater showing, lasting about four weeks, the company made an arrangement for free street exhibits. An auto truck was arranged with screens on three sides so that the film could be seen by three groups of spectators at once, and the truck makes stops of fifteen minutes at different points to show the film. These trips are made between 6 and 10:30 p.m. The number of persons watching the exhibit from the truck have at times been as many as 1,500. The purpose of the film is to make clear some of the more common causes of street traffic congestion and to point the way toward better service through the co-operation of car riders.

The film opens with an explanation by a uniformed employee of the leading causes of interrupted service, the camera showing a would-be car rider of the well set-up American business man type asking the reason for a gap in the car schedule. On the screen are shown animated diagrams of regular and irregular car movement on a complete surface route between a suburban terminal and one of the fast transit transfer stations, the effect of a truck breakdown on the street being clearly indicated. Overcrowding of following cars by the tendency of riders to try to board the first units following the tie-up is shown, with suggestions as to how passengers can help the service by distributing themselves more evenly among the accumulated units which follow a tie-up in close order.

The traffic scenes are followed by a number of snow-fighting pictures, and it is pointed out that thirty snowfalls may cost the company a million dollars in clearing the streets for general service. How fires hold up roll-

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ing stock movement is well indicated, and the film then gives the onlooker visual evidence of the delaying effect of drawbridge openings, of which Boston has about 100 per day. Even a "two by four" tug, the film title states, will tie up the movement of rapid transit and surface traffic on important arteries of travel. Views of the company's power station, tie-treating plant and construction yard are included, and the management points out that through its equipment the car rider in Greater Boston who pays 5 or 10 cents for his ride has "the cheapest taxi in the world." The film ends with a procession of employees of twenty-five or more years of service.

The educational value of the film is considered by the management to be well worth its cost.

Adjustable Fastening for Motorman's Stool

THE Connecticut Company, New Haven, Conn., found it desirable to fasten the motormen's stools in position on the car platforms so that they could not be removed. A permanent fastening, however, had the objection of inconvenience to some motormen, as the stool's location in relation to the controller and air brake valves would vary somewhat with the length of the operator's legs. The adjustable fastening shown in the illustration has overcome this objection.

Fastening for Motorman's Stool Provides for Adjustment of Position

A rod is fastened to one of the bottom cross-pieces of the stool. This is threaded so as to receive a nut. The fastening to the upright stanchion is by means of a short piece of pipe screwed into a tee in the stanchion. The end of the short pipe has a cap with a hole just large enough to receive the rod. By inserting the rod through the cap and fastening with a nut before the cap is screwed in position a fastening is provided so that the rod will slide in and out of the pipe but cannot be entirely removed, as the nut holds it when it comes up against the cap. With this fastening, the stool can be placed in any position convenient for the operator, but it cannot be removed entirely from the platform.

Reversed Operation Prevents Accidents

ON A stretch of double track between the town of Lemoyne, Pa., and the bridge across the Susquehanna River to Harrisburg the Valley Railways has reversed the normal direction of operation. At this point the tracks are alongside an important highway with a steep grade. If operated according to the usual right-hand method, cars inbound to Harrisburg would be going down hill immediately adjacent to vehicles coming up hill on the state road. It is in order to eliminate the possibility of collision that the direction of traffic on the two tracks has been reversed. Cars outbound from the city take the left-hand track going up hill alongside the vehicles bound in the same direction, while inbound cars take the inside track away from vehicular traffic. As this stretch of double track is only about half a mile long the cars soon get back to normal operation when the end of this turnout is reached.

The Readers' Forum

How the Plan to Publish Railway Bus Matter in "Journal" Is Viewed

THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY

MILWAUKEE, WIS., Jan. 24, 1924.

To the Editors:

I am entirely in accord with the new policy of the ELECTRIC RAILWAY JOURNAL in publishing matter relating to the motor bus. I have a feeling that the step was too long delayed. The motor bus has been an important factor in urban and interurban transportation service for several years. This transportation business cannot be properly "journalized" by your paper or any other paper which ignores the motor bus except to bewail the inroads it makes when left to competitors to use against the railway industry. The industry needs and will welcome information respecting this rapidly growing adjunct to organized and efficient transportation service.

S. B. WAY,
Vice-President and General Manager.

MARKET STREET RAILWAY COMPANY

SAN FRANCISCO, CAL., Jan. 23, 1924.

To the Editors:

In compliance with your telegraphic request of Jan. 14, I take pleasure in expressing my agreement with your policy on publishing bus articles. I trust that the following paragraphs will make clear my views on this subject:

The transportation of a maximum number of passengers with a maximum degree of safety, convenience and comfort at a minimum fare is the aim of our industry. This aim does not commit us eternally to the use of electricity, or to the use of any of the methods we now regard as orthodox; but for the immediate present and for a reasonable distance into the future it looks as though we shall find electricity our best motive power, in the main, and trolleys and tracks indispensable in the densely populated districts. However, it seems that in the interests of economy we may dispense with tracks and even with electricity in the outlying districts and still remain faithful to our aim.

Holding such views as I do, I cannot see how I could take exception to the ELECTRIC RAILWAY JOURNAL'S policy, editorially expressed, of devoting space to the operation of buses by electric railway companies as an auxiliary or feeder service.

Before our industry had learned that buses could be used as allies I was opposed to the discussion of bus operation in the pages of the JOURNAL; however, now that we are finding that we can employ such auxiliaries, let us learn to do so most effectively.

M. MCCANTS,
General Manager.

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Association News & Discussions

Central Association in Annual Meeting

Modernization Is the Most Promising Course for Interurbans—Design of Outdoor Substations, Use of Resistance Losses for Car Heating and Rules for Repair of Interchanged Freight Equipment Are Discussed—Summer Meeting to Be at Cedar Point, Ohio

CONVENING in the capital city of the Hoosier State, on Jan. 24 and 25, the delegates to the annual meeting of the Central Electric Railway Association devoted their time very largely to subjects of special interest to interurban railways. Important reports of committees on repair of freight cars while on foreign lines, and on insurance coverage, were interspersed with papers on engineering subjects and on the general economic prospect for the interurban. Papers by Dr. Thomas Conway, Jr., Prof. D. D. Ewing and B. W. Kerr are published elsewhere in this issue.

In the absence of President J. P. Barnes, Vice-President Harry Reid presided. A proposal of the executive committee for the appointment of a special committee of seven members to be known as the policy committee was adopted by the association. The report of the secretary-treasurer was read and accepted. As shown by the report, the membership of the association on Dec. 31, 1923, was sixty-three interurban companies, operating 5,310 miles of track; five city lines and two lake steamer lines. A supply membership of 143 was reported. The work done during the year by the Central Electric Railway Accountants' Association, Central Electric Railway Traffic Association, and Central Electric Railway Engineering Council were also summarized in the report.

NEW OFFICERS OF C.E.R.A.

A nominating committee consisting of C. L. Henry, S. D. Hutchins and W. S. Rodger proposed the following men for officers and members of the executive committee for the ensuing year and their election followed: President, Harry Reid, president Interstate Public Service Company, Indianapolis; first vice-president, Frank R. Coates, New York; second vice-president, G. K. Jeffries, Indianapolis.

Executive committee: James P. Barnes, S. W. Greenland, Robert I. Todd, A. C. Blinn, H. A. Nicholl, C. N. Wilcoxon, W. S. Rodger, F. W. Coen, J. F. Collins, M. B. Lambert, James H. Drew and K. A. George.

As second vice-president, Mr. Jeffries is ex officio chairman of the Engineering Council.

The new executive committee, meeting at the close of the session on Friday, decided to hold the summer meeting at Cedar Point, Ohio, on July 10 and 11.

C. B. Auel, Westinghouse Electric & Manufacturing Company, read a paper entitled "Efficiency and Common Sense," in which he pointed out some of the general phases of our industrial and economic situation, emphasizing the importance of economy and conservation. The importance of reforestation as a national problem of interest to all industries was urged by John Benham, vice-president, International Register Company, and he proposed the following resolution which was adopted by the association:

Whereas the government of the United States has of recent years been giving increasing effort for the preservation of the forests of this country, and endeavoring so to regulate the timber cut as to conserve our lumber supply, it has also been engaged in an effort to reforestate the cut-over and other lands not well adapted for crop raising, but of value for the creating of new forests. Now, therefore,

BE IT RESOLVED. That the members of the Central Electric Railway Association hereby express to the President of the United States and to their Senators and Representatives in Congress, their concern for the future lumber supply, and their deep interest in this great work, and that they look with favor on the work that has thus far been accomplished and urge the appropriation of the needed funds that may be wisely and profitably used for the larger support and extension of this work so far as the appropriation can consistently be made.

A written discussion of Mr. Auel's paper, prepared by R. N. Graham, manager railways, Pennsylvania-Ohio Electric Company, was read by R. Moses, assistant general superintendent of that property. Mr. Graham's discussion dealt with the efficient operation of railway properties and brought out the passing of the old type "hardshell" railway operator. He mentioned clean and neat appearing cars and the elimination of unnecessary manufacturing work in the shops as important factors in a program of efficient railway operation.

Further discussion by W. S. Rodger, general traffic manager Detroit United Lines, dealt with the need for applying the principles of scientific management to railway operations, and with the value of ideas originating with the rank and file of the operating personnel.

Dr. Conway prefaced his paper with a discussion of the potential possibilities of an adverse decision by the Interstate Commerce Commission on the application of Sec. 15-A of the transportation act to interurban railways, and urged every road to be represented at the hearing in Washington on March 19. His paper was discussed by C. N. Wilcoxon, president Chicago, Lake Shore & South Bend Railway, who mentioned past exploitation and bad engineering as the cause of some present railway difficulties. By modernizing their property and equipment, and merchandising their service, he felt that many interurban railways could still obtain a place in the sun.

In the absence of F. R. Coates, chairman of the Engineering Council, A. Schlesinger, superintendent distribution and substations, Terre Haute, Indianapolis & Eastern Traction Company, presided at the afternoon session. A report of the committee which was appointed to prepare a set of rules for the repair of interchanged freight cars was read by E. B. Gunn, superintendent and master mechanic of the Western Ohio Railway. The report was accepted by the association for printing and distribution to the membership with a view toward obtaining additional suggestions and criticisms so as to enable a final set of rules to be prepared and adopted.

On Friday morning Charles L. Henry, president Indianapolis & Cincinnati Traction Company and chairman of the committee on national relations of the American Electric Railway Association, addressed the meeting on the many ways in which the electric railways come in contact with the national government, and particularly on the importance of Sec. 15-A of the transportation act of 1920. This latter was treated quite fully in ELECTRIC RAILWAY JOURNAL for Jan. 12, 1924, page 73. Mr. Henry pointed out that interurban railways must report to the Interstate Commerce Commission on accidents. They were included in a partial way under the federal legislation with respect to block signals, and they are affected by the hours of service act, the parcel post act, the general railway mail act, the safety appliance act, and the regulations for the transportation of explosives. All of these provisions, he said, are administered by the Interstate Commerce Commission.

On the Sec. 15-A matter, known as the recapture clause, Mr. Henry emphasized the necessity of each road appearing at the March 19 hearing and filing its own brief. He called attention to a brief prepared by Judge Bradley for the Chicago, North Shore & Milwaukee Railroad as a test case, which he said gives a very complete presentation of the electric railways' position.

The future of the electric railway industry from the viewpoint of an outsider was discussed by W. L. Taylor, prominent attorney of Indiana and vice-president of the Fort Wayne & Northwestern Railway Company. The awakening of the railroads to a realization that application of the police power largely annulled the protection afforded by franchises has resulted, Mr. Taylor stated, in an increasing conviction on the part of railway managements that service and rates are the primary factors which control railway success.

Summarizing the general status of the transportation industry, Mr. Taylor

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sounded a note of optimism, and divided the situation into three general phases as follows: (1) The period of steam railway construction has been completed and very little additional mileage will be built in the future. (2) Very little electric main-line construction will be carried on, but roads now built will be extended and expanded. Electric railway business may be safely expected to expand materially as business and population continue to increase. (3) The interurban roads are gradually beginning to go after all kinds of business including not only freight but also electric light and power. With the passing of the small town electric plant, service should be taken from large central stations and transmitted over railway power lines to the small communities along the rail routes.

A report of the committee on insurance was presented by F. D. Norviel, general passenger and freight agent, Union Traction Company of Indiana. It provides the basis for working out uniform practices for the insurance of equipment, to facilitate settlements for damages to cars on foreign roads. The report was accepted by the association and the committee continued.

At the dinner on Thursday night, former Governor Cox of Ohio was the guest of honor and speaker of the evening. Several reels of very interesting pictures depicting the latest developments in aircraft were shown at the dinner by special arrangement with the War Department.

Considerations in Design of Outdoor Substations*

By B. W. Kerr
President Railway & Industrial Engineering Company, Greensburg, Pa.

OUTDOOR substations today are the recognized type, and only under exceptional circumstances, or to meet a very special requirement, is a transformer substation housed in a building of any kind. Rotating machinery, such as converters and regulators, requires a building or shelter, and the sensitive equipment of an automatic substation still more requires this protection from the elements.

On the other hand, stationary transformers, oil circuit breakers, lightning arresters and apparatus of this type are sufficiently protected by their regular housings. The addition of a building doubles the hazard by carrying the conductors through the walls in addition to carrying them through the housing of the apparatus. The higher voltages also require such a spacing between conductors and to ground that the cost of a building would be prohibitive.

Outdoor substations can be divided into two general classes. The first, or switching stations are those handling a multiplicity of incoming or outgoing lines together with one or more sets of transformers. The second are stations designed and intended for one specific predetermined load, such as a portable substation or one for a coal mine, and which probably do not require any arrangements or plans for expansion.

The particular purpose stations are as a rule simple and little need be said about them. Usually they consist of a transformer bank fed by one, or possibly two, incoming high-voltage lines. The high-voltage side is ordinarily protected by a lightning arrester and provided with the proper switching apparatus for disconnecting the transformers from the line. It also is desirable to provide an automatic means for opening the circuit and protecting the system in case of trouble in the transformer bank. This may consist of an automatic oil circuit breaker, an automatic air-break switch, or a combination of switch and fuse.

If more than one incoming line is used there must be switching arrangements whereby the transformer bank may be transferred from one line to another when desired. The low-voltage side should in all cases be supplied with an automatic circuit breaker. Any desired metering equipment should be provided either in a cabinet at the station or in the mine, mill, or factory building which is being supplied with power.

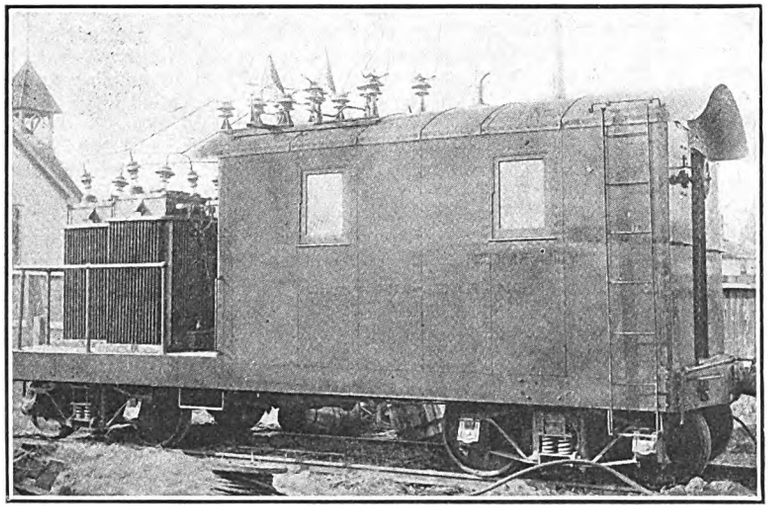
It is in the design of stations of the switching type that engineering problems are met. Many a station is designed which is cramped, prevents expansion and introduces unnecessary hazards, or on the other hand, the design may be too extravagant. Standardization of structures has been given much careful thought, but little progress has been made. Variations that enter into the design are those due to available space; topographic, climatic or geological conditions; capacity; voltage; strains due to incoming wires; type of equipment, and individual preferences of engineers.

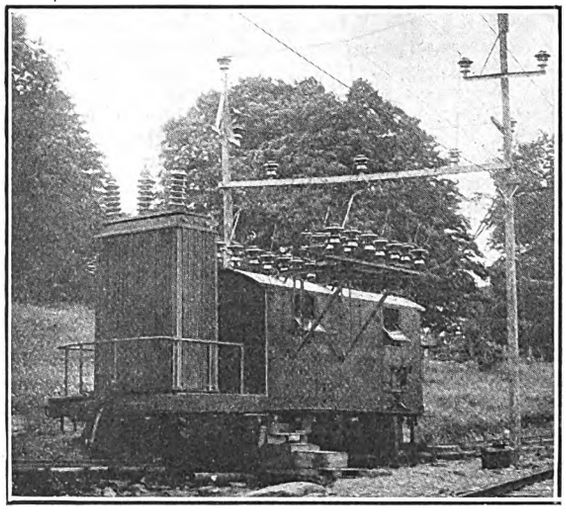
In general these stations are built of steel and are of two main types, the fabricated or the heavy member type. Each has its advantages and disadvantages.

The fabricated type usually costs more per pound but its total weight can be made considerably less. It is stiffer and less liable to deformation if properly designed. Long spans are more practical, which is extremely important in considering high voltages. If the station's location is such as to require trucking at destination, the fabricated type bolted in the field is desirable because the component parts can be shipped in convenient sized bundles.

The heavy member type has the advantage of fewer pieces to handle and consequently greater ease in erection. Its cost will probably be greater, because the steel is not so advantageously used. It may introduce serious difficulties in handling at destination, particularly if a railroad siding is not adjacent to the substation site. The foundations are simpler as a rule with this type than with the fabricated type. The sag in horizontal members will, however, probably be greater and the spans are more limited in length.

*Abstract of a paper presented before Central Electric Railway Association at Indianapolis, Jan. 24, 1924.





At Left, Portable Substation of the Public Utilities Company, Evansville, Ind., Showing Outdoor Equipment. At Right, a Portable Substation of the Scranton & Binghamton Traction Company, Showing Service Connections

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Another phase to be given consideration is whether the station is to be galvanized or painted. If a station is to be galvanized there should be no riveted joints. The best practice demands that all pieces should be separate and bolted together. This makes the structure dependent for stiffness on the care exercised in drawing up these bolts.

Painted structures, on the other hand, lend themselves to shop riveting of trusses, gusset plates and the like. The variation in cost between a galvanized and painted structure for the steel alone will be in the neighborhood of 25 per cent.

Consideration must always be given to the location of the operating handles of the switching apparatus, and to the clearances required by interconnecting rods. Too frequently these are not considered until the design is complete or even until the station is built. The controls are always a divided responsibility unless the manufacturer is responsible for both steel structure and apparatus. He is under a severe handicap in furnishing controls to fit a structure designed by the power company unless he has full details of the steel. Even then it is necessary to furnish information to the fabricator regarding the various holes required to mount, not so much the apparatus itself, as the guide plates, bell cranks, and locking devices required for successful switch operation. If the station is to be galvanized no field drilling of members should be allowed.

Proper clearances between wires and to ground and the proper relative locations of the various circuits will serve greatly in protection of the station and system from disturbances.

My viewpoint, of course, in this discussion is that of the manufacturer, but of the manufacturer who keenly feels the needs of the operator. Too frequently the operator purchases his transformers, oil circuit breakers and the like, figuring they are the long delivery items, and postpones closing for the substation and outdoor switching apparatus until the last minute. The result is that not enough time is given to the problem thoroughly to digest it.

In erecting the air-break switching and protective apparatus, give the same careful supervision to it you would give to oil circuit breakers and indoor substation apparatus. Do not think that because it is outdoor apparatus it can be erected and adjusted by a lineman. Regardless of whose apparatus you buy, adjustments are necessary and a man to make these adjustments needs more qualifications than the ability to use a pair of spurs and change an insulator.

Keep in mind the final appearance of the completed station. In these days of customer stockholders, the properties are given a more careful scrutiny in passing. Neatness of wiring, symmetry of arrangement and maintenance of structure and grounds are essential in an outdoor substation, as it is open to public gaze. A good-looking building can house a multitude of sins, but a wire fence requires a clear conscience.

Possibility of Utilizing Grid Losses for Heating*

By D. D. Ewing
Professor of Electric Railway Engineering,
Purdue University, Lafayette, Ind.

THE question of how to reduce the amount of electric energy consumed by car heaters has come to me a number of times within the past few years. By properly designing the heating system of the car, by proper heat insulation of the car body, by careful operation, and by the use of automatic heater control, we can avoid waste of energy in heating a car. With these items correctly taken care of, the only additional possibility of saving heating energy is in making use of energy that is now going to waste.

The most obvious source of waste energy is the grid resistance loss, and railway men have from time to time proposed using this energy for heating purposes. In looking over my files for published data on the magnitude of these losses, however, I find very little information of value. In most cases where one finds anything at all the grid losses have been figured from typical speed-time curves, and while they are of some interest in indicating minimum limits they do not give as accurate a view of actual operating conditions as one might wish.

In most handbooks and railway treatises, the grid losses are taken into account by making an estimate of the average motor efficiency during the "notching up" portion of the acceleration period. In a theoretical analysis of the various losses occurring in car operation, M. V. Ayres, in the ELECTRIC RAILWAY JOURNAL for Aug. 21, 1909, estimated that the grid losses for a 41-ton interurban car amounted to 0.157 kw.-hr. per start. N. W. Storer, in the ELECTRIC RAILWAY JOURNAL for Feb. 6, 1915, says that in ordinary city service the rheostat losses range from "12 to 20 per cent of the total energy used."

Certainly the most exhaustive treatment of the subject that I was able to find in an extensive search through my technical information files is an article contained in the ELECTRIC RAILWAY JOURNAL for Aug. 17, 1918. In this article certain tests made on a wooden car, 47 ft. long by 8 ft. 7 in. wide, used in elevated service in New York, are described. The conclusions were that in this service the grids furnished about one-third of the heat necessary for the car.

The objections to the use of grids for heating may be briefly summarized:

1. The amount of heat available is not controllable, but depends on the service and efficiency of the motorman.
2. The heat is supplied intermittently.
3. The cost of making the grid loss energy available for heating is greater than the resulting saving in energy.

Relative to the first of these objections, it is of interest to note that the more efficient the motorman the lower will be the grid loss. The second objection indicates the need of an additional thermostatically controlled heating system. As to the third objection, it may be pointed out that in the modern safety car only one small grid bank is used. It would seem that by the proper location of this bank the heat generated in it might be made available inside of

*Abstract of paper presented before Central Electric Railway Association at Indianapolis, Jan. 24, 1924.

TABLE I—HEATING REQUIREMENTS OF ELECTRIC CARS

Length of Car, Feet	Heater Capacity, Kw.-Hr.	Kw.-Hr. per Car-Mile
20–28	5.5	0.55
28–34	7.5	0.75
34–40	10.5	1.05

TABLE II—GENERAL DATA ON CARS TESTED

Car Number	Car Type	Dimensions, Feet	Empty Weight, Tons	Number Motor	Type Motors
A	Safety	27x8x8	7.5	2	GE–264
B	Safety	27x8x8	7.6	2	GE–264
C	Safety	27x8x8	7.6	2	GE–264
D	Paye single truck	32x8x9	15	2	GE–216E
E	Interurban	.....	30	4	GE– 93

TABLE III—GRID LOSSES IN PER CENT OF INPUT TO MOTOR CIRCUITS

Test Number	Car Number	Stops per Mile	Grid Loss in per Cent	Heater Input in per Cent of Motor Input
3	A	5.7	6.76	68.8
4	B	3.85	11.8	67.6
5	B	9.55	12.8	41.6
6	B	7.85	12.1	58.5
7	C	5.55	14.7	19.3
8	D	11.4	9.8	26.0
9	D	10.4	10.0	19.0
10	E	1.08	13.3	.....

TABLE IV—GRID LOSS AND ENERGY CONSUMPTION DATA

Test Number	Car Number	Stops per Mile	Schedule Speed M.p.H.	Input to Motors Kw.-Hr. per Car-Mile	Grid Loss Kw.-Hr. per Car-Mile	Grid Loss Kw.-Hr. per Start	Heater Input Kw.-Hr. per Car-Mile
1	A	3.12	8.9	1.26	.....	.....	0.501
2	A	6.75	6.1	1.325	.....	.....	0.75
3	A	5.7	6.5	1.127	0.0762	0.0133	0.721
4	B	3.85	10.0	1.218	0.143	0.0371	0.731
5	B	9.55	9.45	1.928	0.247	0.0258	0.80
6	B	7.85	8.05	1.504	0.194	0.0247	0.94
7	C	5.55	7.8	4.62	0.678	0.122	0.89
8	D	11.4	7.89	2.00	0.197	0.0189	0.52
9	D	10.4	8.32	2.57	0.258	0.0248	0.49
10	E	1.08	29.4	2.12	0.282	0.261	.....

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the car instead of being dissipated under the platform. It might also be mentioned that the grids commonly used are designed as railway grids always have been designed, viz., to run cool.

With the great improvements in resistor units for electric heaters now available, it seems that it might be possible to use much smaller resistors operating at high temperatures for grid resistances, particularly on the safety cars. Such grid banks would be much smaller even than those now used and would be much more efficient as heating units.

With the idea of getting some test data on grid losses, I started two or three years ago to measure the grid losses of all cars on which I had occasion to make energy consumption tests. These tests are briefly summarized in the accompanying tables.

Data in Tables Explained

Some data relative to the heating requirements of cars are shown in Table I. The first two columns were abstracted from the American Handbook and the last column has been computed on the basis of a schedule speed of 10 m.p.h.

A common allowance for heating purposes is 4 or 5 watts per cubic foot of car body volume. Another common estimate is that ten persons will emit as much heat as a 1-kw. heater.

Table II sets forth some general data relative to the cars tested, while in Table III the grid and heater losses are expressed in percentages of the input to the motor circuits. The input to the motor circuits is the sum of the power actually used by the motors and the grid losses. It will be noted that the heaters require from two to ten times the energy lost in the grids.

Table IV sets forth the test data in greater detail. It will be noted that the grid loss per start ranges from 0.0133 kw.-hr. for one of the safety car tests to 0.261 kw.-hr. for the small interurban car. In passing, it is worth while to note the very high energy consumption of the safety car in Test No. 7. The brakes on this car had just been adjusted and it was found that they did not completely release. This test emphasizes the need of care in taking up brake rigging slack.

As the car in Test No. 3 carried only a few passengers and was run at low schedule speed, the figure 0.0133 kw.-hr. per start is very low. Tests 5 and 6 gave values more nearly in accord with what might be expected in ordinary service. In these two tests the grid loss ranges from one-fifth to about one-fourth of the heater energy.

If 0.2 kw.-hr. per car-mile be considered a fair average for grid losses on safety cars, on the basis of an average car operation of 100 miles per day and a heat requirement of 200 days per year, the grid energy loss would be 4,000 kw.-hr. At as low a figure as 2 cents per kilowatt-hour at the car this energy would amount to $80 per season per car. This amount capitalized at 20 per cent is $400, and is the amount that could be invested in the construction of devices which would enable the grid losses to be utilized. In this estimate it is believed that the car-miles per day is conservatively low and that the depreciation allowed in the 20 per cent is ample.

It is probable that the investment necessary to utilize the grid losses would be less than $100 per car and, therefore, it would seem that for single-truck safety cars grid loss utilization would be profitable. It should be pointed out, however, that thermostatic control of heaters would be necessary if actual savings are to be realized. Even with thermostatic control there would be little saving in very severe weather, because at low temperatures the heater capacity in safety cars is such that the thermostats do not cut cut the heater circuits. In mild weather, however, there would be some saving in energy and in severe weather the cars would be warmer.

Outlook for Interurbans Stated*

Many Difficulties Beset Interurban Railways, but There Is Good Prospect for Their Future Success if Aggressive Management Provides Modern, Attractive Equipment and Then Sells the Service

By Thomas Conway, Jr.
President Chicago, Aurora & Elgin Railroad and Professor of Finance, University of Pennsylvania

From a financial point of view, the interurban roads as a group are in a more critical situation than the city properties. Increased operating costs, coupled with the inroads which the private automobile and motorbus have made upon the traffic of the interurban lines, have undermined the credit of these carriers and threatened their ability to exist.

When we recall that a large proportion of the interurban mileage in this country was built before an opportunity had been afforded accurately to estimate the amount of business which could be commanded; when we remember that a large proportion of the interurban mileage was unable to earn a fair return on the capital invested even in pre-war and pre-automobile days; when we take into account the tremendous increase in the cost of labor and materials which has occurred in the last decade and give consideration to the reduction in business which the privately owned automobile and the motorbus have caused, we can readily understand why the interurban railways have come to such a grave pass and why many observers feel that a substantial part of the interurban mileage at present in operation will be junked during the next decade, unless the owners of the interurban properties and the public served bestir themselves to revamp the entire situation.

Prolonged and extended study of the interurban situation in various parts of the country, as the technical adviser of various bondholders' protective committees, has led me to the conclusion that there are three factors which, singly or together, will determine the future of most of our interurban lines.

The first factor is the extent to which public co-operation is afforded. Unfortunately in many localities the public had come to look upon the interuban as a source of great profit and in some instances as an engine for public exploitation. The events of the last few years have largely dispelled this delusion, especially where company officials have given proper attention to the matter of constructive publicity. If the interurban can survive during the period of time required to make the public understand the economics of the situation, I am confident that the activities of the motorbus will be curbed so that instead of being instrumental in the destruction of the interurban, the motorbus will eventually serve as a valuable feeder or auxiliary.

The second factor in the problem concerns the willingness of the owners of our interurban properties to face the stern realities of the present situation. The rank and file of our interurban companies are operating heavy, expensive, antiquated equipment which was constructed in the era of imitation of the steam carriers. Unless a substantial proportion of our interurbans are willing to displace obsolete equipment, substituting therefor modern, economical, comfortable, attractive equipment, I am afraid that the mortality among interurban companies will be tremendous. There are many localities where the public would prefer the modern motorbus to the antiquated interurban car now in service. Protection from cut-throat motorbus competition can scarcely be secured and retained unless the interurban is willing to keep step with the march of progress and install modern equipment and in other ways improve the attractiveness of its service and secure every possible economy in operation.

The third factor in the equation concerns the willingness and ability of interurban properties to sell their service, thereby reattracting traffic which has been lost in the recent past and creating traffic which the interurban has never heretofore enjoyed. As Britton I. Budd, president American Electric Railway Association, has aptly said in a recent interview, the interurbans must "modernize and merchandise" if they are to succeed.

To my mind, the interurbans of the country divide themselves into three main groups, in so far as the problem of increasing taffic and reducing operating costs is concerned. The first group is made up of what I would term local interurban lines, which would include interurbans connecting some particular city with one or more smaller towns, and depending, to a large extent, upon the local business of the rural districts contiguous to the line. Obviously this group includes the major portion of the interurban proper-

*Abstract of paper presented before Central Electric Railway Association at Indianapolis, Jan. 24, 1924.

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ties of the country. They are essentially local carriers. A number of such carriers within recent months have purchased lighter weight interurban cars for single-car operation, running them on a more frequent schedule. This has ordinarily reduced the ravages of bus-line competition and increased the volume of traffic.

The financial salvation of what I have termed local interurbans depends primarily upon the reduction of operating costs, making possible the operation of more frequent service, which in turn, under most conditions, will tend to increase the volume of business handled. On such properties there is not sufficient business to warrant the service already given, much less train operation.

In the second group of interurbans are those which by location and physical characteristics handle a large volume of through business between terminal cities of substantial size. The number of electric railway lines so situated is much smaller than the number of purely local interurbans. There are, however, a substantial number of properties which operate between cities of approximately 100,000 population or more, sufficiently near each other to engender a substantial amount of intercity business. A large percentage of the interurbans of this type are handicapped by physical defects which in some cases are so serious as to render abortive the efforts of the management to command a substantial volume of through business.

In my judgment, the traffic of the through interurban lines connecting cities of substantial size could be much increased in most cases if it were possible to operate still faster schedules than those which now prevail. The American public puts a premium upon speed. The automobile has raised the requirements of the public as regards speed. Where the characteristics of the interurban are such that it is possible to make a journey in the same or less time by automobile, the interurban is, in most cases, doomed to extinction. Where, on the other hand, the physical characteristics of the interurban are such that it can make the run between the terminal cities in substantially less time than it is possible so to do with an automobile, the interurban is strongly intrenched and will suffer much less from the effects of private automobiles than would be the case under other circumstances. Other things being equal, the public will patronize the carrier making the fastest time without incurring unusual accident hazards.

The premium which the public puts upon speed is clearly evidenced by the recent tendencies in the steam railroad field. A few years ago, the number of extra fare trains was comparatively small and they handled but a fraction of the total long distance business. At the present time, the major part of the through business is handled upon extra fare trains. The public will willingly pay a dollar an hour to reduce the tedium of the journey and to enjoy the comforts and conveniences afforded on extra fare trains. While extra fare trains are out of the question on practically all of our interurbans, the lesson which is so clearly contained in the recent tendencies of steam railroad travel should not be lost upon us.

If an interurban line is built upon private right of way, so that the ever growing volume of vehicular traffic along the main highways will not force a slowing down of schedules for through trains, it will follow that the advantage of the interurban as compared with the motor bus will, in most cases, steadily increase as time goes on. The rapid increase in the number of automobiles upon our main highways is slowing down the speed which the automobile driver can safely make along such highways. This will inevitably mean that the running time between terminals of motorbus routes connecting important centers of population will steadily increase to the direct advantage of the fortunately situated interurban line. Under present conditions it is impossible with safety to make an average speed of much over 30 miles per hour upon congested main highways such as connect large centers of population within 30 to 50 miles of each other. If the interurban line can safely make a schedule of 40 miles or more per hour outside the limits of built-up city areas, it enjoys a great advantage over the motorbus.

I am satisfied that a careful study of the possibilities of many through interurban lines connecting important terminal cities will show that their owners could profitably modernize these properties by a progressive series of steps involving the relocation of portions of the trackage necessary to attain the required schedule speed, and by purchasing modern equipment, in the design of which satisfactory riding qualities, comfort and attractive appearance are not sacrificed to the current fetish of extreme lightness in weight. Indeed I believe that many of the interurban lines of the type just described, which are now making very unsatisfactory financial showings could be turned into dividend payers within a reasonable period of time if the means could be found to modernize the properties and if the extent of such modernization is not so great as to involve the practical reconstruction of a large part of the property.

The factor of good entrances into terminal cities is a most important element of the problem. Increasing street congestion is most serious to the interurban line, for it increases the time required to enter terminal cities. This is so serious a handicap in many cases as to preclude the effective development of a large volume of through intercity business. The street congestion in many cities, however, has become, or will shortly become, so serious that I think it is entirely probable that the next decade will see the construction of subway lines in the central business districts of many of our larger cities, which may be used alike by surface and interurban cars.

The third group of interurbans, to my mind, are those properties whose physical characteristics pertain partly to each of the two groups previously described. Such properties really have two classes of business. Under most conditions it is idle to endeavor to design equipment which would be satisfactory in both classes of service. Equipment designed for high speed through service must necessarily be heavy and with a high gear ratio, which makes it uneconomical in local service. With two distinct classes of business, the proper policy is to have two distinct classes of equipment, each suitable for the type of service in which it is used.

In conclusion, it seems to me that the lesson of the immediate past is the necessity for a careful study of each situation rather than the application of general formulæ to all properties regardless of whether or not they may fit. To stand still is to invite almost certain defeat. The investment of new capital should be contemplated only after a most thorough study of the entire problem. In many cases the situation is such that the investment of any substantial amount of capital could not be recommended by prudent men, but generally the road to success clearly lies in modernizing the properties and merchandising their service, without which the present investment is of little present or potential value.

Electric Railways Should Operate Trucks*

By F. W. Watts
General Express Agent,
New York State Railways, Utica

THE time has passed when we can ignore the existence of unregulated motor trucks and their disastrous effect on our express and freight business. We must take active and immediate steps to combat this unfair competition.

During the past ten years the territory served by the express department of the New York State Railways, situated in the Mohawk Valley from Syracuse to Little Falls, has had a gratifying growth in population, industry and wealth, but the revenue and tonnage of our express and freight business has not kept pace with this growth. Only by rigid economies in operation and an express service at fair rates have we been able to hold our own, and many months have shown an actual loss over the year before. In the face of such conditions can we view unregulated motor trucks with anything but alarm?

On the one hand is the street railway company subject to the provisions of its franchise, to the rules and regulations of the public service commissions, paying in many instances enormous municipal, state and federal taxes, filing copies of tariffs subject to the approval of the commission, responsible for damage and losses, maintaining a uniform and punctual service, as efficient in torrid August as in the snows of January.

On the other hand is the unregulated motor truck engaged in transportation work. Its owner is hampered by nothing save traffic regulations. His rates are on one scale today, another tomorrow, if, indeed, there is any assurance that he will be on hand tomorrow. If

*Abstract of a paper presented at the Midwinter Meeting of New York Electric Railway Association, New York, Jan. 24, 1924.

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the roads are impassable by mud or snows the business is left for the electric line, throwing a peak load for a few months of the year on a force and equipment adequate for only half the tonnage. If the consignee is located in a remote part of the village or city, perhaps on a hill entailing a long, hard trip for the truck, the operator decides he does not want the business, and it is left for the electric. It may be that the electric does not want it either, but under its regulations it is compelled to accept all business.

The truck operator may claim to be responsible for losses and damage to goods in transit, but the actual process of collection from him for such items is a difficult and often impossible task. Often he has no fixed headquarters and no permanent records, but cruises about like a taxi driver competing with others of his kind for enough freight to fill his load. Instead of regulating his rates to insure a profit, he is likely to run his truck at a loss, resulting in bankruptcy and a trail of debts. Then another, carried away by the truck salesman's tale of big profits, takes his place. There is also the unscrupulous free lance who charges exorbitant rates for small packages and fills the rest of his load with freight at less than steam railway rates.

There is a brighter side to this motor truck business in the case of the operators, unhappily few, who conduct their business with fair rates, adequate service and equipment and ample responsibility. They perform a genuine service to the business community and demonstrate in themselves that the motor truck business can be conducted along ethical and profitable lines.

STORE DOOR DELIVERY DESIRED

A survey of the wholesale houses, manufacturers and other large shippers brings out the fact that these shippers much prefer to handle their express and freight by the electric railway carriers, but since the consignees pay the freight, they have the privilege of choosing the medium of transportation. These consignees, small merchants and manufacturers, usually specify the truck, because of the store door delivery, cheap rates and the daily solicitation of the truck drivers.

To meet this demand, the electric railways should be prepared to supplement their present service with trucks, and if they do so they should be willing to submit to reasonable regulations by the Public Service Commission, since naturally our competitors would be subject to the same restrictions and rules. We are confident on this basis we can get the lion's share of this business that now escapes us. This is no counsel of despair or a last resort. It is a common sense recognition of a situation that has got beyond the discussion stage and demands action.

The entrance of electric railways into the general trucking business will undoubtedly precipitate a demand for regulation by the commissions. In other words, we will use these unscrupulous competitors to bring about the result we desire, and when regulation does come, we shall be so firmly intrenched in our territory that the regulations will only the more solidify our position.

It is an old military axiom, "The best defense is an attack." I cannot but believe that carrying this war into the enemy's territory will eventually result in the recapture of this great and growing business.

Determining Service from Daily Operating Statistics*

BY A. L. HODGES
Assistant Secretary and Assistant Treasurer, Brooklyn City Railroad

IN NO city, whether it be Brooklyn, Oshkosh or Kalamazoo, is the riding habit of railway patrons constant from day to day. There is a fluctuation, which it is the manager's duty to anticipate.

We must endeavor to outguess our patrons because there is not one of them who tell us when he is taking his family to the theater or when his club is going to a prize fight and that they will go and return at definite times and on certain lines. No indeed, they expect to go and come as they choose and demand that the service be there for them. And there is no "ready to serve" charge in the railway business either.

In order to keep thoroughly posted as to the riding habits of our customers in Brooklyn, we have adopted methods of keeping daily, monthly and periodic checks of earnings, costs, mileage and passengers carried. Each night, shortly after midnight, the night depot master checks up his conductor's run lists for every line, striking a total of the receipts reported by individual conductors. He also totals the time-table costs for each line operating from his depot, taking into consideration overtime and other changes.

These cost figures the depot master enters in his log book together with the explanation for the increase or decrease. He then telephones the figures to headquarters, where they are entered on a printed form showing lines, revenue and time-table costs for each, a total of sixty-seven lines from our thirteen depots. Several copies of this tabulation are made and are on the desks of each operating official for his perusal when he arrives at the office the following morning.

The figures arriving in our general manager's office are immediately entered on graphic charts which show the daily performance of each line for the current month. At the end of each fifteen-day period an operating ratio is determined by averaging the daily proportion of time-table costs to receipts and this fifteen-day ratio is also shown on this chart.

The preliminary figures from which these charts are made are also kept in cumulative form so that immediately after the close of each month we have the total monthly receipts, time-table cost and mileage. This enables us to secure a preliminary "receipts per car mile." In checking these figures with the accounting department's final figures we have found them to be within ½ to 1 per cent correct, so we have no hesitancy in using them for a basis of traffic study.

A careful study of the charts, comparing them with the previous month's charts, as well as those for the same month of the previous year, enables the manager to order an increase or decrease in service to fit conditions as determined. This has been the means of saving many thousands of dollars. An increase in service is ordered when it is shown that a steady increase in riding is not being properly taken care of. Temporary changes are made by patching the operating schedule and can usually be placed in effect one or two days after the discrepancy is noted by the manager.

In the event that these preliminary changes do not correct the service requirements and the line continues to fall off or build up to an unexplained degree we immediately call for what we term a cross-section check. This check is taken by men trained in traffic counting. If a line is forty-five minutes long, that is the running time between terminals, we station several men along this route about equal distances from each other. These men keep a record of each car passing them in each direction and the number of passengers on the car. Such checks are made in eighteen-hour periods, checkers working in two shifts of nine hours each. The records come in to headquarters and are tabulated in fifteen-minute periods and the tabulation from each checking point is totalled. This automatically determines the maximum loading point, as well as the falling off in the number of passengers to be handled at the other checking points. The information is then plotted on a curve to indicate the heaviest point of riding, in each direction, as well as the relationship of the other points checked to this maximum point.

It would indeed be folly for a railroad manager to attempt to run 100 per cent service from one end of a line to the other when checks plainly show that the patronage builds up from 20 per cent at one terminal and from approximately 25 per cent at the other terminal. Some of the longer lines in Brooklyn have six and eight cut-back or short-line points, showing to what extent we have gone in taking care of our "short rider."

Traffic studies are taken on each line on an average of once in ninety days and careful consideration is given them by the management to determine just how the service as furnished fits each line. [See ELECTRIC RAILWAY JOURNAL Dec. 30, 1922, page 1001, for complete details of these traffic methods.]

*Abstract of a paper presented at the Midwinter Meeting of the New York Electric Railway Association, New York, Jan. 24, 1924.

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National Safety Council and Safety Engineers Meet

JOINT sessions of the engineering section of the National Safety Council and the American Society of Safety Engineers were held in the Engineering Societies Building in New York City on Jan. 22. The general topic for the morning session was handling material, and for the afternoon session welding and cutting. Some of the points brought out in regard to safeguarding welding and cutting operations are of interest to electric railway men.

A consolidation of the American Society of Safety Engineers and the Engineering Section of the National Safety Council to be known as "The American Society of Safety Engineers, the Engineering Section of the National Safety Council," was announced at the banquet following the joint conference of the two organizations.

A paper on safety in electric welding and cutting presented by D. H. Deyoe of the General Electric Company emphasized the necessity for taking precautions for the protection of the operator and those working near him in electric welding and cutting operations. Mr. Deyoe classified these precautions as follows:

1. Protection of operator's eyes from the dangerous rays of the arc.
2. Protection of operator's body from sunburns caused by the dangerous rays of the arc.
3. Protection of operator's body against burns from hot metal.
4. Safeguarding the health of the operator.
5. Protection of others working in close proximity to welder.
6. Protection of operator from electric shock.
7. Fire hazards.
8. Protection of welding apparatus and its control.

The electric arc passing between iron electrodes is rich in visible and ultra-violet radiation, and the amount of energy consumed in the arc makes the total energy radiation more than the eye can safely bear at working distances. The intense glare given off from the arc contains all of these rays and the operator has to be protected against their harmful effects. For light welding, face shields containing light colored protective glass may be safely used, or in some cases goggles alone, fitted with similar glass. For heavy electric welding or carbon cutting, the operator's eyes should be protected, either with a welding helmet or with a face shield, these to be provided with a darker shade of protective glass selected to suit the welder.

Welders' lenses should be carefully selected. Lenses that transmit only bands of color, separated by dark absorption bands, are undesirable, being likely to produce eyestrain. The transmission spectrum should be continuous, as shown in that of Noviweld. It should not extend too far either into the red or the green, and it should absolutely cut out all blue and violet light.

All exposed parts of the body are subject to a burning effect from the rays of the arc. This burning is similar to sunburn. If the body is not protected by covering of some kind, it will cause the operator more or less discomfort or pain. For ordinary welding the welder's body is usually covered by close woven clothing and the hands by leather gloves. In heavy arc and carbon welding and carbon cutting where currents of 200 to 1,000 amp. are used, it is necessary to protect the operator still further. With these heavy currents the arc rays will penetrate the ordinary clothing and it is customary for the operator to wear a large well fitting leather or asbestos apron, protecting as much of his body as possible.

Protecting Operator Against Hot Metal

The greatest danger of injury to the operator comes from hot metal burns. These burns may come from either the operator picking up hot parts just welded or from flying particles of molten metal lodging in some part of his clothing or more often in the tops of his shoes. The necessary protection against such trouble is heavy leather gloves and protectors to be placed above the tops of his shoes to prevent molten metal from lodging there.

When using the arc for heavy welding or cutting, or where welding or cutting is being done on non-ferrous metals or galvanized materials, or materials that are oily, it is very desirable to provide ventilating ducts or fans to carry away the smoke and more or less poisonous fumes. If the operator is allowed to inhale these, his health will sooner or later be impaired.

To protect near-by workers from eye flashes, opaque screens should be placed between the welder and the workman. Or a better arrangement would be to enclose the welder in a welder's booth shutting off all the flashes from the surrounding part of the factory. It is desirable to paint the side walls and all apparatus in a welding booth or a small room used for welding with a paint that will absorb the dangerous rays of the arc. A satisfactory paint for this purpose may be made from zinc oxide or Chinese white mixed with glue water. This will dry with a smooth unglazed surface.

Another paper on safety in gas welding and cutting was presented by H. S. Smith of the Union Carbide & Carbon Corporation, New York, N. Y. He said that the greatest trouble comes from unskilled welders, and that proper training should receive more attention.

Mr. Smith gave several examples of accidents which had happened through unfamiliarity of those having charge of the welding equipment with its construction and operation. Cylinders of gas and oxygen have been stored out of doors in unprotected places where freezing of the cylinder valves has resulted. Mr. Smith told of accidents that have happened as a result of trying to thaw out the cylinder valve with hot water or by using a blow torch. As the fusible plugs with which these valves are equipped melt at a temperature of boiling water, such practices should never be attempted. Mr. Smith emphasized the necessity of storing gas tanks in places where there is no danger of sparks from electrical apparatus. Accidents have happened from sparking of telephone connections.

Repairs to gas welding equipment should be done only by men experienced in this work and pressure gages should be tested periodically to make certain that they are registering properly. A considerable part of Mr. Smith's paper was devoted to safety cautions that should be taken in the installation of gas generating equipment.

Value of Proper Lighting Facilities in Shops

In a paper on "Glare," Charles Sheard of the research laboratories of the American Optical Company, Southbridge, Mass., emphasized the value of proper lighting facilities in shops. He said that the system of illumination used should not only give the workman proper light at his work but should be also combined with a general system of illumination which would avoid a contrast in light whenever the workman looks up from work.

P. R.R. Will Exhibit Locomotives

THE Pennsylvania Railroad has arranged a transportation exhibit for the period of the A.I.E.E. Midwinter Convention at Philadelphia, Feb. 4-8, at Thirty-second Street and Lancaster Avenue, adjacent to the West Philadelphia station. The exhibit will include the most powerful freight locomotive in the world, the "FF1" electric, the new "L-5" electric locomotive and one of the newest multiple-unit cars.

The "FF1" electric locomotive was equipped by the Westinghouse Electric & Manufacturing Company for experimental freight service. It is of the split-phase type with a continuous rating of 4,000 hp.

The new 200-ton single-phase locomotive, known as the "L-5," also equipped by the Westinghouse company, was described in detail in this paper, issue of Jan. 26. It is designed for preference freight service, but is now equipped with passenger gearing, giving a speed of 70 m.p.h.

The multiple-unit car is the type now in service on the Philadelphia-Paoli electrification. These cars, equipped with single-phase series repulsion type motors, now handle 23.7 per cent of the 77,246 passengers handled in and out of the Broad Street Station daily.

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Maintenance of Equipment

Straightener for Damaged Steel Cars

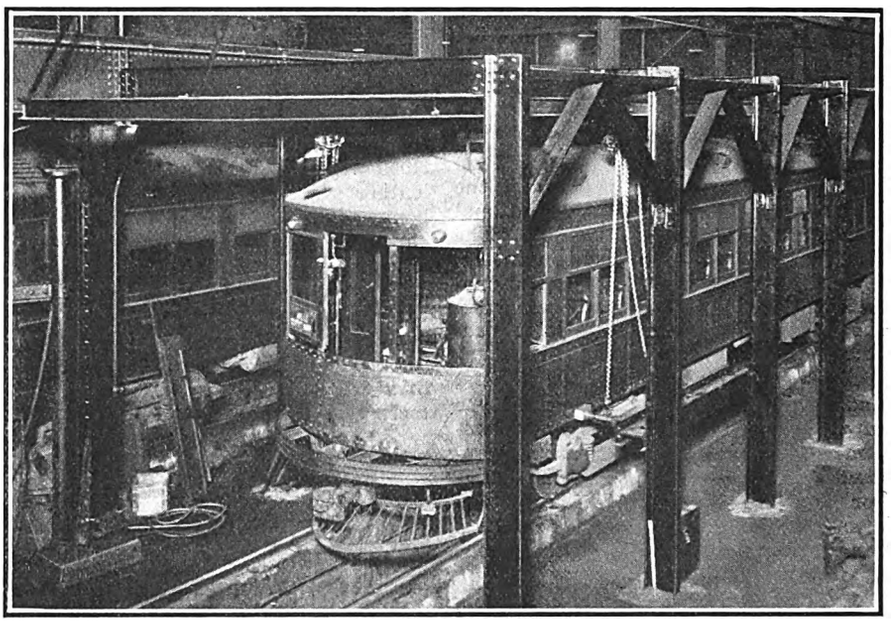
BY P. V. C. SEE
Superintendent of Equipment Northern Ohio Traction & Light Company, Akron, Ohio.

WITH the advent of the steel car it was soon found necessary to change the method of repairing wrecked cars, which in the case of a woden car was to remove the broken material, either renew or splice out the broken sills and posts and then build up with new material. If the parts of a steel car were taken off and carried to the blacksmith shop and straightened and torn parts of the metal welded, the repaired pieces would not fit back in the car properly and the rivet holes never would match up.

A better method developed is to straighten the car without dismantling it. In straightening up a badly damaged car, it is often necessary to make two or three days preparation before the actual straightening is done. Jacks should be placed in their proper positions and turnbuckles at other points, preparations being made to apply the heat simultaneously often at six or eight places throughout the car. This heat is sometimes applied by big oil burners, gas torches, red-hot iron plates and, of late, the acetylene torch. The men doing this work have to be carefully instructed and drilled so that all heats and strains will be applied at the proper rate and time.

The actual straightening of such a car is usually accomplished in a very few minutes, although, as previously stated, the preparation may require several days.

After the car is straightened, if any of the parts have become torn or are too badly bent, they usually can be welded up on the car, or, as a last resort, renewed.

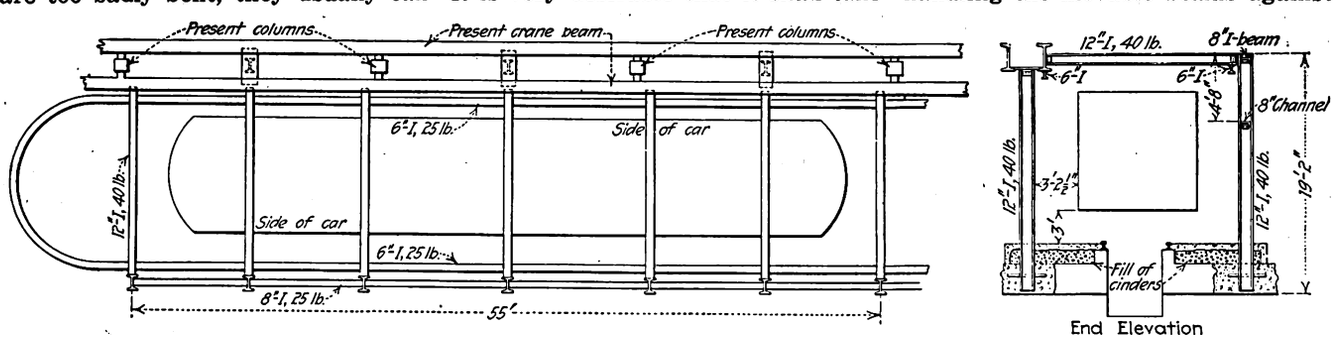


A Car in Position in the Straightener, Showing Application of Movable Beams

In most shops the difficulty is to find a place where the rigging up for this work can be done. Usually one wall of a building will do for one side, but a shop rarely has at hand facilities for applying strains on both sides of the car. Therefore, most of the larger railway shops have designed some form of car straightener.

As the Northern Ohio Traction & Light Company had acquired a large portion of steel equipment, a study was made of the various car straighteners and plans drawn up for a framework that would cover the largest interurban car and enable the application of strain, either in compression or tension, at any point on the car. This apparatus is used a small portion of the time, so it is very desirable that it shall take up as little valuable space as possible.

The steel columns of the building were used to form one side of the device. Between each two of these columns an intermediate column was erected so as to make the spacing short enough to give the desired strength. On the opposite side of the track, in line with each of these columns, was placed a column, there being a total of seven columns in each row. These were formed by 12-in. I-beams, while longitudinally they were connected at the top with 8-in. I beams, and 4 ft. 8 inches from the top a row of 8-in. channels were run so as to prevent any possibility of end strains throwing the apparatus out of line. A 6-in. I beam was hung longitudinally from the top cross-members so as to make a track for the chain block carriers used in handling the movable beams against



Details of Construction of the Northern Ohio Car Straightener

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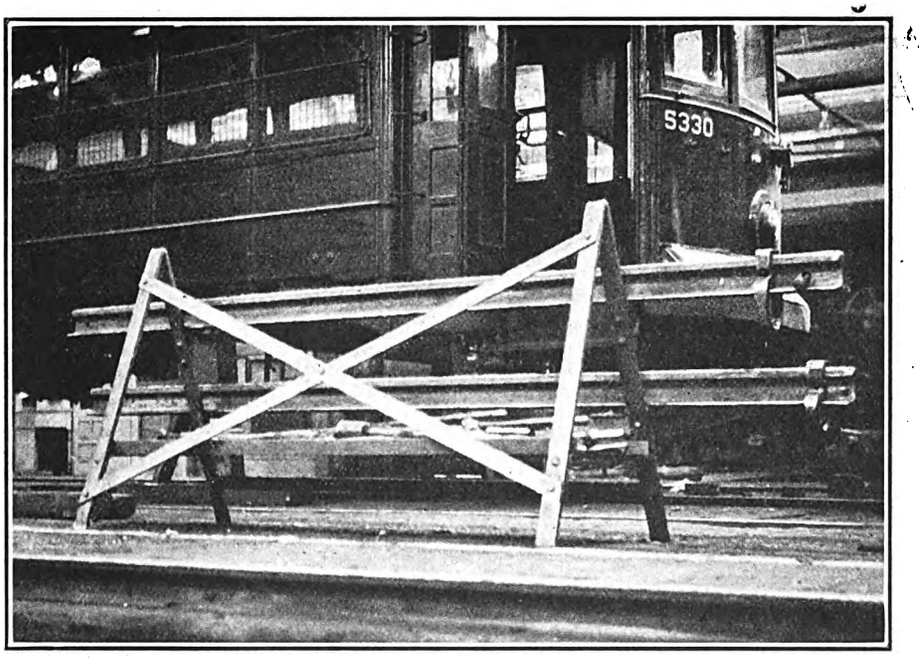
which the pressing or pulling is done. These movable beams were of a 12-in. I beam with 10-in. channels riveted at the top and bottom, thus forming a very rigid girder. When this device is not in use, no floor space is taken up excepting for the bases of the vertical columns. This space can be used, therefore, for the ordinary car repair. The photograph shows position of a bent car in the device, and the details of construction are shown in the drawing.

Crane Car Breaks Up Conduit Track

THE Washington Railway & Electric Company, Washington, D. C., which uses the underground conduit system, has been doing considerable track rehabilitation recently. In ripping out the conduit, which is constructed with heavy cast-iron yokes incased in concrete, the company has been using a Brownhoist crane car with very considerable economy.

The first operation in dismantling this construction, after removal of the paving, is to take out the slot rails, which are midway between the two running rails. Following this the running rails are taken out a section at a time, the crane car being moved along to uncover the track to be removed. The crane car then hooks on to the yokes so as to pull them out. As they are imbedded in the concrete, the action of raising these with the crane loosens the concrete to such an extent that it can be broken up readily and lifted from the trench by the crane so as to load it upon trucks for carting away. The crane car is thus used to break up the concrete as well as to load it, and all heavy labor of lifting is done by the car. In addition to saving labor, this method also is very rapid. The concrete construction is readily taken out and repairs and reconstruction can be started without delay.

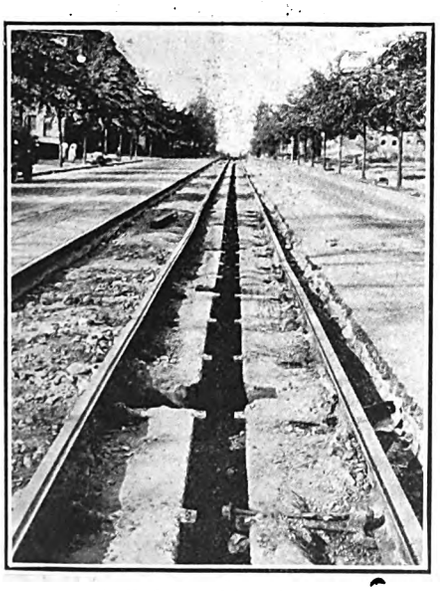


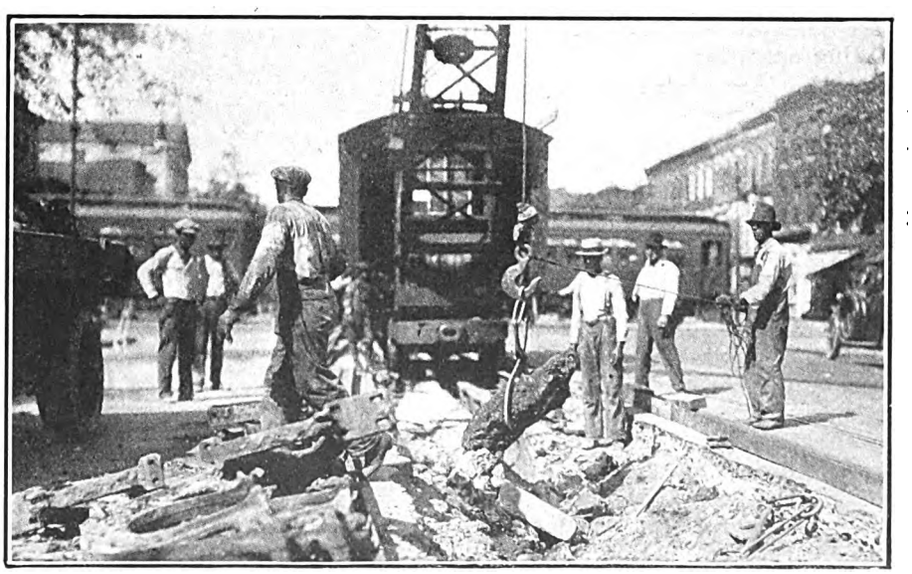
Rack for Small Tools Used by the United Railways & Electric Company of Baltimore

Convenient Rack for Shop Tools

THE problem of keeping various hand tools from becoming scattered over the shop floor, and at the same time providing so that they can be conveniently found when required, has been solved by the United Railways & Electric Company, Baltimore, Md., with a home-made tool rack which is supplied to the overhauling gangs. The accompanying illustration shows such a rack placed alongside one of the shop pits. In addition to having a long pan for carrying heavy tools, wrenches, hammers, etc., brackets are provided on the sides for two lengths of rail. These are placed underneath the car bodies to support them while they are being raised.

The rack is made of flat iron bars, the ends being of an inverted V-shape, thus serving as legs and supporting the rack. The two ends are joined together by diagonal braces. The tray for holding the tools extends the length of the rack, separating the two legs at each end and acting as an additional brace. This tray is raised from the floor approximately 12 in. The entire framework is riveted together, forming a very substantial construction.





At Left, the First Stage of Track Reconstruction Consists of Stripping Out the Slot Rails. At Right, Lifting Broken Chunks of Concrete Onto Trucks for Hauling Away

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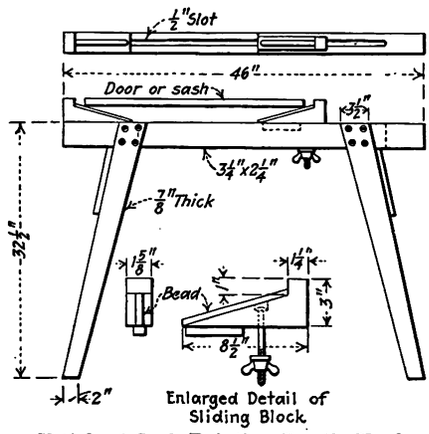
Adjustable Painting Trestle

A HANDY trestle for supporting doors and sash while they are being painted or varnished is used by the shops and equipment department of the Chicago Surface Lines.

During the normal course of overhaul or repair of various types of cars the run of sash and doors that must be handled by the paint department are of several different sizes. The work is therefore facilitated by the type of painting trestle shown in the accompanying sketch.

The door or sash is supported on thin beads tacked to the faces of a



Sketch of Sash Painting Trestle Used in Chicago

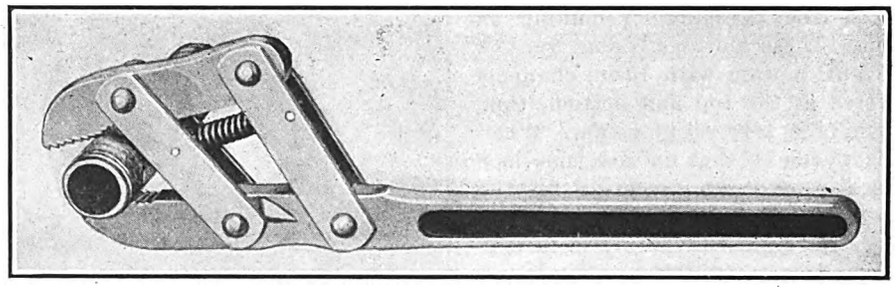
pair of tapered blocks. One of these blocks is fastened permanently at one end of the trestle while the other is arranged to slide back and forth along the trestle top bar. A bolt attached to the movable block passes through a slot in the top bar so that the block may be fastened in any desired position with a thumb nut underneath.

By this arrangement the blocks can be quickly adjusted for sash of different sizes and the trestle provides a secure support during the painting operation.

New Equipment Available

Self-Adjusting Wrench

A NEW type of wrench which differs quite radically from other adjustable wrenches now on the market is being introduced by the Greater Service Electric Company, Newark, N. J., under the trade name of "Robert." Its construction makes unnecessary the usual hand-screwing adjustment to make it fit various size nuts. The design provides a firm grip without danger of the wrench slipping. The various parts are strong and are so proportioned that the wrench is easy to handle. The handle and jaw are drop forged from high carbon steel. Springs of a special construction, made by the Charles Fisher Spring Company, are used in the wrench. The 12-in. size shown in the accompanying illustration will handle any shaped nut, pipe or other articles up to 1 in. diameter.



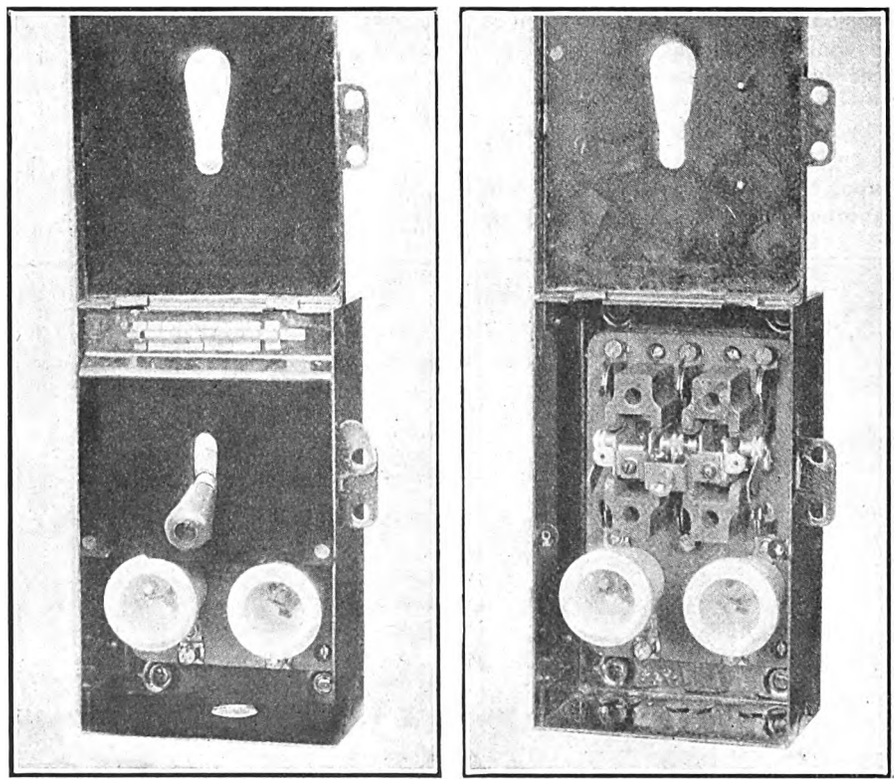
Special Toggle Tight Grip Wrench

Starting Switch for Small A. C. Shop Motors

A NEW single-throw starting switch, the CR-1038-A1, has been put on the market by the General Electric Company for use with small alternating-current motors. This switch is of the three-pole type, designed for quick "make and break," and is operated by an up-and-down movement of the handle. The unit permits of wall or pedestal mounting.

Overload protection is provided by means of two thermal cutouts, one connected in each of two legs of the motor circuit, in order to protect all phases of the motor against unbalanced and single-phase overloads, as well as overloads distributed over all phases. These thermal cutouts have an inverse-time characteristic and sufficient thermal capacity to permit the motor to operate at all overloads of short duration that are not objectionable from the standpoint of overheating the motor.

A new feature in the design of these cutouts is the elimination of the old screw base, two screws being used to fasten the cutout in place, the screws being readily loosened to remove the device if necessary. The fusible links may be removed without removing the cutout.



Motor Starting Switch. At Left, Cover Open and Shield Closed. At Right, Both Cover and Shield Open

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The News of the Industry

Must Resume Railway Operation

Service "Just as Good" Idea at Spartanburg Is Condemned by the Supreme Court

As briefly stated in the ELECTRIC RAILWAY JOURNAL, issue of Jan. 19, the city of Spartanburg won a victory over the South Carolina Gas & Electric Company in a recent decision handed down by the South Carolina Supreme Court, granting the city the mandamus petition to require the railway to "restore its lines and operate the same according to law."

The controversy in Spartanburg dates back to December, 1922, when the company abandoned operation of its railway. The mandamus petition was argued before the Supreme Court in Columbia on Oct. 8. The recent decision is the result of this hearing.

The opinion upholds the contention of the city that the franchise of the company to operate cars was a contract which the South Carolina Railroad Commission had no authority to abrogate. Discussing the contention that buses were substituted for street cars, the court held that no agency of the state could substitute something "just as good" for a specific service named in a contract "even if it is just as good."

Referring to the power delegated by the Legislature to the State Railroad Commission to "regulate, supervise and control" the public utilities of the state, the court ruled that that could only refer to a going concern; that it did not in any way pretend to give the commission the power to annul or destroy the operation of public utilities; that Legislature did not pretend to give to the commission, nor could it give to the commission or to the courts, the power to destroy or impair the obligations of a contract.

In expressing its opinion on the contention of the company that there was a demand for electricity and gas and no demand for railway service except by 3 per cent of the people, the court reminded the company that the gas, the electric light and power and the railway business stood or fell as a unit under the company's franchise contract.

The court was divided on the matter. One of the justices held that the commission did have the authority to order the discontinuance of the railway and that to compel the operation of the lines at a loss would violate the Fourteenth Amendment. Justice Marion in his dissenting opinion held that the contract between the city and the company was made subject to the reserved police power of the state, and within that power could be changed by the state without impairing the obligation of the contract.

Wage Issue in Worcester and Springfield Still in Abeyance

Although the employees of the Worcester Consolidated Street Railway and the Springfield Street Railway in Worcester and Springfield, Mass., have agreed with company officials to arbitrate issues for the new contract the matter is still held up owing to the failure of Attorney Warren, representing the companies, and Attorney Vahey, representing the union employees, to find the time to confer on the matter of selecting a third arbitrator.

The decision to arbitrate was reached after company officials and committees representing the union had held several conferences in an effort to reach an agreement. The union representatives would not change their demand for an eight-hour day and increased wages. Clark V. Wood, president, told the men the railway could not meet the demands as to do so would add to the annual payroll approximately $750,000, an amount that even an increase in fares could not be expected to produce.

More Ride in Winter in New York

Up-State Commission Shows Heaviest Travel to Be During the Winter Months—$5,500,000 Deficit Reported for the Railways in New York Outside of New York City—$1,770,977 Paid in Dividends in 1922

OPERATING revenues of electric railroads in New York State outside of New York City for 1922 show a decrease of approximately $1,000,000 below those for 1921, with an offsetting decrease in operating expenses of slightly more than $300,000, thus resulting in a small increase in the operating ratio. For the fifth consecutive year this group of companies has failed to have a gross income sufficient to meet fixed charges, and for 1922 the deficit was approximately $5,500,000. Of the entire group only twelve companies declared dividends in 1922, amounting to $1,770,977, and four of these operated lighting departments.

These facts are contained in the report of the Public Service Commission presented to the Legislature on Jan. 15. The commission says that it is significant that the reduction in the number of passengers carried still continues. The number of passengers carried in 1922 was 599,080,364 as compared with 643,870,858 in 1921 and 743,233,247 in 1920, while the number of revenue car miles was 92,481,319 in 1922 as compared with 91,059,219 in 1921. One explanation of this situation offered by the commission is that the private use of automobiles has increased to such an extent that the operation of electric railroads is seriously affected. A further study of the operation of electric railroads shows that the heaviest travel is during the winter months when many automobiles are in storage.

On the matter of fares the commission included in its report the accompanying summary:

STATEMENT SHOWING RATES OF FARE IN EFFECT IN NEW YORK STATE

Item	1919 Cities	1919 Per Cent of Total	1920 Cities	1920 Per Cent of Total	1921 Cities	1921 Per Cent of Total	1922 Cities	1922 Per Cent of Total	1923 Cities	1923 Per Cent of Total
5 cents....	26	46	19	33	16	28	15	26	13	23
6 cents.....	23	39	5	8	9	16	5	8	4	7
7 cents....	6	11	24	43	16	28	24	43	27	47
8 cents....	2	4	9	16	16	28	13	23	13	23
Total...	57	100	57	100	57	100	57	100	57	100

An investigation was made of the "unlimited ride, transferable weekly pass." This form of fare is used in thirty cities and with few exceptions a noticeable increase in revenue followed its introduction. The commission says that it would seem that if the price of the pass is fixed after competent analysis there should be no reason why its use would cause any difficulty. It is impossible to take more than two rush hour rides a day and it is good business to give to the twice-a-day rider a concession that really applies only to non-rush hour riding when vacant seats are usually available. The "weekly pass" is now used in New York State in the village of Peekskill and in the cities of Olean and Salamanca. Besides being used in the cities, the Olean, Bradford & Salamanca

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RESULTS OF OPERATION OF ELECTRIC RAILWAYS OUTSIDE OF NEW YORK CITY AS REPORTED BY THE PUBLIC SERVICE COMMISSION

	1920	1921	1922
Railway operating revenues	$47,059,281	$42,824,208	$41,858,280
Railway operating expenses	39,483,189	37,290,565	36,978,228
Net revenue railway operations	$7,576,098	$5,533,646	$4,880,052
Railway tax accruals	2,668,731	2,779,829	2,872,018
Railway operating income	$4,907,362	$2,753,813	$2,008,034
Net revenue, other operations	824,809	817,335	1,302,688
Non-operating income	968,531	1,086,074	924,942
Gross income	$6,700,707	$4,657,220	$4,235,664
Interest charges	8,943,678	8,548,575	9,034,475
Other deductions from gross income	636,614	642,060	694,362
Net income	Loss $2,879,590	Loss $4,533,411	Loss $5,493,173
Dividends during year	305,719	419,659	1,770,977
Passengers carried (fares and transfers)	743,233,247	643,870,858	599,080,364
Revenue car-miles	97,356,831	91,059,219	92,481,319
Mileage in New York State	2,014	2,001	1,990
Operating ratio	83.90%	87.08%	88.34%

Railway expects to extend its use to the interurban lines. The commission says that the use of the weekly pass is now being considered in the cities of Rochester and Schenectady.

The number of accidents at grade crossings of electric railroads and highways outside of cities and villages has not increased over that of last year. Of the eight persons killed in this class of accidents, five were killed in an accident which occurred at Stop 13½ on the Schenectady-Troy Road when a five-passenger auto with curtains up, traveling the same direction as the electric car, attempted to cross the path of the trolley.

The commission says that one of the developments of the past year has been the tendency towards the formation by electric railroad corporations of subsidiary companies for the operation of bus lines. The commission expects that the extension of such bus lines as feeders to existing electric railroads will increase. It also looks forward to more extensive use of trackless trolleys in the urban districts. The commission says:

> The operation of bus lines and lines of trackless trolleys by electric railways is in a more or less experimental stage. The determination of the most economical method of service, street railroad, motor bus or trackless trolley, seems to depend upon the territory to be served and the frequency of operation required. Results of operations of this character will be closely observed in order that a proper appraisal may be made of their economy and value. The commission renews the recommendation in its last report to the Legislature to the effect that the laws on the subject of automobile bus regulation should be stated in as complete detail as are the statutory provisions governing other carriers and utilities.

The commission refers to the enactment of Section 53-a of the Public Service Commission law (Laws of 1923, Chap. 901). This measure provides that all railroads operating within cities having a population of 1,000,000 inhabitants or over are required to operate all trains by electricity on and after Jan. 1, 1926. The corporations affected were directed by the commission to file plans and specifications for its approval. The New York Central Railroad accordingly filed plans covering the electrification of its railroad within New York City not already electrified, and has also filed with the Transit Commission a set of plans for the elimination of all grade crossings on the west side of New York City.

Two Participators in Dynamiting Outrage Sentenced to One Year

Maximum penalties were imposed upon two of the four striking platform employees of the International Railway, Buffalo, by Federal Judge George F. Morris of New Hampshire, for their alleged participation in the dynamiting of the Buffalo-Niagara Falls high-speed line train at Ellwood during the strike in August, 1922. The other two, who were found guilty a week ago, were given lighter sentences, but the district attorneys of Erie and Niagara counties have started the presentation of the evidence to county grand juries and indictments of the men will be asked on grounds charging more serious offenses. Francis Reilley and Healey Breeze, Buffalo, were sentenced to the Erie County penitentiary for one year and fined $5,000 each.

This is the maximum under the section of the Sherman anti-trust law under which the four striking platform employees were convicted for conspiracy. William L. Vandell and William H. Smith, Lockport, also were jailed for one year each, Vandell being fined $2,000 and Smith $3,000.

Judge Morris denied the request of District Attorney William J. Donovan, who prosecuted the case for the government, for a postponement of sentence because of the presentation of evidence against the four men to the grand juries in Niagara and Erie County. The court said there is nothing to prevent the state from prosecuting the defendants even though they are serving jail sentences for offenses against the government.

The court denied the application by Ernest W. McIntyre, counsel for the defendants, for a new trial for Messrs. Healey and Breeze on the ground that insufficient evidence to implicate them in the alleged conspiracy had been introduced at the trial. Counsel then filed a bill of exceptions, laying the basis for an appeal to the United States Circuit Court of Appeals.

Three more members of the Amalgamated and officers of the local union will be placed on trial before Federal Judge Morris on Feb. 4 for their part in the alleged conspiracy to dynamite the Buffalo-Niagara Falls high-speed line train. They are John M. Parker, Niagara Falls, Ont., president of the Buffalo local; Clarence F. Conroy, Buffalo, business agent, and Vincent Tuero, financial secretary of the union. State Senator Robert C. Lacey, Buffalo, also will be tried at the same time.

Engineers to Report

Both Oakland Railway and City Plan Surveys to Determine Local Transportation Needs

Oakland's muddled transportation situation is to be surveyed by two experts, one employed by the Key System Transit Company, the successor to the San Francisco-Oakland Terminal Railways, and the other by the City Council. This is the latest highlight in the controversy over the respective merits of one-man cars and buses.

Richard Sachse, the railway company's engineer, has already started work. Announcement of his employment was made on Jan. 23 by C. O. G. Miller, president of the company.

The Council voted the same day to undertake a survey similar to that planned by the railway, but the city's survey cannot be started until an ordinance to that end has been prepared by the city attorney.

Mr. Miller has called at the Oakland city hall and invited the co-operation of Mayor Davie and other city officials in the matter, suggesting a conference at which transportation problems could be considered. He met with a rebuff, however. Mayor Davie, backed by Commissioner Moorehead, said in effect:

"There can be no such conference until your company stops violating the law of this city. I refer to the continued operation of one-man cars in defiance of our ordinance."

The city's survey plan originated with Commissioner Colbourn. It provides for the employment of a competent engineer to recommend, after an exhaustive survey, ways of meeting the city's transportation needs. It is understood that this survey will also contain an expression of opinion on the question of whether the city shall run a competing line or procure the present system by purchase, and whether temporary bus permits shall be issued.

The Mayor and Commissioner Moorehead favor the municipal bus plan. They have already taken a flier in municipal operation by the purchase of a city bus which has now been running for about four months. Other members of the Council, however, feel that nothing should be done without expert advice and then only after the voters have had their say.

Mr. Colbourn and his colleagues are averse to antagonizing the present franchise holders. Aligned with Mr. Colbourn in this view are Commissioners Baccus and Carter. They favor co-operation with the Key System Transit Company and the State Railroad Commission.

This view may be reflected in the adjacent city of Alameda, which has just put the bus question up to the commission, after a long wrangle in the City Council. The commission is already on record as favoring the operation of one-man cars.

Mr. Sachse will study not only Oakland but the entire East Bay section. He was formerly chief engineer of the California Railroad Commission.

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Dispute Over Paving Delays Improvement Program

The proposed plan of the Wisconsin Railway, Light & Power Company, Winona, Minn., to undertake a large program of track improvement during 1924 in La Crosse can not be placed in operation apparently until an agreement can be effected between the company and the City Council over the question involving the payment for paving laid in the proposed track zones.

The City Council recently adopted an ordinance approving of the company's plan to commence new extension work, but inserted a section compelling the company to pay for the pavement between its tracks. During the war the company was exempted from these charges.

The company has refused to accept the ordinance unless it is made exempt from paving costs while the Council has adopted a resolution to secure an order from the Railroad Commission to force the company to build its tracks according to the franchise and city statutes.

Opposes Construction Program

Objection has been made by Milwaukee Electric Railway & Light Company to that part of Waukesha's paving program requiring the company to cooperate with the city in certain repair work within one year. The company, however, has submitted to the city a plan of co-operation and construction covering a three-year period. The expenditure of a large sum of money for 1923 track zone repair work and a certain loss of revenue in 1924 from the interurban line between Milwaukee and Waukesha were some of the reasons given by the company for being unable to complete this work in one year.

Street Accidents Increase in Cincinnati

That the hazard of death and accident is increasing in the streets is strikingly illustrated by statistics compiled by the Department of Street Railroads, Cincinnati, with regard to the number of persons killed and injured by electric cars during 1923 as compared with 1922. The fatalities jumped from nine in 1922 to seventeen in 1923. Pedestrians struck by electric railway cars in Cincinnati increased from 151 to 201. Collisions with automobiles in 1923 were 5,089 as compared to 3,621 in 1922, an increase of 1,468. There was also an increase of collisions between electric railway cars, the figures being 647 in 1923 and only 318 in 1922.

Still, riding on electric cars is apparently becoming safer. In 1923 passengers injured were 296, as compared with 385 the year before, a decrease of 89. So, too, there was a decrease in the number of employees injured.

W. Jerome Kuertz, Director of Street Railroads, said the increase in the number of collisions and mishaps to persons other than passengers was due, not to increasing carelessness on the part of motormen and conductors, but to the growing danger of all street traffic, and particularly to the greater number of automobiles and the recklessness of some drivers.

One Thrift Week After Another for Illinois Corporation Public

Every week this year will be "Thrift Week" for the customers and public in the territory served by the Illinois Power & Light Corporation, Chicago, Ill. Commencing during National Thrift Week, this company launched a thrift campaign that will be waged throughout the entire year. "Make This Your Thrift Year" is the slogan that will be used. The company sold more than $2,000,000 of its 7 per cent preferred stock to consumers and the general public in the last four and a half months of 1923.

Dayton Companies Seek Temporary Restraining Order to Permit One-Man Cars

The fight of the Dayton City Railway and the Oakwood Street Railway to retain one-man cars in Dayton, Ohio, was carried into the Federal Court on Jan. 26 when the companies asked for a temporary restraining order permitting them to continue the use of one-man cars while the matter is being threshed out in the courts. The city of Dayton, Mayor Frank Hale, three city commissioners, City Manager F. O. Eichelberger, the safety director, city attorney and chief of police are made defendants in the action.

The company contends that the city ordinance ousting the one-man cars is unconstitutional, invalid and illegal in that it takes away property of the company "without due process of law" in contravention of Article V of the Fourteenth Amendment to the Constitution. Since penalties provided in the ordinance are cumulative the company sets forth that they would amount to such excessive sums pending litigation that it would prevent the companies from asserting their legal rights in court. Its effect, they set forth, is to deny the company equal protection in law. The ordinance was passed following a referendum vote on the subject last November in which the people of Dayton expressed disapproval of the system. No attempt has so far been made, however, to enforce the measure.

The principal contention of persons active in opposing the one-man car was that they are a menace to public safety although no serious accidents have been reported in Dayton which may be attributed to their use.

The hearing of the case is expected to determine the future of the one-man car in Dayton. Among other things the company's lawyers expect to attack the validity of the election on Nov. 6, claiming that an insufficient number of legal signatures was made on the petition. Numerous instances are cited by the company's attorneys as reasons why Dayton should retain the cars it now has in service.

Hearing on the motion for the temporary retaining order has tentatively been fixed for Jan. 31.

Pacific Electric Official Suggests Method of Subdividing Land

New streets being laid out along the right-of-way of the Pacific Electric Railway should be so arranged that the rear of the lots will abut the railway. Entrance to the streets should be distant approximately 150 ft. on each side of the railway. These suggestions were made by D. W. Pontius, vice-president and general manager of the company, in a circular letter to the chambers of commerce, planning commissions, realty and industrial boards and other civic organizations in southern California. The letter was prompted by the announcement of the plan for subdividing Los Angeles County. The suggestions were advanced after a study of the situation in which Mr. Pontius concluded that the policy which had been established looking toward the opening of such streets on each side of the right-of-way practically paralleling the track of the railway was a very serious one. Mr. Pontius says that residential and business property backing up to the right-of-way would increase in value more quickly than if it faced the right-of-way. He said that with the increase in population in southern California industries were a necessity and that they could not be attracted unless they could be served directly and efficiently with a railway industrial track. The circular letter contained diagrams showing the present method and the suggested method of subdivision.

Explains Delay in Constructing

Construction and operation of the proposed electric railway line by the Milwaukee Western Electric Railway, from Milwaukee to Beaver Dam and from Sussex to Waukesha, plans for which were started in 1909, will not take place before the next two years, owing to the fact that prevailing conditions have made impossible the financing of the project.

This information was given out by A. P. Kletzsch, president of the proposed line, to the Wisconsin Railroad Commission at a hearing on Jan. 7, held for the purpose of considering the advisability of revoking certificates issued in 1910 granting permission to begin the construction and operation of the line. The hearing brought out a request for a two-year extension which the commission took under advisement.

No More Postponements in Cincinnati

What the city administration of Cincinnati terms an ultimatum was served on representatives of the Cincinnati Street Railway and the Cincinnati Traction Company on Jan. 21, when the street railroad committee of the City Council fixed Feb. 11 as the "final" postponed date for the two companies to report whether they have or have not reached an agreement for the settlement of Cincinnati's traction problem.

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Service Suspended in Akron

Local Cars Withdrawn in Ohio City at Expiration of Franchise, Following Refusal of City Officials to Grant Fare Increase Pending Negotiation of New Operating Contract

THOUSANDS of Akron citizens walked to work on Feb. 1 following the discontinuance of electric railway and bus service by the Northern Ohio Traction & Light Company on its Akron city lines. Other thousands walked many blocks to the company's carhouses and suburban stations from inside the city and jammed the suburban and interurban cars. The promised "adequate service" by Mayor D. C. Rybolt did not materialize. A few buses from other cities in the State are in Akron, and Henry Ford sent in 500 jitneys, but the people refused to ride them. In an advertisement in Feb. 1 papers the railway set forth a history of the negotiations and renewed its offer to continue operations provided a 6-cent fare was agreed to.

The present Akron transportation crisis had its inception on Jan. 3 when the company filed with the Ohio Public Utilities Commission a rate of four tickets for 25 cents, with a cash fare of 7 cents, effective on Feb. 1 on its Akron City lines and sent a letter to the city announcing this fact. The Ohio law provides that where there is no existing franchise, or contract, between a municipality and a street railway any rate to become effective must be filed with the State. The railway franchise at Akron was entered into twenty-five years ago. It provided for a 5-cent fare, with free transfers. The grant expired at midnight on Jan. 31, at which time the proposed new rate was to have become effective.

The company's action followed numerous efforts during the last two years to secure a new contract on a basis in excess of the old 5-cent fare. It also followed an intensive campaign covering a period of four months in which railway patrons were asked voluntarily to pay 6 cents for their ride. Incidentally this campaign met with favor. An average of 9 per cent of the riders did voluntarily pay the extra cent.

In its communication to the city announcing the new rate filed with the State, the company said that for the year ended Nov. 30, 1923, the operating results of the Akron City system were as follows:

Gross earnings	$1,864.509
Operating expenses	1,837,802
Difference	$26,707
Taxes	107,524
Deficit	$80,817

In commenting on these results the company said:

> From the above it will be seen that the Akron city railway did not even earn its taxes, to say nothing of depreciation and return.
>
> We want to furnish transportation in the city of Akron at the lowest possible rate, but we cannot provide it at less than cost, plus a reasonable return on the value of the property used by the public.

Immediately the city called a meeting with representatives of the company. The company was asked by the utilities committee of the Council and the Mayor to continue operations at the 5-cent rate for a period of sixty or ninety days. The company then asked for a statement of the basis upon which negotiations would be taken up looking toward a new contract. The Mayor, on behalf of the city, announced that he was elected on a 5-cent fare platform and that any negotiations would necessarily have to be on a 5-cent basis.

The company then announced its refusal to extend the period beyond Feb. 1. A week later the city passed an ordinance providing that the company must operate for a period of sixty days on a 5-cent fare or else get off the street. The company was given four days in which to accede to that demand. It refused to meet these terms. The ordinance further provided that the city tracks should be torn up within a period of six months from the passage of the ordinance. It also provided that the company must cease operations at the end of the sixty-day period unless the time was further extended.

At this point a citizens' committee of one hundred that had been working on a new franchise submitted its report. This committee proposed a service-at-cost contract patterned after the Cleveland grant. It provided certain extensions, the establishment of a commission to handle railway affairs in the future, provided a maximum rate of 7 cents, new bus lines and general development of the entire system.

When the report was submitted to the Mayor he characterized it as "ridiculous" and declared he would establish a bus system for Akron that "would be the finest in the world." He further announced through the newspapers that he would never agree to anything except a 5-cent fare, and that "buses would operate at that figure and make money."

The members of the citizens' committee of one hundred, the Chamber of Commerce and various other civic organizations held numerous meetings in an effort to secure a compromise. The company agreed to operate on a 6-cent basis until a new contract could be drawn. The Mayor refused to change his position. H. S. Firestone, of the Firestone Tire & Rubber Company, assured the Mayor he was in the right and said he would aid him in securing buses. The statement was made by the Mayor that 250 double-deck buses would be brought to Akron. Later he said they were not adaptable for Akron purposes, but 100 buses would be brought from Newark, N. J., and other cities. Tuesday the Mayor stated Ohio buses only would be used, while Mr. Firestone exhibited a telegram from Henry Ford saying he would lend 500 Ford sedans to the city. Wednesday the statement was made by the Mayor that there would be "ample transportation to care for the city's needs," but urged the people to "bear with me until I get the proper service established."

In the meantime the newspapers have been filled with letters, meetings have been held and the car riders have openly announced their willingness to pay 6 or 7 cents.

There is discussion about a referendum to vote on a 6-cent fare and talk of a recall of the Mayor and members of the Council. The public feels the street railway has been the football of politics long enough, if open statements by private citizens mean anything. The citizens' committee Wednesday night announced it would start a referendum as soon as it could agree with the company on a new contract.

Employment Service for Engineers

Within the past few months the employment service operated under the joint supervision of the national engineering societies has entered upon a policy calculated to insure the needed funds to provide a truly national employment service, with offices in leading cities throughout the country. Under this policy the societies continue their financial support and this is supplemented by contributions from those deriving benefit from this enterprise as no profit to anyone is to be taken, simply a self-supporting service. Contributions if on a basis of 25 per cent of the fees which must be necessarily exacted by a commercial agency will make possible the realization of a national service.

More than 55,000 engineers are members of the societies conducting the service. This membership ensures employers a selection from engineers whose records have been closely scrutinized.

Engineers seeking opportunities may arrange to obtain each week by first class mail the current list of openings. Their availability is also announced in the respective publications of the engineering societies.

Employers of engineers and those seeking competent men are urged to use the service.

Bill Introduced Against One-Man Car.—House Bill No. 225, introduced in Kentucky, would require street railways in cities of the first class to employ crews of not less than one motorman and one conductor on each car operated. The bill is aimed at the use of one-man cars in Louisville, which is the only city in the State with the first-class rating. The bill has been referred to the committee on municipalities.

Interurban Seeks Court Intervention.—A petition for a federal court writ prohibiting interference with transit has been prepared by attorneys for the Chicago, North Shore & Milwaukee Electric Railway in anticipation of an ouster order, to halt what the city alleges is "illegal and unlawful" entry of trains into city over elevated rights of way. As explained previously in the ELECTRIC RAILWAY JOURNAL an opinion was prepared recently by the corporation counsel for presentation to the City Council holding that the interurban was exceeding its legal rights in operating into Chicago over the local elevated lines.

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Foreign News

Moving Platforms for Paris

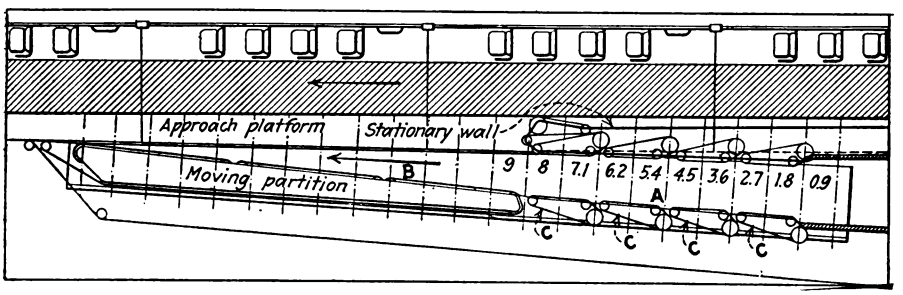
Paris authorities have been giving serious consideration to the possibility of using the *trottoir roulant*, or moving sidewalk, for the relief of the traffic congestion of pedestrians on the boulevards. The project is for a moving platform running between the Madeline and the Place de la Republique by way of the grand boulevards.

Three distinct methods are being considered. The first provides a platform divided into three parallel sections running at speeds of 3.1, 6.2 and 9.3 m.p.h. This is practically the same as the platform proposed for New York City and constructed experimentally by the Continuous Transit Company, and which was described in this paper for Nov. 24, 1923, page 899. The second plan is for a single moving platform running at the constant speed of 9.3 m.p.h.

The arrangement for gaining access to the platform is by means of a series of short, narrow platforms at progressively increasing speeds. These will be arranged on the level or on a slight slope, as indicated in the plan shown herewith. They will be driven by a series of endless chains, ten speeds being provided in steps of slightly less than 1 m.p.h. from standstill to 9.3 m.p.h., the speed of the main platform.

The third plan provides partially or totally inclosed cars running at slow speeds at the stations, but automatically accelerated to high speeds between stations. This is to be accomplished by a form of worm drive, a series of endless screws being sunk beneath the platform. A maximum speed of 24 m.p.h. would be provided between stations and 3 m.p.h. at the loading platforms. The average speed attained, 12.7 m.p.h., is considerably in excess of the minimum speed of 9.3 m.p.h. demanded by the commission in charge of the project, and likewise in excess of that of the two competing systems. Methods of embarking and disembarking from the speed of 3 m.p.h. at the stations have not been disclosed.

One phase of the question being discussed is the method of announcing stations. It has been suggested that the name of the station, accompanied by the legend "Prepare to Descend," be outlined with red electric lights on a sign about 100 ft. in advance of the station, and that at the station the name with the single word "Descend" be shown. Since there is about six seconds time for the passenger between these signs, there is some possibility that riders may have to remain on board until the next station is reached.



One of the Plans for a Paris Moving Sidewalk Has a Series of Approach Platforms Running at Graded Speeds

A—Short approach platforms. Figures show speeds in m.p.h.

B—Section of approach platform moving at same speed as main platform, 9.3 m.p.h.

C—Flexible partitions moving at same speed as platforms alongside.

London Trail Cars to Be Abandoned

The London County Council has adopted without discussion the proposal to abandon trail cars on its tramway lines. This was done after the highway committee of the Council had carried out a series of tests from which it concluded that while it would be possible considerably to reduce the schedule time of trail trains, it was more economical to use motor cars only. It was considered that in order to increase the number of passengers every gain in speed is desirable, and furthermore tends to economy and to enhance the popularity of the service, which it was felt can best be done with motor cars alone. It was decided, therefore, that the tramways must keep pace with and, if possible, be in advance of other forms of transportation. Trailers were first introduced into London in 1914 after considerable opposition by the metropolitan police authorities.

Tramways or Railless

The Bradford Tramways is considering the advisability of the introduction of railless electric traction as tramway tracks in the city wear out. Already twenty railless cars are in use. Repairs and maintenance of permanent way in Bradford cost the equivalent of nearly one penny per car-mile. On the other hand, the railless system working expenses were 16½d. per car-mile, compared with 18d. for the tramways.

London Holiday Traffic

On Boxing Day (Dec. 26) the London underground group of railways, tramways, and buses carried about 3,500,000 passengers, or 500,000 more than on the corresponding day of the previous year. These figures do not include the traffic on the London County Council tramways.

No Season Tickets in Edinburgh.—Edinburgh Town Council has negatived a proposal to extend the season ticket arrangement on its tramways, which is in use on one section. The tramway manager recommended a six months experiment, but the chairman of the tramways committee stood out for no change, on the ground that season tickets would mean a tremendous loss of revenue.

Standards for British Traction Motors.—A new standard specification for the electrical performance of direct-current, series-wound traction motors has been published by the British Engineering Standards Association, superseding one previously in use. The specification keeps closely in line with that for traction motors of the American Institute of Electrical Engineers.

New Linings for London Tubes.—Contracts amounting to £765,000 have been placed by the London underground railways for 85,000 tons of cast iron lining segments to be used for enlarging the tunnels of the southern section of the City & South London Railway and for the extension about to be constructed between Charing Cross station of the Hampstead line and Kennington station of the City and South London line. No information has yet been given out as to the cost of the lining for the enlarged tunnels of the northern section of the City & South London Railway nor that of the new connecting line between it and Hampstead railway.

London Tube Railway Extension.—Work has just been begun on the extension of the City & South London Railway from its present terminus at Clapham Common to Morden on the southwestern outskirts of the metropolis, a distance of more than 5 miles, of which 4½ miles will be in tunnels. Service shafts at points near the sites of the future stations will be driven vertically into the ground to varying depths and down them will be lowered the rotary excavators which will drive the tunnels through the clay. Each excavator will have a forward drive of from 20 to 25 ft. per day. It is expected that the construction of the new line will be accomplished in record time. There will be seven stations on the extension, which will serve a population of about 300,000. It is estimated that 50,000,000 passengers will be carried annually.

London Tube Railways Install More Escalators.—At Liverpool Street station of the Central London Railway a fifth escalator of the reversible type is to be installed. The total capacity of the five will be 36,000 passengers per hour. This new moving stairway is part of the large escalator scheme mentioned in ELECTRIC RAILWAY JOURNAL Jan. 23, 1923. No fewer than twenty-eight escalators are to be installed to replace lifts, the cost being £1,000,000.

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Financial and Corporate

Twin Cities Railways Doing Well

Report for Year 1923 Shows Balance of $1,360,067 After Taxes and Preferred Dividends

The Twin City Rapid Transit Company, Minneapolis, Minn., and subsidiaries report for 1923 a balance of $1,360,067, equal to $6.18 a share on the $22,000,000 common stock outstanding, after deducting taxes, interest, rents, preferred dividends, etc., as compared with a balance of $1,355,201 or $6.16 a share, on the same amount of common outstanding in 1922. The statement compares as follows:

	1923	1922
Total operating revenue..	$13,463,111	$13,772,647
Total operating expenses..	9,537,841	9,914,325
Net operating revenue..	$3,925,270	$3,858,322
Taxes assignable to railway operations.....	1,373,069	1,251,924
Operating income.....	$2,552,201	$2,606,398
Non-operating income....	116,936	69,241
Gross income.....	$2,669,137	$2,675,639
Interest, rents, etc.....	1,099,070	1,110,438
Net income.....	$1,570,067	$1,565,201
Preferred dividends.....	210,000	210,000
Balance.....	$1,360,067	$1,355,201
Common dividends.....	1,320,000	880,000
Surplus.....	$40,067	$475,201
Previous surplus.....	1,722,735	1,211,202
Total.....	$1,762,802	$1,686,403
Adjustment.....	11,290	36,332
Final surplus.....	$1,774,092	$1,722,735

Horace Lowry, president, in his remarks to the stockholders said that on Oct. 8, 1923, hearings were commenced before the Railroad & Warehouse Commission of the State of Minnesota for the purpose of determining the value of the property of the Minneapolis Street Railway, fixing a reasonable rate of return thereon, and the rate of fare to be charged by that company. The hearings have continued, with short recesses, but the taking of testimony had not been completed at the time he spoke.

Similar hearings will follow before the commission for the purpose of determining the value of the property of the St. Paul City Railway, fixing a reasonable rate of return thereon, and the rate of fare to be charged by that company. The railway officers are using every effort to hasten the final determination of the value of the properties.

Mr. Lowry explained that because the unsettled situation confronting the companies is likely to continue until the valuation of the properties is finally determined only such additions, extensions and improvements have or can be made as are urgently required and fully justified by increase in travel and necessary convenience to the car riders.

The engineers of the subsidiary companies have been experimenting for more than two years in the development of a light weight car which would be as nearly noiseless in operation as possible. Mr. Lowry says it is believed they have succeeded in building a car which is in advance of anything else in operation in any other city of the country.

Net Income for Year in Philadelphia $1,800,000

For the twelve months ended Dec. 31, 1923, the Philadelphia Rapid Transit Company, Philadelphia, reports a net income of $1,800,000, compared with $1,829,278 for the previous year.

In 1923 the amount available after providing the net income of exactly $1,800,000 for the 6 per cent dividend upon the Philadelphia Rapid Transit Company stock fell short by approximately $50,000 of providing for the full 10 per cent co-operative wage dividend upon the wages received by the employees during the year.

For the twelve months of 1923 the number of passengers was 917,787,235, compared with 848,883,512 for 1922. The passenger revenue for 1923 was $44,249,361, compared with $41,758,763 for 1922.

Stock Dividend Proposed in Brooklyn

A special meeting of the stockholders of the Brooklyn City Railroad has been called for Feb. 6 to take action on a proposal to increase the company's capital stock from 1,200,000 shares, par value $10, to 1,600,000 shares of the same par value. The increase, if approved, will be distributed as a stock dividend to the shareholders.

In a letter to the stockholders Frank Lyman, president of the company, calls attention to the fact that when the company, formerly leased to the Brooklyn Heights Railroad, was returned to its owners for private operation dividends were withheld and capital expenditures in excess of $4,000,000 were made out of the earnings. It is now proposed to issue $4,000,000 par value additional stock against these expenditures.

With the return of the properties from the lessee in 1919, according to President Lyman, the management of the Brooklyn City Railroad was confronted with the problem of raising large sums required for capital improvements. This money was obtained by retaining in the treasury earnings otherwise available for dividends. The last dividend at the full rate of $1 a share a year was paid on July 15, 1919, and dividends were not again resumed at the 10 per cent rate until Sept. 1, 1923, though three quarterly dividends had previously been paid at the rate of 80 cents annually. In the last four years more than $4,000,000 has been spent for rolling stock and more than $600,000 for track reconstruction and roadway improvement.

Opposition Develops to $7,500,000 Stock Issue for New Orleans Company

The ordinance introduced by Commissioner Paul H. Maloney at the regular meeting of the Commission Council of New Orleans, La., on Jan. 15, granting authority to the New Orleans Public Service, Inc., to issue $7,500,000 additional common stock for the purpose of providing funds for improvements to its property as well as to increase its dividend rate on all common stock from 8 per cent to 9 per cent appears to have encountered opposition among the members of the Commission Council. This may delay if not imperil adoption of the measure. The ordinance was to have been considered at the regular session of the Commission Council on Jan. 22, but its consideration was put off to the following day, when a special session of the Commission Council was called to take final action on the measure. No session, however, was held.

Mayor McShane is one of those arrayed against the ordinance.

Commissioner Ray said he thought the directors of the Public Service, Inc., were going too fast. There might come a time when an issue of stock by the New Orleans Public Service, Inc., paying 9 per cent might be justified, but he felt such an issue was premature now.

It has been made clear by Commissioner Maloney that the permit sought by the Public Service, Inc., to pay a 9 per cent dividend on its common stock instead of 8 per cent, as is now being paid, will not affect the rate of return of 7.5 per cent the company under the settlement ordinance, upon a rate base of $44,000,000, which has since been increased through reinvestments to $53,000,000.

Pittsburgh Receivers Discharged

The receivership of the Pittsburgh Railways was terminated at midnight on Jan. 31 following the signing of the final decree by Judge W. H. S. Thompson in the United States District Court. In the presence of A. W. Robertson, vice-president and general counsel, and Attorney E. W. Smith, both of the Philadelphia Company, and Attorney George E. Alter, chief counsel for receivers, C. A. Fagan, W. D. George and S. L. Tone, the order was made effective giving the property back to the owners. The road had been in receivers' hands since 1918.

Successful Year in Vancouver

The net revenue of the British Columbia Electric Railway, Vancouver, B. C., for 1923 available for interest and dividends was more than £416,472, compared with a little more than £409,233 in 1922. This fact was brought out at the twenty-seventh meeting of the company held in London in a statement prepared by R. M. Horne-Payne, chairman of the board. Mr. Horne-Payne's speech brought out that the revenue shown in the profit and loss accounts did not include any profit on

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exchange derived from the remittance of money from Vancouver to London. He commended in a warm manner the invaluable services rendered by the executives in British Columbia, Messrs. Kidd, Murrin, Goward, Glover and others. He referred especially to the equitable and satisfactory settlement of the tramway fares on a permanent basis.

Way Being Cleared for Birmingham Sale

All properties of the Birmingham Railway, Light & Power Company, Birmingham, Ala., will be sold to the highest bidder at public auction within the next few weeks. Lee C. Bradley and J. S. Pevear, co-receivers, disclosed this fact to the members of the City Commission at a conference on Jan. 24 between the city commissioners and the receivers.

The principal thing which is holding back the sale of the properties is the fact that the receivers desire to abandon a portion of the Tidewater line. The City Commissioners have so far refused to consent to this change. The Tidewater line is operated from East Lake to Ensley, a distance of some 14 miles. The receivers say the Tidewater line has lost $400,000 since it was taken over by the Birmingham Railway, Light & Power Company. It is stated that within thirty days after the matter of the Tidewater line has been satisfactorily adjusted the company can lift the receivership.

The receivers are also asking an extension of the thirty-year franchises. City Attorney Wynn stated that his opinion on this proposed franchise was not ready, but so far as he could see there would be no difficulty in this, if other matters were worked out.

Approval of $13,000,000 San Francisco Issue Sought

The Market Street Railway, San Francisco, Cal., has applied to the Railroad Commission for permission to issue 15,000 first mortgage 7 per cent sinking fund gold bonds, each of $1,000 par value (due April 1, 1940), secured by all the physical property of the company, and to sell $13,000,000 face value of the said bonds for a price of 93 per cent of face value.

In this connection it has been explained that the railway desires to use the proceeds derived from the sale of these bonds for the payment and discharge of $4,269,000 of five-year 6 per cent collateral trust gold notes, due April 1, 1924, and $9,239,550 first consolidated mortgage 5 per cent gold bonds, due Sept. 1, 1924. The remaining $2,000,000 face value of the proposed issue are to be held by the company, subject to further authorization by the commission, to finance not to exceed 75 per cent of the cost of additions and betterments.

The bonds proposed under this issue were offered for public subscription at 100 and interest on Jan. 8 subject to approval of the commission. The offering was timed to take advantage of the first of the year reinvestment period.

Another $15,000 Needed for Milwaukee Survey

If the survey now under way by the street railway acquisition committee at Milwaukee, Wis., in connection with the proposal for the city to take over the property of the Milwaukee Electric Railway & Light Company is to be concluded an additional $15,000 to carry on the work will be needed. The last appropriation of $7,500 has been exhausted. The new appropriation has been included in the 1924 budget, but the additional expenditure must be approved by the finance committee of the Council. If the expenditure of additional money is approved it will make the total spent by the city in this investigation and study approximately $50,000. Fred S. Hunt, chairman of the acquisition committee, declares that this will be the final appropriation and promises that the work will be completed within the next three or four months. The company's properties have been valued up to and including 1919, but compilations remain to be made of extensions and improvements carried out since that time.

York Railways Does Better

The York Railways, York, Pa., reports gross earnings of $2,007,461 for the year ended Nov. 30, 1923. The net income after paying interest and taking care of bond discount was $391,671. This compares with $303,331 for the previous year. The properties at York under the York Railways include the railway lines, the Edison Light & Power Company, the York Steam Heating Company, the York Suburban Land Company and the York Transit Company. The last mentioned is the bus operating subsidiary. It is at present operating one vehicle. This bus was placed in service on Aug. 17 between Dover and Dillsburg, a distance of 14 miles. It connects with the Dover line, thus furnishing transportation from Dillsburg and Wellsville to York.

The pamphlet report explains that the railway receipts indicate that the effect of automobile travel has been offset in the city, where satisfactory gains now appear, but that this point has not yet been reached on the suburban lines, where the decrease in riding continues. It is explained that this condition is obviously due to the extension by the state and county of the system of concrete roads and the increased use of private motor cars. The combined railway receipts show an increase of $17,000 as compared with the year 1922.

Auction Sales in New York.—At the auction rooms of A. H. Muller & Sons there were no electric railway securities sold this week.

Sale of Winona Interurban in Prospect.—Negotiations are said to be under way for the purchase of the Winona Interurban Railway by interests connected with the Interstate Public Service Company, Indianapolis, Ind. The Winona property, extending from Peru to Goshen through Warsaw and Winona Lake, is the connecting link in a through interurban route from Louisville through Indianapolis to South Bend and Chicago. The company has been in receivership for many years.

New Member on Board.—The directors of the Monongahela-West Penn Public Service Company, Fairmont, W. Va., have elected Harry Restofsky a member of the board to succeed E. Baline Moore.

Officers Elected.—The Shamokin & Mount Carmel Transit Company, Mount Carmel, Pa., at the annual meeting of stockholders elected William Kiefer, Mount Carmel, president and general manager. He succeeds E. W. Samuel. Other officers of the company vice-president, F. W. Magrady; controller and secretary J. B. McConnell, Ashland; treasurer, Fred Kiefer; solicitor, Voris Auten. The directors are: F. W. Magrady, Thomas J. Kiefer, J. Edgar Reed, Claude E. Womer, J. D. McConnell, W. A. Phillips and Fred Kiefer.

Fewer Passengers in St. Louis.—The United Railways, St. Louis, carried 318,278 fewer persons during the quarter ended Dec. 31, 1923, than for the corresponding quarter in 1922. The figures were 70,895,101 for the 1923 quarter compared with 71,213,379 in the same period in 1922. The average number of cars in use during the 1923 quarter was 1,411 on week days, 1,333 on Saturdays and 675 on Sundays. This is slightly more than for the similar period during 1922.

Railway Sells Park.—Brookside Park, between Athol and Orange, Mass., has been sold by the Northern Massachusetts Street Railway to George Donley, Orange, who for four years past has managed the park under a lease from the company. The park comprises 16 acres, with baseball diamond and amusement pavilions.

Branch Discontinuance Allowed.—Permission has been granted by the California Railroad Commission to the San Francisco-Sacramento Railroad to discontinue operation of its San Ramon branch between Saranap and Diablo. It was shown at public hearings conducted by the commission that the company was unable to finance the necessary repairs and construction work to place the line in proper working order and that its continuance would work hardship upon the company.

$4,000,000 of 6½ per Cent Bonds Offered at Par.—Alexander Brown & Sons, Baltimore, and E. H. Rollins & Sons, New York, offered for subscription at par and interest on Jan. 28 $4,000,000 of Maryland Electric Railways first and refunding 6½ per cent bonds, due Jan. 1, 1957. The utility represents a consolidation of the principal subsidiaries of the United Railways & Electric Company, which does the entire electric railway business in and around Baltimore. The bonds, while bearing the guaranty of the United Railways & Electric, are also a first mortgage on a portion of the company's properties and a direct mortgage on the balance. During the past ten years the company has never failed to earn more than 2.16 times all charges.

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Traffic and Transportation

Sentiment Favors Railway

Many Expressions of Appreciation at Atlanta of Work of Local Company Seeking Fare Advance

William Pollard, well-known Atlanta labor leader, on Jan. 23, not only advocated the proposed changes in fares for the Georgia Railway & Power Company to 10 cents, with 2 cents for a transfer, but recommended that other labor indorse them as well. Mr. Pollard's statement was made at the close of an address by H. M. Atkinson, chairman of the board of the company, before the Atlanta Federation of Trades at the Labor Temple.

Mr. Pollard declared that the railway offered the only real means of transportation the average laboring man had, and that it would indeed be most unfortunate if its ability to serve the public was reduced either by design or inadvertently. He said further that the railway was the only employer, to his knowledge, that had offered to let the public audit its books and help it find a fair way to manage its business. He said:

> Let's give the company a living wage. If there's a fairer plan, let's show it to the officers of the company. If there isn't, let's try this one out. The company has done its best to be fair with us in this matter—let's be fair to it.

Real estate men came to the rescue of the company at the third public hearing on its proposed changes in rates held on Jan. 22. They declared that only 10 per cent of the people of Atlanta had any means of transportation other than the railway and pointed out the vast amount of money paid by the company in taxes each year.

J. R. Smith, local real estate dealer; Hollins Randolph, chairman of the Stone Mountain Memorial Association, and Mr. Atkinson were the principal speakers.

Mr. Smith sprang a surprise on the meeting when he told how the real estate interests he represents had offered to build the necessary railway extensions and give them to the company in order to have cars operated to the suburbs. The railway had, however, been compelled to refuse to accept this offer, as it could not afford to operate cars on the tracks even if the property owners built them and gave them to it. He said the company should be protected against the loss of its profitable short-haul traffic to the jitneys while it is compelled, by its contracts, to haul people a distance of 15 miles in some instances for a 7-cent fare. Mr. Smith said that the company had paid more than $5,750,000 in ad valorem taxes since the present contract was put into effect, and as the largest single taxpayer in the city it was entitled to some consideration.

Mr. Atkinson spoke about the injustice of compelling the railway to pay paving taxes when it was really the jitney and the automobile that wore the paving out. He then went into the history of the paving charge from the old horse car days.

A change in fare of from 7 to 10 cents, elimination of jitneys from streets on which street cars are operating and relief from paving assessments are some of the things the railway is asking of the Council. A series of public hearings is being held in order that both the company and jitney operators may give their sides of the case.

Jacksonville Fare Issue Continued

The hearing on the application of the Jacksonville Traction Company, Jacksonville, Fla., for an increase in fares has been continued until March 4. The company has not asked for a specific increase. Meanwhile the fare will remain at 7 cents.

The chief witness for the company was C. F. W. Wetterer, vice-president. He said that the 3 per cent gross tax, the paving charges and the free rides to city employees were burdens the company should not be called upon to bear. In referring to the 7-cent fare, which was put into effect in December, 1920, he said that the number of passengers decreased 17 per cent against the estimated 14 per cent, but that the gross receipts increased. One of the main reasons given for the loss in passengers was the increase in the number of automobiles.

Charges Illegal Operation of Jitneys in Muncie

The Union Traction Company of Indiana recently started suit in the Superior Court against twenty-five owners of jitneys in Muncie, Ind. The company asked for an order enjoining the defendants from operating buses on streets upon which the tracks of the company are laid until a notice of hearing can be given for a permanent injunction.

The railway contends that all of the defendants are operating contrary to the city ordinance affecting jitneys; that they so operate their buses as to precede the plaintiff's cars until the bus has gathered the desired load; that the speed of the jitneys imperils the safety of passengers and employees on the railway, and that more than 1,000 passengers a day are carried by the buses who would ordinarily be accommodated on the street cars. The company also charges that few of the jitneys have paid either the license or the registration fee.

The company charges, in short, that the operation of jitneys on the street is an unlawful invasion of the plaintiff's franchise with the city. The company then goes on to show the contrast in the amount of taxes paid by the defendant and by the railroad company itself.

Rate Matter Settled Out of Court

The suit of the Augusta-Aiken Railway & Electric Company against the Georgia Public Service Commission was dismissed on Jan. 23 in the Federal Court at Atlanta following an agreement of counsel on both sides.

The case originated in May, 1921, when the commission ordered a reduction in rates in the territory served by the company. The company, in turn, sought an injunction to prevent the rates ordered by the commission from being put into effect.

Later Judges King, Sibley and Clayton, of the Federal Court, granted an interlocutory injunction restraining the commission from interfering with the 10-cent fare then being charged, but permitting the commission to enforce the lower light and power rate schedule as laid down by it. There the matter has rested since the granting of the injunction some months ago. Under the terms of the settlement just reached the company will charge the rates for light and power ordered by the commission, but will continue to charge a 10-cent fare on the railway.

Fare Increased.—The Hutchinson Interurban Railway, Hutchinson, Kan., has been authorized by the State Public Utilities Commission to increase its fare from 6 cents to 8 cents.

De Luxe Buses for Providence.—The United Electric Railways, Providence, R. I., will place in operation shortly after Feb. 15 on its Providence-Arctic line three Fageol safety coaches. This bus route is not new, but has now in operation buses of an older and less commodious type. A number of independent jitneys also follow this route.

Five-Cent Fare Will Continue.—The 5-cent fare on the lines of the Public Service Railway in New Jersey will continue for the present at least, although the four months trial period, which started on Oct. 1, expired on Feb. 1. The 5-cent rate was adopted by the company on Oct. 1 at the suggestion of the State Board of Public Utility Commissioners after the company had filed a tariff for a 10-cent cash fare. The company's financial report for the first two months of the period showed deficits of more than $300,000 monthly.

Additional Bus Provided.—The Twin State Gas & Electric Company on Jan. 9 began operating an additional bus from West Brattleboro to Brattleboro, Vt., due to an increase in patronage.

Bus Franchise Awaits Ratification.—The Board of Public Works of South Bend, Ind., recently approved an agreement for a ten-year franchise to the Chicago, South Bend & Northern Indiana Railway for the operation of buses subject to ratification by the Common Council. A clause in the agreement entered into by the board and the traction company provides that the buses shall operate on schedules after June 1, 1924 and shall carry no advertising on the outside of the buses other than the name of the line. The new route is from Washington Avenue and Main Street, and after passing through various streets, back to its starting point.

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Fight on Trolley Bus Routes.—The railroad and telegraph committee of the City Council of Toledo, Ohio, has approved the Fearing-Detroit Avenue route for the new cross-town line to be 5.5 miles in length and twelve trolley buses. This is the route recommended by Street Railway Commissioner Cann. Another longer route was approved by the city plan commission based upon studies made by its own engineers and investigators. The cost of the project is estimated at $157,000.

Tickets and Buses in Cumberland.—The Cumberland Electric Railway, Cumberland, Md., put two buses in operation Jan. 1 connecting with and transferring to the electric lines. The bus fare is 10 cents, which includes transfer. The transfer from the electric line to the bus costs the fare plus 3 cents additional at the transfer point. The bus line will be an experiment and, if satisfactory, additional lines will be routed to cover other sections of Cumberland to suburbs not served with traction lines. Every effort will be made to attract more passengers to patronize the cars and buses.

Announces Fare Increase.—The Cleveland & Eastern Traction Company has announced an increase in fare effective Jan. 27, subject to the approval of the Ohio Public Utilities Commission. The rate of fare from Lee Road to Chardon will be increased from 75 cents to 90 cents. The rate to Burton will be raised from 80 cents to $1 and to Middlefield it will be $1.20 instead of 95 cents. Robert D. Beatty, general manager, stated that if this did not remedy the trouble there would be an application to the Public Utilities Commission for abandonment as the revenue had not met the operating expenses and taxes.

"Front Way Out" in Williamsport.—The Williamsport Passenger Railway, Williamsport, Pa., has started a "front way out" policy. All cars now stop at the near side of all crossings. Passengers enter by the rear doors and leave by the front doors. In the past passengers were accepted at either end.

Proposes Uniform Five-Cent Fare.—A uniform 5-cent fare in the city of Providence on trolleys, buses and jitneys was proposed in a bill introduced in the House recently by Representative James H. Kiernan of Providence and referred to the judiciary committee. The proposed act directs the Public Utilities Commission to devise a system of schedules and rates and place the 5-cent fare in operation not later than July 1, 1924.

Bus Suggested to Replace Railway.—The Pacific Electric Railway Los Angeles, Cal., has applied to the Railroad Commission for a certificate to operate an auto stage service between Pasadena and Shorb in place of the electric railway service now maintained.

Changes in Bus Operation Sought.—The Jamestown Street Railway, Jamestown, N. Y., wants a new deal with respect to bus operation. The company discontinued bus service on Jan. 1 on the North and South side lines because the results were unsatisfactory. These lines are operated under temporary permits whereas the West side bus line, understood to have been profitable, is run under a franchise that does not expire for three and a half years. In order to provide adequate bus service and justify the investment of the additional capital the company wants a blanket franchise of twenty years. It also wants a 10-cent bus fare with transfer from bus to bus or bus to trolley and a 2-cent charge for a transfer from a trolley to a bus. The fare on the railway and the bus has been the same, 8 cents cash with five tickets for 35 cents.

Legal Notes

IOWA — *Time When Passenger Has Alighted Defined.*

An instruction that if, after the car stopped to permit the passenger to alight, and she had a reasonable time to do so and stepped from the car to the pavement, and, after alighting from the car and being free therefrom, she fell to the pavement and sustained injuries, the carrier would not be liable, fully and properly covered a refused instruction that the relation of carrier and passenger continued only to the time she left the car. [Mathis vs. Des Moines City Ry., 195 Northwest Rep., 620.]

KANSAS — *Operation of Unprofitable Extension of Street Car Line Required.*

A street railway company built an extension, operation of which proved unprofitable, and it was abandoned, but the company still operated by virtue of the franchise, 4.6 miles of railway. The court held that the operation of the extension may be compelled by mandamus. [City of Salina vs. Salina Street Railway, 220 Pacific Rep., 203.]

MASSACHUSETTS—*Duty of Company in Case of Crowded Car.*

Evidence showed that the plaintiff entered the car when there was ample room in it and took her seat. Later, the car became very crowded. When she left, she managed with hard struggling to get out to the vestibule, where she got pushed out of the door. The conductor was standing at his post and said nothing and did not ask if she was hurt but started the car right off. The court found this action did not show any breach of duty by the company. [Rogers vs. Boston Elevated Railway, 141 Northeast Rep., 285.]

NEW JERSEY — *Automobile Driver Not Licensed May Recover for Injuries.*

The rule established in New Jersey is that where one who is unlawfully traveling on a highway, as in an automobile which has never been registered under the statute and without a driver's license, in violation of the statute, is injured by the negligence of another, he may recover for his injuries, unless his violation of the law contributes to the accident or is its proximate cause. [Muller vs. West Jersey & S. R. Co., 122 Atlantic Rep., 693.]

NEW YORK — *Statutory Responsibility of Automobile Driver Dependent on Proper Location of Disc Sign.*

Where a disc sign, provided for by Railroad Law, Sec. 53-a, was located only 230 feet from a crossing in the open country, where physical conditions did not interfere with the location of the sign at the required distance of 300 feet or more from the crossing, the statutory duty of an automobile driver to reduce speed to a safe limit and to proceed cautiously did not attach. [Fleahman vs. Schenectady Railway Company et al, 201 New York Sup., 607.]

TEXAS—*Whether Car Split Switch Because of Street Railway's Negligence Held for Jury.*

Where a car "split" a switch, resulting in a sudden stop of the car, and a jury in the county district court held that the company was not liable for the accident, presumably on the theory that gravel from the adjacent road may have been thrown into the switch by the movement of the first truck, the Court of Civil Appeals of Texas will not interfere with the verdict. [Heck et al. vs. San Antonio Public Service Company, 255 Southwest Rep., 811.]

TEXAS — *A Construction Company Is Required to Use Ordinary Care in Placing Things on the Street Attractive to Children.*

The rule that most things can be constructed by an owner on his property without any thought of injury to children who may trespass thereon should not be extended to structures erected wholly or in part upon the public walks and streets. Hence, a seven year old child, injured while at play on cross-ties piled partly on a public sidewalk, is not guilty of contributory negligence as a matter of law. [Charles vs. El Paso Electric Railway, 254 Southwest Rep., 1094.]

UTAH—*Passenger Who Had Standing Room Elsewhere Held Contributorily Negligent in Assuming Position on Crowded Side Steps of an Open Car.*

A passenger who suffers discomfort and is injured through the carrier's fault in failing to provide adequate accommodations and protection may recover damages for those discomforts as well as for his injuries. This ruling, however, does not cover the case of a passenger who, to avoid the heat and smoke in a smoking car, where he had standing room, left it and boarded the already over-crowded side step of an open car from which he fell when the car lurched in passing over a crossing. [Taylor vs. Bamberger Electric Railway, 220 Pacific Rep., 695.]

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Personal Items

Important Transfers in Stone & Webster Organization

David Daly, formerly district manager of the Middle West group of properties under Stone & Webster executive management, has been elected president of the Blackstone Valley Gas & Electric Company, Pawtucket, R. I.

Samuel B. Tuell, formerly district manager Houghton County Electric Light Company and Houghton County Traction Company, Houghton, Mich., has been made district manager of the Middle West companies in place of Mr. Daly, these including the Mississippi River Power Company, Keokuk Electric Company, Keokuk, Iowa; Fort Madison Electric Company, Fort Madison, Iowa; Paducah Electric Company, Paducah, Ky., and also the Houghton companies above mentioned.

Walter H. Burke, who has been manager of the Keokuk Electric Company, has been appointed manager of the Houghton County companies.

Walter M. Bird, formerly manager of the Fort Madison company, succeeds Mr. Burke as manager of the Keokuk company.

Philip M. Wentworth, formerly assistant manager of the Truckee River Power Company, Reno, Nev., has been appointed manager of the Fort Madison company.

H. U. Wallace Appointed to Knoxville

H. U. Wallace has been appointed assistant general manager of the Knoxville Power & Light Company, Knoxville, Tenn. He goes to Knoxville from Little Rock, Ark., where since early 1923 he has fulfilled the duties of assistant general manager of the Arkansas Central Power Company.

Mr. Wallace is the personification of activity, having at various times with untiring energy given his best to many utilities, including the Western Light & Power Company, the Chicago, Lake Shore & South Bend Electric Railway and the Fort Dodge, Des Moines & Southern Railway. His earliest well-known connection was with the Illinois Central, which he served in the rôle of superintendent and chief engineer from 1894 to 1905. He then branched off in private consulting work, only to return to the utility game as general manager of the Chicago, Lake Shore & South Bend Interurban. While he served the Fort Dodge, Des Moines & Southern Company he supervised the completion of the electrification of that line, which was part electric and part steam. Mr. Wallace was again in the limelight in 1912 upon his acceptance of the post of vice-president and general manager of the Western Light & Power Company. Here he remained until 1918, when he joined the army as Major of Engineers. He left the service on April 1, 1919, engaging in private practice until his appointment early in 1923 as assistant general manager of the Little Rock Railway & Electric Company.

Harry Reid Heads C.E.R.A.

President of Indianapolis-Louisville Interurban Elected at Indianapolis to Direct Work of Association

Harry Reid, outstanding progressive among interurban men of the central territory, was elected president of the Central Electric Railway Association at its meeting in Indianapolis on Jan. 25. Mr. Reid is best known as president of the Interstate Public Service Company, which operates a high-speed interurban line between Indianapolis and Louisville and an extensive system of light and power properties in this territory, but he is also president of the Kentucky Utilities Company, supplying gas and light and power to a group of Kentucky communities.

Harry Reid

The activities of Mr. Reid's companies have frequently been the subject of articles in this and other publications, since he has been in a measure pioneering in the central territory through his work of developing the lines now operated as one system between Indianapolis and Louisville. This development has included the installation of high-speed modern passenger cars, the inauguration of a very successful and rapidly growing freight business, the general modernization of the property, and more recently the inauguration of club-dining car service, with sleeping cars on order for installation within the next few months.

Mr. Reid is distinctly one of the doers in the utility business. He has surrounded himself with an active organization which is succeeding in developing a rapidly increasing business in all departments. He has been active in both the national railway and power associations as well as the state and sectional associations in his territory and is one of the most popular of the executives in the central district. He was recently made a member of the executive committee of the American Electric Railway Association.

Mr. Reid was born in Johnstown, N. Y., on Dec. 31, 1879. He entered the utility field at the age of twenty-one years as cashier with the Fulton County Gas & Electric Company, Johnstown. He served that company in every capacity except manager until 1907, when he went to Kentucky and located at Versailles, where he bought and rebuilt the electric lighting system. Completing this, he followed up his work by syndicating a number of utility properties in that territory. Out of these operations grew the Kentucky Utilities Company, with offices in Lexington. Mr. Reid was vice-president and general manager of this company. In 1916 the offices of this company, then owning and operating thirty-six utilities in Kentucky, were moved to Louisville. Meantime, Mr. Reid had succeeded in interesting the Insull interests in this territory and the Kentucky Utilities Company became a part of the Insull holdings and Mr. Reid was made president. Later the properties which now are comprised in the Interstate Public Service Company were purchased and Mr. Reid became president of that company in 1917.

Undoubtedly one of the strongest reasons for Mr. Reid's success in the utility business has been his keen sense of the interests of the public. He is steadily aiming to provide a superior service and that policy is responsible for the return the public is giving in the way of growing business.

New Officers Named for Pittsburgh Railways

Thomas Fitzgerald, who has been acting for the Philadelphia Company in connection with the handling of that company's interests in the Pittsburgh Railways, has been appointed general manager of the Pittsburgh Railways.

Frank R. Phillips, long associated with the Pittsburgh Railways as superintendent of equipment, acting manager and general manager under the receivers, has been appointed mechanical and electrical engineer of the company.

William H. Boyce, now with the Beaver Valley Traction Company, has been appointed commercial manager of the Pittsburgh Railways.

Announcement of these appointments was made on Feb. 1 following the lifting of the receivership that day.

George Kuhn, acting superintendent of equipment of the International Railway, Buffalo, for the last five months, has been appointed to the position permanently. He will report to H. L. Mack, vice-president of engineering.

A. M. Farrell, formerly traffic manager of the Eastern Wisconsin Electric Company in Oshkosh under B. W. Arnold, who recently resigned in order to assume the management of the motor coach department of the Chicago, North Shore & Milwaukee Railroad, has been placed in charge of the street and interurban railway properties of the company in Oshkosh. He will work under M. H. Frank.

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Fred E. Schornstein, whose resignation from the Eau Claire property was referred to in the ELECTRIC RAILWAY JOURNAL for Jan. 19, will join the Adirondack Light & Power Corporation at Schenectady, N. Y.

Obituary

Henry St. Clair Putnam

Henry St. Clair Putnam, well-known consulting engineer of New York, died Jan. 30. His most important work in the electric railway field was that which he did for his firm in connection with the electrification of the Manhattan Elevated Railroad, New York, the system of the Interborough Rapid Transit, that city; the Hudson & Manhattan Railroad, operating under the river between New York and New Jersey, and the Westchester & Boston Railroad, a high-speed electric line on a private right-of-way extending out of New York into Westchester County. More recently Mr. Putnam had turned his attention to the possibilities of the moving platform. He was president of the Continuous Transit Company, which installed a demonstration plant in Jersey City, described in the ELECTRIC RAILWAY JOURNAL, issue of Nov. 24, 1923.

Mr. Putnam was a man of unusual talents. He was educated in both law and science, but after engaging for a short while in the practice of law. he turned to engineering. He first served with the Thomson-Houston Electric Company. He next turned to the manufacture of arc light carbons and served with the Thomson-Houston Carbon Company, the Brush Carbon Company and the American Carbon Company. Later he established himself as a consulting electrical engineer in Chicago, where he worked from 1896 to 1900. He then removed to Philadelphia, where he remained for two years. Following this he entered into partnership with L. B. Stillwell forming the firm of Stillwell & Putnam, with which he remained from 1902 to 1922. He was also consulting engineer for the Hoosac Tunnel electrification of the New Haven Railroad.

Charles Kilgour, vice-president of the Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio, died Jan. 18. Mr. Kilgour was an electrical engineer and after he was graduated from schools in the East he became associated with the Thomson-Houston Company of Lynn, Mass., which later became the General Electric Company. He remained with that concern until he retired from active business some years ago. Mr. Kilgour had been making his home in Ripley, N. Y., for the past five years. The Toledo, Bowling Green & Southern Traction Company, of which Mr. Kilgour was vice-president, is owned by Cincinnati interests. Mr. Kilgour was fifty-eight years old. He was the son of John Kilgour and brother of Bayard Kilgour, both of whom have long been prominent in traction affairs in Ohio.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Equipment Makers Doing Well

Prosperity Among Them is General—Laconia Car Being Put on a Firm Basis

Preliminary reports in which estimates are made of the earnings of the makers of railway equipment of all kinds indicate that such companies generally had a very good year during 1923. Moreover, it has been shown that a considerable quantity of business has been carried over into 1924 and that plants generally are booked ahead for fairly long periods. Best of all, no diminution is being shown in the amount of new business coming in.

All this has been reflected in the market price for the equipment shares. On the whole, these prices have climbed steadily in accordance with the increase in their intrinsic worth until some record high prices of recent years have been made. On the other hand, there have been one or two sensational advances in the quoted price of securities based on reports of consolidations or purchases that have not materialized.

Naturally the makers of equipment have been enabled in consequence of the steadily increasing volume of their sales, materially to strengthen their financial position. In the car building field one of the companies that has perhaps been helped most by the uninterrupted demand for manufactured articles is the Laconia Car Company. In consequence the officers of that company have under way a plan of readjustment of the capital of the company which it is thought will take care of its financial needs for some time. For the past three years the business of the company has been good and prospects appear ahead that would justify the resumption of dividend payments. The credit of the company, however, and the limited working capital have been such that it was hardly practical to consider this until some means had been found for raising the money necessary to pay the present accumulated dividends on the preferred stock.

Part, at least, of these dividend accumulations of $700,000 on the preferred stock could be paid in cash, but it has been deemed wiser not to deplete the company's working capital. In lieu of the payment of the accumulated dividends in cash it has been proposed that preferred holders be given an additional 10,000 shares of common stock and that the right be reserved to them to convert their preferred stock into common stock on the basis of one share of preferred for four and one-half shares of common if converted within ninety days from the date the plan is declared operative, or for four shares if converted later. It was voted by the stockholders on Jan. 25 to put this plan

ELECTRIC RAILWAY MATERIAL PRICES—JAN. 30, 1923

Metals—New York

Copper, electrolytic, cents per lb.	12.687
Lead, cents per lb.	8.025
Nickel, cents per lb.	28 00
Zinc, cents per lb.	6.837
Tin, Straits, cents per lb	48 25
Aluminum, 98 to 99 per cent, cents per lb.	27.50
Babbitt metal, warehouse, cents per lb.:	
Fair grade	52.00
Commercial	25.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$5.75
Somerset mine run, Boston	2.25
Pittsburgh mine run, Pittsburgh	2.00
Franklin, Ill., screenings, Chicago	1.875
Central, Ill., screenings, Chicago	1.45
Kansas screenings, Kansas City	2.25

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$43.00
Standard open hearth rails, gross ton	43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	3.10
Tie plates (flat type), cents per lb.	2.575
Angle bars, cents per lb.	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.125
Steel bars, cents per lb.	2.40
Ties, white oak, Chicago, 6 in.x8 in.x8½ ft.	$1.70

Hardware—Pittsburgh

Wire nails, base per keg	3.00
Sheet iron (28 gage), cents per lb.	3.85
Sheet iron, galvanized (28 gage), cents per lb.	5.00
Galvanized barbed wire, cents per lb.	3.80
Galvanized wire, ordinary, cents per lb.	2.75

Waste—New York

Waste, wool, cents per lb.	.15
Waste, cotton (100 lb. bale), cents per lb.:	
White	12–18
Colored	9–14

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), per gal.	$0.94
White lead (100 lb. keg), cents per lb.	11.60
Turpentine (bbl. lots), per gal.	$1.03
Car window glass, (single strength), first three brackets, A quality, discount*	84.0%
Car window glass, (single strength), first three brackets, B quality, discount*	86.0%
Car window glass, (double strength) all sizes, A quality, discount*	85.0%
Putty, 100 lb. tins, cents per lb.	4–6

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb.	15.375
Rubber-covered wire, No. 14, per 1,000 ft.	$6.65
Weatherproof wire base, cents per lb.	17.00

Paving Materials

Paving stone, granite, 4x8x4, f.o.b. Chicago, dressed, per sq.yd.	$3.60
Common, per sq.yd.	3.20
Wood block paving 3½, 16 treatment, N. Y., per sq.yd.	2.56
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots	54.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.75
Cement, Chicago consumers' net prices, without bags	2.20
Gravel, ¾-in., cu.yd., f. o. b. N. Y.	2.00
Sand, cu.yd., N. Y.	1.25

Old Metals—New York and Chicago

Heavy copper, cents per lb.	10.50
Light copper, cents per lb.	9.50
Heavy brass, cents per lb.	6.00
Zinc, old scrap, cents per lb.	4.25
Yellow brass, cents per lb. (heavy)	6.00
Lead, cents per lb (heavy)	7.25
Steel car axles, Chicago, net ton	$19.25
Old car wheels, Chicago, gross ton	20.75
Rails (short), Chicago, gross ton	20.75
Rails, (relaying), Chicago, gross ton	33.50
Machine turnings, Chicago, net ton	10.25

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into effect just as soon as substantially all the stock had been deposited.

It might appear at first sight that the details just recited are of primary interest to the holder of Laconia shares. As a matter of fact they are, but behind them the larger story is reflected of the increased prosperity of the equipment makers as a whole.

First Month of 1924 Fortifies Confidence in Business Outlook

Events at the turn of the year have further fortified confidence in the business outlook. Buying is still generally conservative, but conditions in most branches of business do not call for heavy inventory accumulations. Nevertheless, activity in some lines is exceeding most expectations. No less an authority than the Guaranty Trust Company, New York, points out that the most significant feature of recent prices in this country is the comparative steadiness of their average, despite a slight net decline in 1923, as compared with a more pronounced increase in the preceding year.

Another factor to which commentators on the economic trend refer is the progress made toward the resumption of customary relationships between prices, since the early reactions from the swift decline in 1920-21, represents a cumulative strengthening of the bases of economic well-being. In the absence of a sharp general movement in either direction, further correction of remaining disparities may be expected. And neither in the banking and currency situation nor in the state of industry and trade is there indication of a coming general disturbance of prices.

A revival of price inflation in consequence of the large gold supply, which was so freely predicted, has not appeared. The reserve holdings of gold, however, are greatly in excess of legal requirements, and in a sense they do make possible an inflation of bank credit. On the other hand, the administration of the banks gives no indication that the present gold stocks will be treated as if they were expected to remain indefinitely around present levels. With the persistence of a wholesome restraint upon any tendencies toward inflation of credit and prices, there is preserved also a powerful potential check upon influences tending to depress prices. When the expected redistribution of gold does begin, the reduction of stocks in this country will probably be effected gradually with a corresponding gradual reduction in the American level of commodity prices.

Automotive Car Division Formed by Brill Company

The J. G. Brill Company has formed the automotive car division, with C. J. McPherson, sales manager, to take care of the increased demand for the gasoline rail car. All renewal part business for cars of this type now in service and other types of these cars for steam railroads, ranging from the thirty-passenger six-wheel type of the Model 55, with a maximum seating capacity of fifty-five, will also be handled by this division. The company purchased the railroad motor coach division of Service Motors, Inc., Wabash, Ind., some months ago, with exclusive rights for the production and sale of the type of gasoline rail car heretofore known as Service Model 55 Railroad Motor Coach.

Rolling Stock

Pittsburgh Railways, now that the receivership has been lifted, will spend $3,000,000 for new rolling stock under the terms of the plan of the reorganization.

Worcester Consolidated Street Railway, Worcester, Mass., during 1923 spent $72,000 for snow sweepers and dump cars.

Pacific Northwest Traction Company, Everett, Wash., has ordered three buses of twenty-eight-passenger capacity each, for use on the company's lines between Mount Vernon and Everett.

Georgia Railway & Power Company, Atlanta, Ga., in its budget for 1924 has included the purchase of twenty new cars.

Cincinnati, Newport & Covington Railway, Covington, Ky., will request authority for the purchase of twenty cars of the double-truck type of its board of directors. The announcement was made by General Manager Harton at a recent conference of the city commissioners of Covington. Mr. Harton said that the additional equipment would improve the company's service in northern Kentucky about 30 per cent. Approximately $250,000 will be appropriated for the purchase of the new cars.

Milwaukee Northern Railway, Cedarburg, Wis., has purchased a parlor car to be one of the sections of the Lake Shore Limited. This is the third of this type the company has in use.

Virginia Railway & Power Company, Richmond, Va., has purchased two additional Brill trolley buses with G. E. equipment. The buses will be of the same general type as are now operating in Petersburg.

Menominee & Marinette Light & Traction Company, Marinette, Mich., has purchased a Reo bus of thirteen-passenger seating capacity for use between Marinette and Park Mills.

Track and Line

New Orleans Public Service, Inc., New Orleans, La., plans an expenditure of $1,586,000 in 1924 on rerouting of tracks and unification of gage.

British Columbia Electric Railway, Vancouver, B. C. has announced a program of capital expenditures this year amounting to $5,000,000. The proposed railway improvements amount to $600,000.

Pacific Electric Railway, Los Angeles, Cal., has been authorized by the State Railroad Commission to construct a spur track at grade across 100th Avenue near Sawtelle, Los Angeles County.

Baton Rouge Electric Company, Baton Rouge, La., has started work on a 3-mile extension. This line will serve several thousand people in the suburbs beyond the Standard Oil Company's refinery.

Seattle Municipal Railway, Seattle, Wash., is being urged by the Duwamish Commercial Club to double track its lines from the city limits to the end of the South Seattle car lines.

Walla Walla, Wash.—The Oregon-Washington Railway & Navigation Company has been authorized by the Interstate Commerce Commission to build 3 miles of electric railway from Umpaine to connect with the Walla Walla Valley Railway's line, owned by the Northern Pacific system. The electric line will be extended 2 miles southwesterly from Milton to form the connection, and the 5 miles will be jointly owned and operated by the two companies to serve a large fruit district. The connection will be completed early in the coming summer.

Pacific Northwest Traction Company, Bellingham, Wash., through Harry B. Sewall, manager, announces that in 1924 it will spend $450,000 in extensions and improvements in Whatcom and Skagit Counties. Of this sum $140,000 will go for power extensions; $60,000 for a steel bridge to replace a wooden structure at Hibridge over Chuckanut Creek in Whatcom County; $160,000 for rebuilding or filling in the interurban trestle at Clayton Bay; other expenditures will cover grading and ballasting of filled areas, new transformers and meters, ties and gas plant improvements.

Trade Notes

Connecticut Company, New Haven, Conn., has awarded a general contract to the Tuscon Steel Company, Youngstown, for the erection of a steel carhouse on Pratt Street, Meriden. The new structure will be a one-story building 20 ft. x 126 ft.

Lathrop & Trotter is the new firm name of the Cincinnati representatives of the Conveyors Corporation of America, Chicago, Jay C. Lathrop having associated with himself L. E. Trotter. The offices of the firm are 733 Union Trust Building, Cincinnati. The new firm will handle the sale of American steam jet ash conveyors, American air tight doors, cast iron storage tanks and other power plant equipment in Cincinnati and the surrounding territory.

McClellan & Junkersfeld, Inc., announce the removal of their home office to 68 Trinity Place, New York, effective Feb. 1, 1924. This firm, engaged in engineering and construction, has offices in Chicago, Philadelphia and St. Louis.

Link Belt Company, Chicago, has further reduced the price of its portable belt conveyor. It claims that this reduction has been made possible by increase in production and consequent lowering of costs.

New Advertising Literature

Roller-Smith Company, New York, N. Y., has issued Bulletin No. 400, on direct-current switchboard instruments.

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New York, February 9, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 63
Number 6

Modernizing Plea Is Taking Hold

IT WAS good to note at the recent meeting of the Central Electric Railway Association that the agitation which has been made by the leaders of the industry for displacing obsolete with modern equipment and otherwise modernizing railway service is really beginning to take serious hold. Even some of the "old timers," whom one would expect to be among the last to see the need for a change, were very plain spoken about the kind of transportation that is being dispensed by many companies. This is indeed encouraging and it presages even more activity of a modernizing character this year than during 1923, good as that was. For the money can be had if the management has the will to progress, unless the railway is one of those that should never have been built.

A Treacherous Way to Make a Market for Buses

FEELING exists here and there that attempts are being made to coerce electric railway companies into buying out existing bus lines, or to force them to buy new buses to anticipate a rival installation. Some may think that to get a certificate or franchise and start a bus line, whether there is any prospect of its paying or not, with the idea of selling out to the railway company which will want to buy to avoid competition, offers good opportunity to make some easy money. It may work in a few instances, but it is certainly a treacherous practice that must soon come to grief.

In our present state of regulation and organization in the electric railway field, and with the opportunity which the bus affords to fight fire with fire, it seems almost incredible that much headway could be made in such a nefarious way of going into the bus business, or indirectly, of selling buses. Yet some railway men have had cause to give serious thought to this matter, and attention is directed to the matter for what it is worth. It comes to the attention of this paper again this week in a letter from a railway executive, from which we quote:

> I am very much concerned with some evidences I have recently seen of blackmailing attempts on the part of certain bus manufacturers, or by those who are undoubtedly in their employ. I think the bus people should be given clearly to understand that while future sales opportunity is with present street railway companies, this field must develop naturally as the legitimate demand for buses arises, and not through some forcing processes along blackmailing lines.
>
> I can well remember fifteen years ago in certain states where utilities were not commission controlled that it was one of the favorite outdoor sports of some fly-by-night promoters to apply for a franchise for a light and power service under some pretext, which, if secured, could be peddled at a good profit to the company already in the field. I know that there are certain interests now exploiting and getting ready to exploit the street railway field. . . .

Such a course would reflect a most shortsighted policy on which to build business, and it would hardly be undertaken by any responsible bus manufacturer who expected to remain in business.

Akron Company Had No Other Course but to Cease Operation

AKRON, rubber city of 200,000 population, has been without trolley service since Feb. 1. Having completely discharged its contract obligations, the Northern Ohio Traction & Light Company ceased operation with the expiration of its franchise at the close of Jan. 31. Throughout all the war period and the five years of high operating costs since, the company has continued to provide service at the pre-war 5-cent rate with universal free transfer.

It has done even more. In spite of continuing losses, it has shown its good faith by purchasing many fine new cars and by augmenting the railway lines with bus routes, in order to provide Akron with good, up-to-date transportation. It has not deferred these improvements, nor maintenance, as many companies have done, until the city was signed up to a satisfactory adjustment of the fare. It has gone ahead, confident in the fairness of the public when it came to understand the conditions.

Meantime it has done a splendid piece of public relations work and has succeeded in winning a generous measure of support from most of the civic and business and social organizations and from the thinking public in general. It has told its story in a constructive, friendly way, and has seemingly convinced every one of the justice and necessity of its requirements except the public authorities and the large foreign labor element.

Repeatedly, a settlement of the fare question had all but been made, and then in the final vote or veto, politics has prevailed over the best interests of the public and a square deal for the railway. Having been put off and betrayed in these negotiations during the past several years, the company could have no assurance that any other treatment would ensue, were it to comply with the Mayor's recent requirement that service be continued for three months longer at a 5-cent fare while the matter was debated.

The company had no other course but to shut down. There was no reason for it to continue longer to operate its cars at a loss. It had no recourse to the courts. The state commission has no jurisdiction over the utilities of any Ohio city. It has not even been able to afford the company any relief from the jitney competition which the city has permitted in spite of the monopoly-implied franchise to which it has held the railway. Furthermore, the Mayor was elected on a 5-cent platform. So there was nothing to do but shut down.

Jitneys did not provide a satisfactory substitute

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service in New Jersey, Des Moines, Saginaw or Toledo. There is no better prospect that they can do so in Akron. In fact, operating conditions are much more severe in Akron on account of the heavy grades. While the unorganized, haphazard operation of heterogeneous buses will not be a true test of the bus, nevertheless, any real bus company would be even more foolhardy than the railway to take a franchise at a universal 5-cent fare with free transfer. This is entirely aside from the very serious question to Akron of whether buses could possibly handle the service in a city of this size.

Hence, the question is: How long will it take for public sentiment to assert itself and force the Mayor and city council to come to their senses and do what is truly for the best interests of the city. Perhaps the nickel could be retained as the basic fare, if transfers were abolished and the fare made to apply for the ride from any point to or from the center of the city. By this is meant that the conductor would collect a nickel as the passenger enters the car while inbound to the downtown section. Outbound he would collect a nickel as the passenger leaves the car. The few passengers who ride through the downtown section from one side of the city to the other would pay two fares for the ride. This is the simplest application of the zone fare principle.

It is believed such a fare plan would provide the company with sufficient revenue and let the Mayor out on his 5-cent fare pledge.

Business and Sentiment— There Must Be Progress

AN "OLD TIME" railway operator—one who has grown up from the ranks—was asked whether he ever thought it advisable to shake up his supervisory force. "It probably would be advisable," said he, "but I haven't the heart to do it. These men have grown up with me. They are faithful pluggers and even if they are not abreast of the modern idea of railroading they will be safe in their jobs as long as I am here. Some day, no doubt, a new man will take my place, one without any sentimental connections with the past. He will weed out the 'dead ones' in the organization and the good results will be very evident."

There is much truth in this philosophizing of an "old timer." We have seen it worked out on more than one property. Our sympathy, like that of the operator quoted above, is with the men who have given their best years to any job. They, perhaps, were promoted on their merits in the past. Time came when they fell behind in the modern pace. It would seem heartless to dismiss them so as to make way for men more efficient. If pensioning arrangements had been made this would not be necessary. However, in many cases positions might be found for them elsewhere on the system where they would not stand in the way of property development.

It is a subject worth thinking over because many a manager is up against the competition of motor bus companies and other organizations which are starting fresh with a very aggressive personnel. If a study of supervisory forces reveals stagnant situations, the sooner they are cleaned out the better. A railway executive owes a duty to his employers which is just as important as the sympathy he may feel for old timers down the line.

One Stock Dividend that Does Not Indicate Swollen Profits

STOCK dividends by public utilities, and particularly by electric railways, are so rare that particular interest attaches to the plan approved on Feb. 6 by the stockholders of Brooklyn City Railroad to pay a stock dividend of 33⅓ per cent. Offhand, the public thinks of swollen profits, concealed assets, and all the other things that often are played up when distributions of this sort are made.

To get a true picture of the situation it is necessary to get the perspective furnished by the history of this road. It always has been a profitable enterprise, being favorably located. The long-haul business in Brooklyn naturally goes to the rapid transit lines, so that the average ride per passenger is not as great as on other surface properties in large cities. Also, the management is notably enterprising and efficient and the Borough of Brooklyn is developing rapidly in prosperity and population.

Incorporated in 1853, it never has had financial difficulties of its own. In 1893 it was leased for 999 years to the Brooklyn Heights Railroad, which later became part of the Brooklyn Rapid Transit System. The value of the property is indicated by the terms of the lease, the lessee assuming operation and agreeing to pay all taxes, organization expenses and fixed charges, and also a guaranteed rental of 10 per cent on the capital stock amounting to $12,000,000. This, of course, was passed on to the stockholders in 10 per cent dividends. This rental was paid, except for an adjustment for a claim against the company, continuously until the receivership of the B.R.T. in July, 1919. The owners of the Brooklyn City Railroad sued for possession of their property, and it was returned to them on Oct. 19, 1919.

Following the resumption of independent operation, the management found it essential to spend a large amount of money for improvements and additions. There was a good deal of deferred maintenance and a shortage of rolling stock when the property was turned back. On account of the financial situation, particularly since the company had been associated with the other Brooklyn roads, it was decided to plow back the earnings into the property. Accordingly no dividends were paid after that of July, 1919, until December, 1922, when payments at a rate of 8 per cent were resumed. Three dividends were paid at this rate, and Sept. 1, 1923, the 10 per cent dividends were again paid.

In this period of suspended dividends more than $4,000,000 was spent for rolling stock and $600,000 for track reconstruction and roadway improvements, chargeable to capital account. This amounts to 38 per cent on the $12,000,000 of stock. Had dividends been paid at the 10 per cent rate continuously, the amount received by the stockholders in cash would have been 34 per cent. Instead they are to receive additional stock amounting to only 33⅓ per cent. As it works out the market price of the stock on Feb. 6 was 13¼ (par 10), so that the cash value of the stock dividend was slightly below 33⅓ cents on the dollar. The stockholder, however, has been forced to wait for this distribution, and has had no return on his investment for over three years. The market price of the stock naturally fell considerably below par. Furthermore, the guarantee of payment has been abolished, so that instead of being a gilt-edged investment the stock must now take its place with others whose dividends fluctuate with their earnings.

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Plotting City Schedules

A New Method Is Suggested by Which the Schedules of an Entire System May Be Seen at One Time—By the Use of Colored Threads and Beads the Effect of Various Changes Can Easily Be Visualized

By Charles Rufus Harte
Construction Engineer the Connecticut Company

SO LONG as the electric railway furnished the only practicable means of general mass transportation, the public was perfectly satisfied with a schedule of operation which showed a reasonable regard for local requirements; if the service met the opening and closing hours of the chief industries and connected with the important trains, the rest of the car movements could be arranged to suit working conditions of the railway employees rather than anything else. With the advent of the automobile, however, the situation was materially changed. The owner of a car could step into it at almost any moment, ride downtown much faster than on the trolley, and be landed at the door of his office or place of business. That the cost of such movement was greatly in excess of the cost of the trolley ride; that the time absorbed in parking the car, and the time lost due to the fact that the man could read on the trolley ride down, but could not do so when driving his own car, generally ate up the apparent saving, was not usually appreciated, and if appreciated was almost never appraised at full value.

So long as the number of automobiles was comparatively small this trend received little notice, but the quantity production of a number of low-priced cars and their employment in competition with the trolley suddenly called attention to what promised to become a most serious condition. The public apparently not only found little use for the trolley as a means of transportation but was quite unconcerned as to how unfair might be the competition with it.

The growing appreciation of the short-sightedness, not to say the economic crime, of thus virtually wrecking what every real test has shown to be a most essential utility is steadily eliminating the irresponsible "jitney" and is equalizing the conditions of competition by the more legitimate bus lines. But there are in the latter service elements of convenience and speed which are rightfully characteristic of such service which the trolley must meet, not by attempting restrictive legislation but by producing at least as attractive transportation. Today quite a little work is being done along these lines.

One trouble in connection with the problem is the difficulty of getting a—so to speak—moving picture of the car relations of the entire system, if the latter is anything more than a single line. The zigzag diagram, made up on a chart with time measured horizontally and distances vertically, or vice versa, is admirable for the single route. It is not well adapted, however, to the combination of two or more routes, nor, when the writer some time ago was called upon to make a study of certain operating conditions, could he find any information regarding such a scheme.

As one result of that study there was developed, very largely by Harold Bates, principal assistant to the writer, the diagram here described, which it is believed does give just such a picture.

Briefly, the diagram consists primarily of a single broken line plan of the territory under consideration, preferably to scale, although this is not essential. Indeed, in most cities, the trackage in the center must be on so large a scale that it would be impossible also to have the outlying trackage on a sheet of reasonable size unless it is shown diagrammatically and greatly shortened. These broken lines are referred to as the route lines. At each junction point, and at other important points there are drawn "clocks," or lines of equal length, divided into sixty equal parts. Each clock is placed with its center point on its route line and perpendicular to the latter. Operations in both directions can be shown on one diagram, but if there are many movements it will usually be found more convenient to plot, say, all north and west movements on one sheet, and all south and east movements on a separate one.

To plot the operation it is necessary to know the time at which any car of a route leaves the starting point, the headway and the running time between some of the more important points. If the operating speed varies materially in different parts of the territory, it is essential to know when cars are due at the beginning and at the end of each of these parts. As it will shortly appear, with this information at hand determination of the corresponding facts for any point between is easily made.

To set up the facts, a start is made at one end of a route, and there is marked on the clock at that point the time at which one of the cars leaves, one end of the clock being taken as the even hour, and the route line being at the half hour. The times at which the same car passes each of the successive clocks to and including the one at the other end of the line are then marked in their proper places, and a line, the car line, is drawn connecting them. The plotting of the movement of that group of cars is then completed by drawing parallel lines separated by the headway, as measured by the clocks. If, now, at any point between clocks a similar movable scale is placed at right angles to the route line with its center upon it, the times at which the cars are due at that point are shown by the intersection of the "car lines" with that scale. Moreover, if a line is drawn through the same point of each clock, its intersections with the several car lines indicate the points where the cars represented by those lines should be at that time, and if map pins are set at these points, a "still" picture is given of the route as it should be at that particular moment.

Effect of Schedule Change Easily Found

Another use of the chart is possible, if it is mounted on a board and colored threads are employed to represent the time lines and car lines, and colored beads sliding on the car-line threads are used to represent the cars. Then if these beads are slid along the

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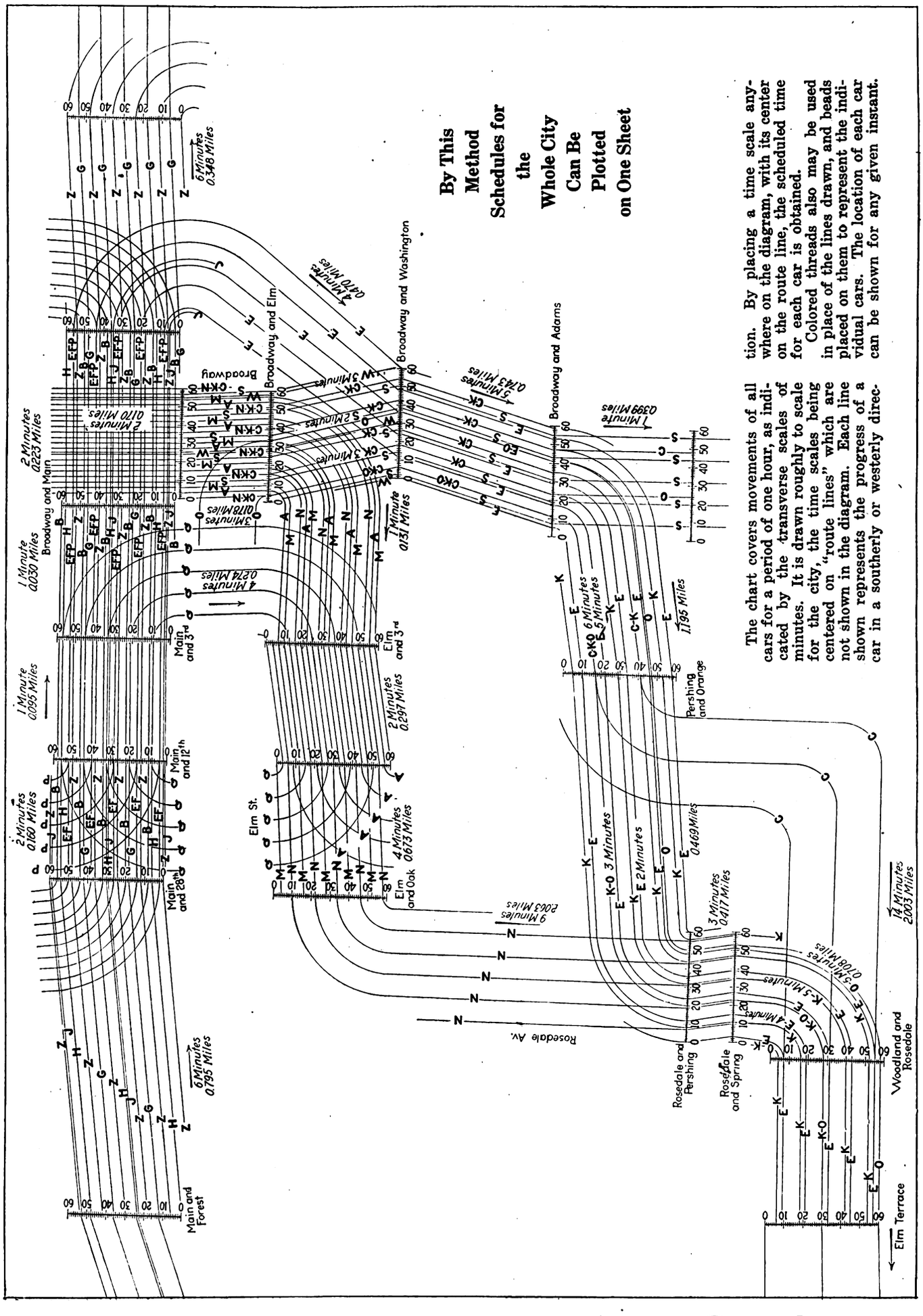

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car-line threads to the intersections of these threads with the time-line threads or clocks, the effect of any change in speed, headway, or starting time can be readily studied, or shown to those citizens who are always sure they can materially better schedules but do not always realize that a change of time at one point on a route may result in serious bunching elsewhere. Again, if these beads are slid along to points at which it is desired to have them at the times represented by the time lines through them, and then car lines are drawn through the beads, there will be indicated the schedule between those points necessary to obtain the desired result.

Perhaps the best way to show the plan is to take a specific case. The diagram shown represents south and west movements at the date the diagram was being developed. It does not show the route lines, which were in pencil on the tracing, but were erased after the clocks had been located, because it was thought with so many car lines they were apt to cause confusion. Later it was found that by the use of a broken line, this difficulty could be obviated. It was also found desirable to line up the clocks on the route lines, and at turns to put clocks at both ends of the curves, and to take the distances between clocks, disregarding the lengths of the curves.

An Application Described

Starting at the Broadway loop going south it will be seen that the suburban O line cars, operating on thirty-minute headway, pass Broadway and Elm at three minutes and thirty-three minutes past the hour, the first one being on the same time as the first C and K cars after the hour. The C and K cars, however, are on twelve-minute headway, so that the second O car, going south at thirty-three minutes past the hour at Broadway and Elm, is midway between two Cs and two Ks. At Pershing and Orange, where the C line branches off, the O cars pass at seventeen and forty-seven minutes past; at Pershing and Rosedale the times are twenty and fifty, and at Woodland and Rosedale, when the C cars return to the main line, the O cars are at twenty-eight and fifty-eight, the C which was on the same time as an O at the start now being, because of the longer run, at thirty-one.

It will be seen that between Broadway and Adams, and Pershing and Orange, the cars are evenly spaced, except for the O suburban line on thirty-minute headway, while at Woodland and Rosedale they are in groups with three and nine minute intervals. This very clearly shows a local situation. The E cars do not run so directly to the shopping district as do the Ks and Os; as a result, they are not quite so popular and can make a little better time. By bunching them at the outer end of the line the drag on K and O, due to their more frequent and longer stops, effects an even spacing in the shopping district where this is particularly desirable. The gain in running time of the E cars over the other cars, during the outer part of their run, due to their higher speed, is clearly shown in the chart.

Obviously, fully to understand any situation, all the facts must be known. Every case has its real "local conditions" which, as in the instance given, may make it desirable to "bunch" at one point in order to obtain better conditions at points of greater traffic and importance, and these conditions often change quite suddenly. The schedule of today, for the lines shown, is very materially different from the diagram, which was of the spring of 1919. The scheme, however, seems to give a very satisfactory method of studying the effect of such changes in conditions, and of changes in schedule to meet them, and as some little inquiry has on the one hand indicated quite a little interest in the diagram, and on the other has failed to show anything like it, it is here described in the hope it may prove of value to the industry.

U. S. Census Figures for 1922 Show Gains for Electric Railway Industry

THE preliminary figures of the electric railway census for 1922 as compared with 1917 show a decrease of 2 per cent in track mileage and an increase of 5.7 per cent in the number of passengers carried. Gross railway operating revenues amounted to $925,477,485 in 1922, an increase of 42.3 per cent as compared with 1917; operating expenses increased 61.1 per cent, while net income made a gain of only 1 per cent.

The energy generated in 1922 aggregated 6,440,380,325 kilowatt-hours, and in addition 5,926,421,203 kilowatt-hours were purchased by electric railway companies. Of this energy 3,250,828,351 kilowatt-hours were sold for light and power purposes, for which revenue to the amount of $90,046,953 was received.

The difference in the number of electric railway companies as shown by the census and the number listed in the ELECTRIC RAILWAY JOURNAL for Jan. 6, 1923, can probably be accounted for by different methods of classifying subsidiaries and controlled companies. The fact that the statistics in the JOURNAL covered the electrified mileage of steam railroads, which was not included in the census report, probably accounts for the difference in the mileage figures. The same explanation no doubt holds good concerning the number of cars. In regard to the number of electric locomotives, it appears likely that the greater total shown by the census includes also motor freight cars which are used for hauling trail cars, the difference being one of nomenclature rather than of actual numbers. The figures are given in detail in the accompanying table.

	1922	1917	Per Cent of Increase 1917–1922
Number of operating companies	†857	943	* 9.1
Miles of single track operated	‡43,904.80	44,808.31	* 2.0
Number of cars, all types	99,855	102,603	* 3.3
Number of electric locomotives	404	357	13.2
Number of persons employed	300,523	294,826	1.9
Salaries and wages	$445,680,135	$267,240,362	66.8
Primary horsepower, total	4,161,221	4,200,192	* 0.9
Kilowatt capacity of generators	2,969,104	2,924,779	1.5
Energy generated, kilowatt-hours	6,440,380,325	7,240,502,789	*11.1
Energy purchased, kilowatt-hours	5,926,421,203	4,947,348,042	19.8
Passengers carried	§15,331,401,801	14,506,914,573	5.7
Revenue car mileage	2,124,443,362	2,139,801,530	* 0.7
Railway operations, revenues	$925,477,485	$650,149,806	42.3
Railway operations, expenses	$678,563,107	$421,250,838	61.1
Net revenues, railway operations	$246,914,378	$228,898,968	7.9
Auxiliary operations, revenues¶	$91,241,607	$59,675,286	52.9
Auxiliary operations, expenses	$49,232,061	$31,343,816	57.1
Net revenues, auxiliary operations	$42,009,546	$28,331,470	48.3
Net operating revenues	$288,923,924	$257,230,438	12.3
Taxes assignable to railway operations	$64,788,315	$45,756,695	41.6
Operating income	$224,135,609	$211,473,743	6.0
Non-operating income	$32,329,229	$20,282,948	59.4
Gross income	$256,464,838	$231,756,691	10.7
Interest and other deductions from gross income	$199,453,934	$175,305,761	13.8
Net income	$57,010,904	$56,450,930	1.0

* Denotes decrease.

† Reduction due to mergers and to companies which have discontinued operations.

‡ Excludes 27.06 miles of track in both years located in Canada but owned by companies operating in the United States.

§ In addition there were 16,118,165 passengers carried by 370 motor buses operated by electric railway companies.

¶ Chiefly revenues from electric light and power departments of electric railways.

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Pass Increases Earnings 6 per Cent

Santa Barbara, Tourist City of 30,000, Has Had Weekly Pass for Twelve Months and Has Had 25 per Cent Increased Riding

BY W. E. ERWIN
Superintendent Santa Barbara & Suburban Railway, Santa Barbara, Cal.

THE weekly pass was inaugurated on the lines of the Santa Barbara & Suburban Railway, Santa Barbara, Cal., Dec. 11, 1922, after the approval of the Railroad Commission of the State of California.

The pass is sold for $1 and permits unlimited riding between Sunday midnight and the succeeding Sunday midnight and is transferable. Passes are placed on sale Friday prior to the week for which they are valid and remain in the hands of the car operators until the following Wednesday. Pass sales at present are averaging about 635 per week, or one pass for every forty-five population.

Santa Barbara is primarily a tourist city. Its regular population of 30,000 is augmented during the summer and winter months by a great many transient visitors. It has no industrial and manufacturing plants and the street railway is not called upon to serve heavy peak loads so common to cities of such character. Distances from the business center are short, and the tendency to walk or accept the invitation of some friendly automobilist was impelling when the cost of the street car ride was 8 cents cash or 7-cent ticket fare purchased in strips of five coupons. These fares were approved by the State Railroad Commission and went into effect Nov. 1, 1920, and immediately resulted in a definite loss of patronage with but a slight increase in gross revenues.

Facing such problems as these, the management decided to install the weekly pass, which has now been in operation for twelve months. The Santa Barbara & Suburban Railway operates 100 per cent safety cars. In addition it operates three Moreland safety coaches into territory not served by the street railway lines and used to supplement and feed the lines of the railway. Passes are sold and accepted for transportation on the bus lines and transfers issued between buses and street cars. Ninety-five per cent of all passes are sold by car operators and bus drivers, who are enthusiastic as to the pass as it greatly speeds the traffic and lightens the burden of fare collection. The color of the pass card is changed weekly, and in addition to this a large numeral designates the week during which it is valid.

With the public there is no question as to its popularity. Car riding has increased 25 per cent and gross earnings 10 per cent, of which at least 6 per cent is directly attributable to the pass, without additional operating expense. In other words, the car riding index since the installation of the pass has been raised from 68.6 in 1922 to 86 in 1923.

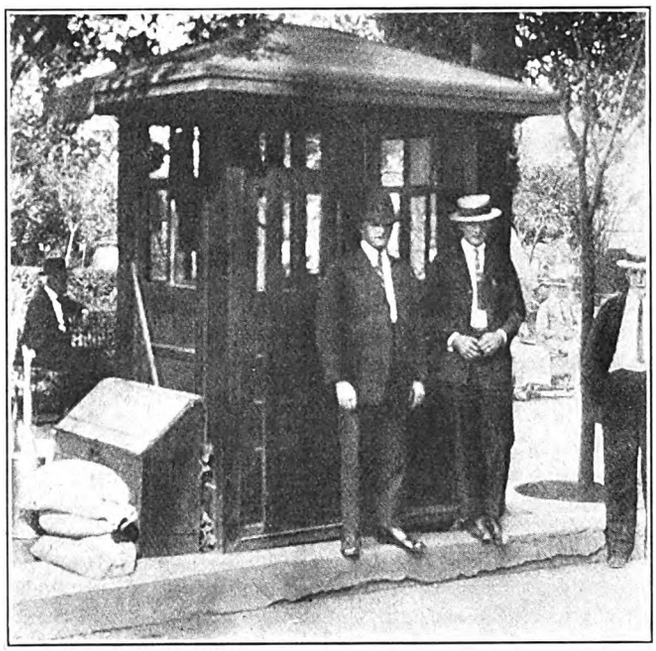
The proportionate revenues derived from the different forms of fare are: 8 cents cash, 40 per cent; 7-cent ticket, 38 per cent, and weekly pass, 21 per cent. The traffic represented by these three forms of fare is as follows: 8 cents cash, 32 per cent; 7-cent ticket, 34 per cent, and weekly pass, 33 per cent. Accurate account of pass riders is kept daily and represents 3.89 pass rides per day per pass. As the longest car ride is 3¾ miles, it has been approximated that the pass rider averages less than eight blocks per ride.

The pass has naturally produced a lower revenue per revenue passenger ride since its installation, as the revenue per revenue passenger during the year prior to its installation was 7.19 cents, while at present it is 6.1 cents. Further analysis of fare earnings shows that regular patrons who formerly purchased 7-cent tickets now use the pass. This has resulted in a decrease of 27.4 per cent in this form of fare, while the 8-cent cash fare shows a gain of 10 per cent, which no doubt proves that the pass rider does not ride alone during off-peak periods.

The management is well pleased with this form of fare and believes it has increased the good will of its patrons, as the demand for lower cash fares has subsided.

Dispatcher's Booth Serves as Information Bureau*

ON THE lines of the El Paso Electric Railway an inspector is constantly on duty at the downtown plaza. His duty is not only to dispatch the car, but also to serve as an information bureau and guide to the public and tourists seeking assistance. His headquarters are in a booth, which is equipped with telephone, fire extinguisher, block and tackle for picking up trolley wires, rubber gloves and, for the convenience of the public, a map of the city and a city directory. This booth is shown in the accompanying illustration. Several booths of similar type are installed at various places in the city.



The Booth Is Equipped with Telephone and Accessories for Use in Emergencies

The merit and bonus system of the Los Angeles Railway, whereby a Christmas bonus of $60 a year, based on a rate of $5 per month, is granted to trainmen who have a specified standing on the merit system, as described in past issues of this paper, has been extended by the award of additional prizes, ranging from $10 to $100, to top-notch trainmen in each division.

*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.

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Combined Shop and Carhouse for Small Property

Fireproof Construction, Open Pit, Inclosed Paint Shop, Overhead Traveling Crane and Abundant Daylight Are Features of the New Oshkosh Shop—Details of Construction Are Given

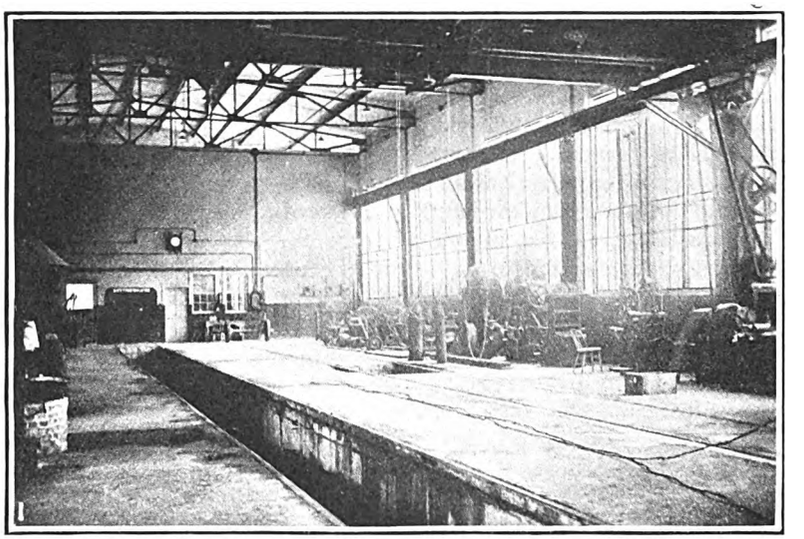
TO REPLACE the old frame shop and carhouse destroyed by fire, the Eastern Wisconsin Electric Company has recently completed a building of fireproof construction upon the site of the old structure in Oshkosh, Wis. In designing this new plant considerable thought was given to the various features of overhaul and repair incident to the successful maintenance of cars in order that these duties might be performed with a minimum of labor and time. While providing adequate machinery and equipment for this work, the fact was not lost sight of that the building must also serve as a carhouse for the storage and cleaning of the cars during the night.

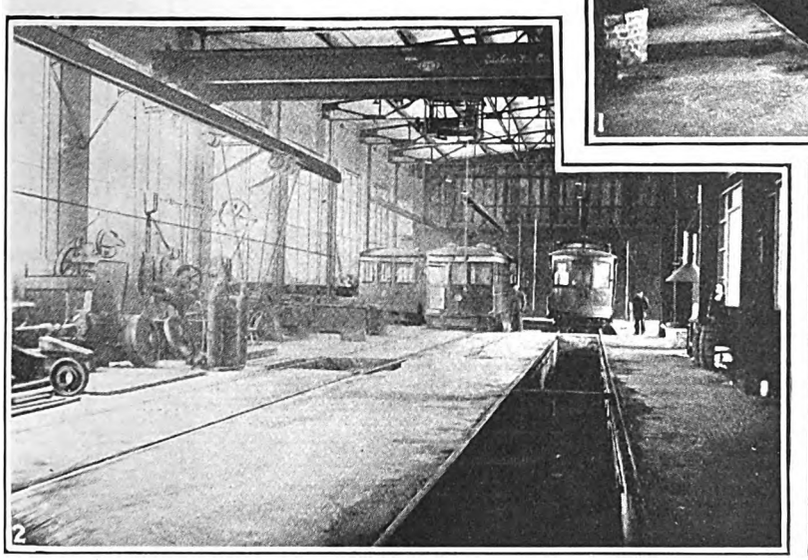
Details of Construction

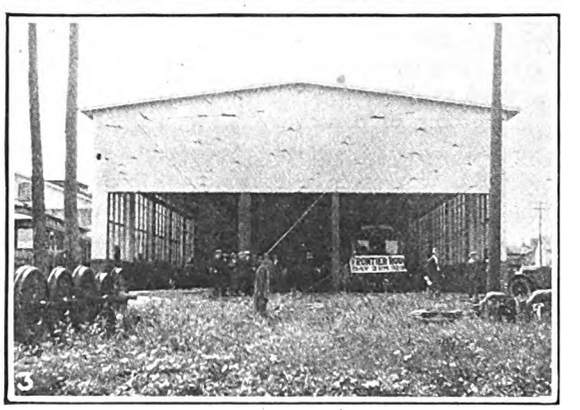
The building has a concrete floor and brick rear and side walls below the windows. The roof and side walls above the windows are of hemlock planking. The floor, of reinforced-concrete construction, is broken up into several sections by the pits, of which there are seven, located at various points throughout the layout.

One 4-ft. pit extends the length of the building. The front 60 ft. of this pit is widened to 22 ft. and extends from 1 ft. on one side of track No. 2 to 1 ft. on the opposite side of track No. 3, as seen in the accompanying floor plan. The track, as well as the floor between these two tracks, is carried on a steel I-beam structure so designed as to leave the space between the rails of each track free from obstruction. As is the case on the outside tracks, the intervening floor is carried only to within 1 ft. of the rails. This main pit, located, as it is, just inside of the entrance doors, is used for inspection and general under-rigging repairs which can be made without removing the part from the car. The elongated single track pit previously referred to is used for the general overhaul and repairs to the cars such as necessitate the use of a traveling overhead crane. Four other single-track pits, which vary in length from 6 ft. to 12 ft., are located at advantageous points on each of the other tracks in order that repairs or inspections may be carried on without waiting for space over the main pit.

The building itself is divided into two sections, one of which is approximately twice the size of the other, by a line of structural steel columns which serve as a support for the rail on which one end of the overhead traveling crane runs. Advantage has been taken of this







No. 1—New Oshkosh Shop Showing the Arrangement of Machinery Along the North Wall. No. 2—Cars in Position Over Inspection Pits. The Traveling Crane and Rolling Steel Doors at Front of Shop Are Seen. No. 3—Extensive Use of Windows in Side Walls and Galvanized Corrugated Iron Sheeting Above the Rolling Steel Door Openings

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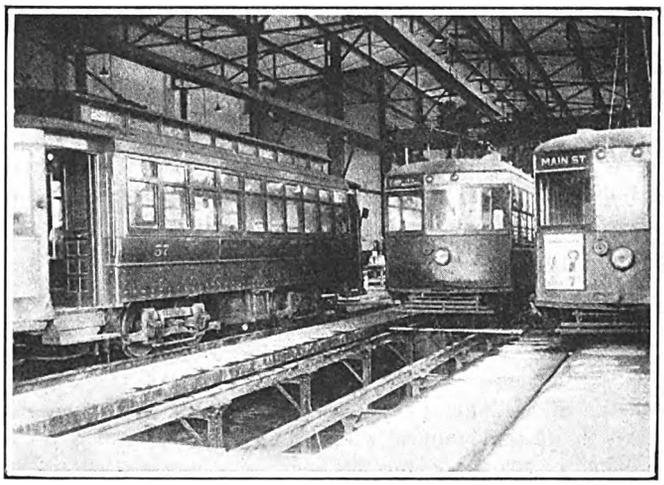


Open Pit Construction Employed in Oshkosh Shop and Carhouse

division to inclose a portion of the smaller section by means of wood framing and sash, to form a paint shop with provision for handling two cars. Double swinging doors at one end of this inclosure provide entrance from the main shop.

The roof construction is of single-span, gable-type design using angles as members of the fabricated truss, and channels with a bolted nailing strip as purlins to which the 2-in. plank roofing is secured. The trusses are spaced 19 ft. 10½ in. center to center, and are supported on brick pilasters built up from the foundation. Save for these 4-ft. pilasters, of which there are nine on each side, both sides of the building for the entire length of 200 ft. are glazed from 6 ft. above the ground level to within 5 ft. of the roof with 10-in. x 14-in. clear glass panes. The sash which hold this glass are of wood construction and stationary.

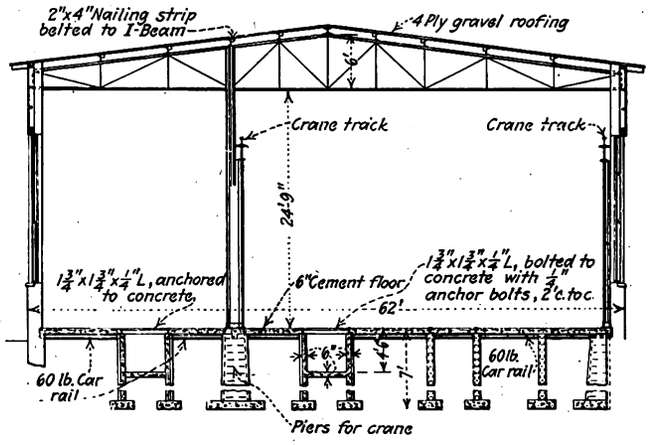
In the rear of the building a section 20 ft. 6 in. is partitioned off from the shop proper by a brick wall and is further subdivided into an office, armature room, and stockroom. In an adjoining building on the south side of the main shop are located the boiler room and wash room.

Five tracks enter the shop through the west opening, which is free from obstructions save for the two steel guides which hold the three rolling steel curtains in position when they are down. These curtains, the widths of which are 25 ft., 23 ft., and 13 ft., respectively, are 19 ft. high. Above them corrugated galvanized iron completes the wall construction to the roof.

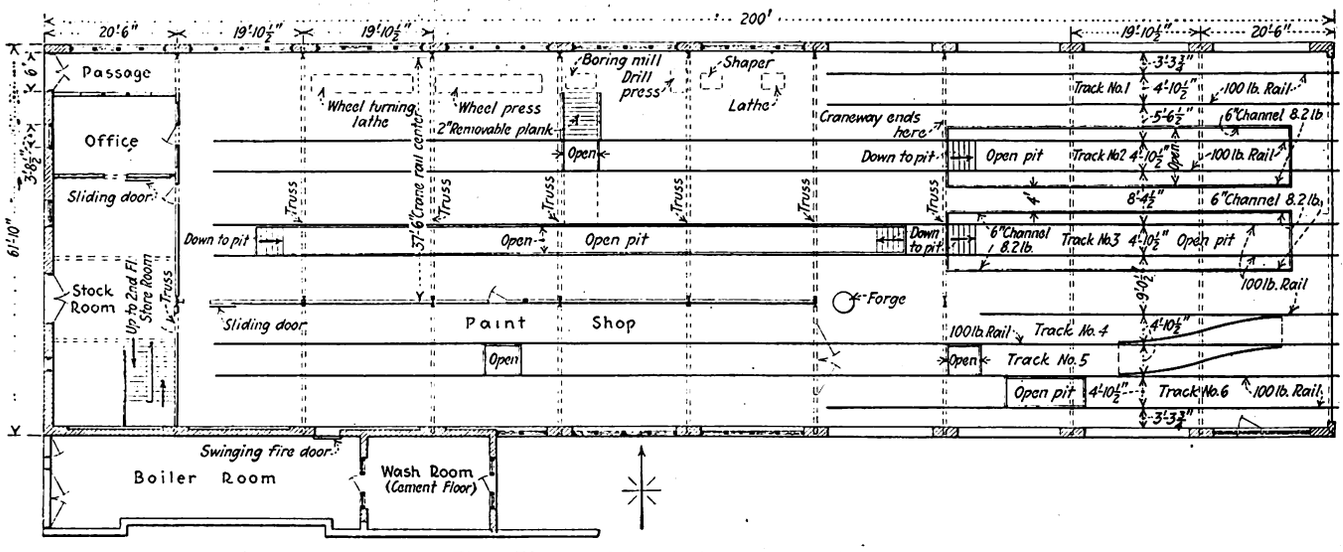
Extending approximately two-thirds the length of the shop is the 37-ft. 6.-in. craneway on which a 15-ton electrically-propelled single-hook crane operates. The 40-lb. crane running rail is supported by a 20-in. I-beam mounted on 8-in. H-sections at the outside wall and upon the built-up structural steel columns at the inside end of the runway.

The machine tool equipment installed in the new Oshkosh shop and inspection house consists of a wheel-turning lathe, wheel press, wheel-boring machine, shaper, 28-in. engine lathe, emery wheel, and drill press. These machines are located along the north wall of the building in the space which would be occupied by track No. 1 if it were extended into the craneway. The wheel press and wheel lathe have individual motor drive, while the remainder of the machinery is driven by a single motor through countershafting mounted on brackets secured to the wall columns. The traveling crane serves all of these machines and the routing of a pair of wheels through the shop for turning is simplified by this arrangement. A small hand forge is provided to the right of the entrance to the paint shop, while a work bench occupies the corresponding position on the other side of the room.

An innovation in small property shops is the sanitary, up-to-date washroom provided for the employees. Here complete equipment is provided for cleaning up after doing dirty work under the cars. White en-



Cross-Section of Oshkosh Shops Shows Pit Construction



Floor Plan of Oshkosh Shop and Carhouse

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amel bowls, showers and basins give the workman an opportunity to refresh himself before leaving the shop.

While ample light is provided during the daylight hours for the usual work upon the car bodies and roof, each pit is supplied with light circuits with numerous drop cords for inspecting the under-rigging of the car. General night illumination is provided in the form of three 100-watt shaded lamps in each bay on a level with the lower member of the roof trusses. Painting of the ceiling and walls and the sprinkling of lime on the floor are great aids in the general illumination of the interior.

The cost of this construction for a building 200 ft. long by 60 ft. wide by 31 ft. high from the ground to the peak of the gable was $50,000. This included the laying of the rails and the steel structure incident to supporting the tracks over the open inspection pit near the entrance. The equipment outlined, and which is shown in the accompanying photograph, was purchased for $24,000. This includes the cost of the 15-ton, 37-ft. span crane.

Average Ride Is 1.65 Miles

Traffic Survey on Surface Lines for Four Most Populous Boroughs in New York Shows that Rides Average Less than 1¾ Miles

THE accompanying tables give some of the figures obtained as the result of a traffic count in New York City made during October and November, 1921, under the direction of the New York Transit Commission. About 200 employees of the various divisions of the commission were engaged in this work, which comprised all of the surface lines in the city with the exception of those in Richmond Borough.

The public had been prepared for the survey by printed notices in English, Yiddish and in Italian, which were posted in the cars for a few days prior to the time when the count was taken on that line. These notices explained why the count was being undertaken by the Transit Commission, and passengers were requested to answer the questions of those conducting the count.

These men were employed on each car—one to time the operation of the car, because the survey included the question of speed of the car as well as direction of travel of the passengers. The two other representatives distributed and collected the inquiry slips.

The questions asked on this slip were five in number and were essentially as follows:

1. On what car line did you begin this trip and at what street corner?
2. At what street corner did you get on this car? (This answer would be the same as to No. 1, only if the passenger was not a transfer passenger.)
3. At what street corner do you expect to get off this car?
4. At what street corner on a car line is your final destination, and what is that line, i.e., surface, elevated or subway?
5. On this car did you pay a cash fare, a 2-cent transfer, or a free transfer?

Surveys were made of every line in the four boroughs mentioned for one day on each line, and usually for nine round trips. Three of these trips were selected in the morning rush hours, three in evening rush hours and three in the middle of the day. The inquiry blanks were in two colors, so as more easily to distinguish those used during workward travel hours and those used during homeward travel hours. The total number of slips used on each line varied according to the travel. On the important lines from 1,000 to 2,000 slips were collected, and on one line there were 2,391 slips used. The total for the entire period was 122,725.

The main purpose of this count was to determine the direction of traffic flow in the city. For this reason the city was divided into 135 sections, and the tabulation of the slips was conducted to determine not only

AVERAGE RIDES ON STREET SURFACE LINES OF ALL COMPANIES OPERATING IN MANHATTAN, BRONX, BROOKLYN AND QUEENS DURING OCTOBER-NOVEMBER, 1921

Operating Company		Workward			Homeward			Average Ride Workward and Homeward Combined
Number of Lines	Name	Number of Replies	Total Length of Lines in Miles	Average Ride in Miles	Average Ride in Miles	Total Length of Lines in Miles	Number of Replies	
13	New York Railways	5,633	50.440	1.215	1.183	50.263	6,076	1.199
2	New York & Harlem R. R.	868	10.025	1.197	1.089	10.045	986	1.143
2	Second Avenue R. R.	977	13.975	1.399	1.487	13.975	1,010	1.443
1	Eighth Avenue R. R.	470	9.570	1.457	1.393	9.480	482	1.425
2	Ninth Avenue R. R.	670	10.530	1.320	1.283	10.530	748	1.302
4	Third Avenue Railway	2,608	23.975	1.563	1.578	23.965	2,522	1.571
4	Dry Dock, E. Broadway & Battery R. R.	1,367	12.308	1.422	1.249	12.303	1,351	1.335
1	Belt Line Railway Corporation	366	1.795	0.831	0.789	1.795	346	0.810
4	42nd St. Manh. & St. Nicholas Ave. Ry.	1,731	16.596	1.329	1.238	16.596	1,744	1.284
33	Totals for Manhattan	14,690	149.214	1.308	1.259	148.952	15,265	1.284
18	Union Railway	6,889	58.001	1.396	1.382	58.001	6,373	1.389
1	Southern Boulevard R. R.	473	5.050	1.328	1.677	5.050	429	1.502
1	Westchester Electric R. R.	237	1.205	0.853	0.840	1.205	321	0.846
1	Yonkers Railroad	340	1.375	1.374	1.362	1.375	392	1.368
6	N. Y. City Interborough Ry.	2,814	25.700	1.542	1.600	25.700	2,859	1.571
27	Totals for Bronx	10,753	91.331	1.405	1.421	91.331	10,374	1.413
33	The Brooklyn City R. R.	12,174	142.301	1.598	1.670	142.301	12,719	1.634
3	Brooklyn Heights R. R.	914	3.063	1.006	1.007	3.063	929	1.006
9	Bklyn, Queens Co. & Suburban R. R.	3,417	41.249	1.791	1.826	41.249	3,345	1.809
5	Coney Island & Brooklyn R. R.	2,207	28.565	1.797	1.997	28.565	2,300	1.897
1	Coney Island & Gravesend Ry.	188	3.223	1.531	1.521	3.223	149	1.526
17	Nassau Electric R. R.	6,899	77.251	1.649	1.651	77.251	7,051	1.650
3	South Brooklyn Ry.	497	7.522	1.132	1.151	7.522	417	1.141
1	Van Brunt & Erie Basin R. R.	202	1.390	0.909	0.896	1.390	269	0.903
1	Manhattan Bridge 3-Cent Line	356	2.018	1.755	1.712	2.018	354	1.734
73	Totals for Brooklyn	26,854	306.582	1.596	1.647	306.582	27,533	1.621
12	New York & Queens County Ry.	4,006	60.013	2.346	2.448	60.013	4,383	2.397
2	Long Island Electric Ry.	936	15.510	2.818	2.980	15.510	865	2.899
3	New York & Long Island Traction	1,238	16.746	3.616	3.979	16.746	1,318	3.797
1	Manhattan & Queens Traction	507	10.460	4.234	4.657	10.460	533	4.446
18	Totals for Queens	6,687	102.729	2.715	2.885	102.729	7,099	2.800
151	Grand totals for four boroughs	58,984	649.856	1.632	1.669	649.594	60,271	1.650

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AVERAGE RIDES ON STREET SURFACE LINES IN MANHATTAN AND BRIDGE LOCALS DURING OCTOBER-NOVEMBER, 1921

Lines		Workward			Homeward				Average Ride in Miles Workward and Homeward Combined
No.	Name	Number of Replies	Terminal	Length in Miles	Average Ride in Miles	Average Ride in Miles	Length in Miles	Terminal	Number of Replies	
1	Broadway—7th Ave.	687	South Ferry	5.050	1.096	1.095	4.990	59th St. & 7th Ave.	646	1.096
2	8tn St. Crosstown—E. 10th St. Ferry	254	Christopher St. Ferry	2.280	1.067	1.055	2.250	E. 10th St. Ferry	419	1.061
3	14th St. Crosstown	414	W. 23rd St. Ferry	3.270	1.513	1.316	3.303	Clinton & Delancey Sts.	448	1.414
4	7th Ave.—Delancey St.	263	Clinton & Delancey Sts.	4.346	1.601	1.282	4.3663	59th St. & 7th Ave.	363	1.442
5	Columbus—Lenox Ave.	496	65th St. & Columbus Ave.	4.580	1.468	1.520	4.580	146th St. & Lenox Ave.	443	1.494
6	8th St. Crosstown—Delancey	361	Christopher St. Ferry	2.498	1.176	1.227	2.401	Clinton & Delancey Sts.	315	1.202
7	23rd St. Crosstown	727	W. 23rd St. Ferry	2.083	0.953	0.951	2.083	E. 23rd St. Ferry	718	0.952
8	Lexington Ave.	582	Bowling Green	8.600	1.451	1.292	8.580	131st St. & Lex. Ave.	772	1.372
9	116th St.	247	106th St. & Amst. Ave.	2.275	0.987	1.026	2.275	116th St. & E. River	226	1.006
10	Sixth Ave.	372	South Ferry	5.280	0.875	0.926	5.260	59th St. & 6th Ave.	426	0.900
11	Spring & Delancey St.	192	B'way & Spring St.	1.208	0.779	0.856	1.208	Lewis & Delancey Sts.	150	0.818
12	34th St. Crosstown	475	E. 34th St. Ferry	2.350	1.069	1.029	2.350	W. 42nd St. Ferry	482	1.049
65	Lexington—Lenox Ave.	563	23rd St. & Lex. Ave.	6.620	1.761	1.809	6.620	146th St. & Lenox Ave.	668	1.785
Total	Thirteen lines, N. Y. Rys.	5,633		50.440	1.215	1.183	50.263		6,076	1.199
13	4th & Madison Ave.	687	City Hall	8.305	1.725	1.457	8.325	135th St. & Mad. Ave.	827	1.591
15	86th St. Crosstown	181	86th St. & C. Park W.	1.720	0.668	0.721	1.720	E. 92nd St. Ferry	159	0.695
Total	Two lines, N. Y. & H. RR.	868		10.025	1.197	1.089	10.045		986	1.143
16	Second Ave.	503	B'way & Worth St.	7.725	1.485	1.466	7.725	129th St. & 2nd Ave.	590	1.476
17	First Ave.	474	B'way & Astor Pl.	6.250	1.313	1.508	6.250	125th St. & 1st Ave.	420	1.410
Total	Two lines, 2d Ave. R.R.	977		13.975	1.399	1.487	13.975		1,010	1.443
19	Eighth Ave. R.R. Co., Total	470	Cort. St. & Wash. St.	9.570	1.457	1.393	9.480	159th St.-Polo Grounds	482	1.425
21	Ninth Ave.	341	Canal & Wash. St.	6.370	1.315	1.238	6.370	116th St. & Amst. Ave.	425	1.277
22	53rd St.	329	53rd St. & 7th Ave.	4.160	1.324	1.328	4.160	B'way & 125th St.	323	1.326
Total	Two lines, 9th Ave. R.R.	670		10.530	1.320	1.283	10.530		748	1.302
24	Broadway—145th St.	359	145th St. & Lenox Ave.	2.580	1.301	1.356	2.580	181st & B'way.	478	1.329
25	Broadway—Kingsbridge	535	125th St. & E. River	6.780	1.957	2.053	6.770	225th St. & B'way	623	2.005
26	3rd and Amsterdam Ave.	1,390	Post Office	12.540	1.893	1.847	12.540	193rd St. & Amst. Ave.	1,062	1.870
27	125th St. Crosstown	324	125th St. & E. River	2.075	1.102	1.058	2.075	Ft. Lee Ferry	359	1.080
Total	Four Lines, Third Ave. Ry.	2,608		23.975	1.563	1.578	23.965		2,522	1.571
28	Avenue B	363	Post Office	4.720	1.170	1.306	4.720	59th St. & 1st Ave.	475	1.238
29	Grand St.—Brooklyn	324	Debrosses St. Ferry	3.169	1.887	1.003	3.175	W'msb'g Bridge Plaza	324	1.445
30	Grand St. Crosstown	292	B'way & Grand St.	1.360	0.684	0.775	1.360	Grand St. & E. River	256	0.729
31	Post Office—Brooklyn	388	Post Office	3.059	1.945	1.911	3.048	W'msb'g Bridge Plaza	296	1.928
Total	Four Lines, Dry Dock, E. B'way. & Batt. R. R.	1,367		12.308	1.422	1.249	12.303		1,351	1.335
32	59th St. Crosstown—Belt Line Ry.	366	54th St. & 10th Ave.	1.795	0.831	0.789	1.795	1st. Ave. & 59th St.	346	0.810
33	Broadway Branch	692	42nd St. & 3rd Ave.	8.260	2.046	1.775	8.260	181st. & B'way.	613	1.911
34	10th Ave. Branch	426	W. 42nd St. Ferry	4.910	1.505	1.395	4.910	12th Ave. & 125th St.	544	1.450
35	42nd St. Crosstown	409	42nd St. & E. River	1.940	1.029	0.959	1.940	W. 42nd St. Ferry	393	0.994
36	110th St. Crosstown	204	3rd Ave. & 110th St.	1.486	0.735	0.824	1.486	125th St. & Hancock Pl.	194	0.780
Total	Four Lines, 42nd St., Manhattanv. & St. Nicholas Ave. Ry.	1,731		16.596	1.329	1.238	16.596		1,744	1.284
Grand Total	33 lines in Manhattan	14,690		149.214	1.308	1.259	148.952		15,265	1.284
98	Brooklyn Bridge Local	240	Park Row	1.174	1.174	1.174	1.174	Term. B'ldg.—Sand St.	235	1.174
100	Wmsb'g Bridge Local	659	Delancey & Essex St.	1.541	1.536	1.531	1.541	W'msb'g Bridge Plaza.	659	1.534

the average length of ride on each line, but also the extent of traffic movement from each of the 135 sections to each of the other sections. From these records data are available for rerouting to accommodate changes in the traffic flow.

Two tables made up as a result of this count are presented, one of companies in the four boroughs and the other of a number of the individual lines in Manhattan Borough. It will be noticed in the former that the shortest rides are in Manhattan Borough and next in the Bronx, then Brooklyn and Queens. It will also be noticed that the average ride in Manhattan is a little more than 1¼ miles. This includes the ride on a transfer.

Of course, one reason for the much shorter ride on the surface cars in New York than in other cities is that for long distance travel persons in New York use the rapid transit lines.

The last general survey of this kind made by the New York Transit Commission in New York, though not so extensive as the one just mentioned, was conducted in 1908. At that time the average ride in the different boroughs did not vary greatly from that shown in the recent count.

Theaters and Interurbans Co-operate

A ROUND trip fare of one and one-half or one and one-quarter the regular one-way rate is being offered by some of the interurban railways operating out of Indianapolis, Ind., to passengers who desire to come into Indianapolis to attend the theater. The special rate is made good only on the last two trips before theater time and returning that night. A point in making this special rate effective only on the before-theater or before-dinner trains is that local merchants in outlying towns cannot claim that the interurban is offering special inducements to local residents to take their merchandise business into the city.

An innovation in connection with this low-rate theater transportation is that the management of the Shubert-Murat Theater in Indianapolis has added a traveling representative to its staff, whose time is spent in the rural communities to organize theater parties. This theater representative spends six days a week in these small towns and travels entirely on the traction lines. He tries to cover two or three towns a day. After arranging a theater party, he makes all arrangements for a special car, if this is needed.

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Co-ordination of Bus and Trolley

Ten Kinds of Desirable Co-ordinated Service Between Trolley and Bus Are Listed and the Possibilities of Each Are Pointed Out—The Bus Is Yet in Its Early Stages and Further Progress Is to Be Expected

By J. A. Emery
Ford, Bacon & Davis, Inc., New York

THE co-ordination of bus and railway services is proclaimed to be the desired answer to the question of the future of city transportation, but aside from some generalities there seems to be no definition of co-ordinated service, and there has been little advance in working out concrete practical plans of co-ordination.

Co-ordination means primarily the avoidance of destructive competition. This is a negative virtue and, of course, a good one, but the main point is that the bus can be made a tremendous help to any electric railway in its business of community transportation and particularly in keeping the conveniences of public modes of travel on a high enough plane to prevent the drift to privately owned vehicles.

The place of the bus as co-ordinated with electric railways is commonly considered to be on routes where the traffic is too light to warrant railway construction. Such locations are generally in the outskirts of cities, and such routes act largely as feeders to the railway.

As a feeder the bus's function is to concentrate traffic to such a degree of density that it can be handled economically by railway lines. In projecting feeder lines, it is not necessary that the feeder be wholly self-supporting, if a profitable fare is obtained on the main line. Railways can in certain cases afford to subsidize bus feeders or to run them at some loss.

While feeder service is a most important use of the bus, there are many other uses fully as important existing in the territory of practically every electric railway. Some of these co-ordinated uses are:

1. Express or local service, jointly with railway lines.
2. Supplementing the service on single-track railway lines, where the railway headway cannot be reduced to meet the demands of traffic.
3. Supplementing the railway carrying capacity in the rush hours.
4. On new routes within the more thickly settled districts, say within 2 miles of the business center, designed to serve districts not contiguous to the railway lines, to supplement the railway through this zone of maximum loading and to reach important delivery points which it is not practicable to reach by direct railway routes.
5. To serve important traffic points like large factories, where waiting cars would obstruct the track and where the greater flexibility of the bus would permit it to make two or more rush-hour trips as compared with one by car.
6. As a substitute for the railway on lines where the track is worn out and the construction of new track is not warranted, or on lines which do not earn operating expenses.
7. For quality service. There is a real demand in all cities for higher priced service than the street cars can afford to give.
8. For pleasure riding. This is one of the most important fields for the bus.
9. For special chartered service.
10. Emergency service.

Express and Local Service

On streets where the railway headway is four minutes or less an effective combination of bus and railway service may be obtained by running one facility, preferably the bus, for local service, permitting the railway cars to run without stops.

From the public standpoint this plan has some great advantages. In particular the railway serves to collect passengers in the outer and intermediate residential zones and then to carry them quickly through the more congested inner zones to the business center. At the same time the passengers in the inner zones are convenienced because the cars as usually operated are crowded through the inner zones and the local service gives them space of their own. There is a further advantage in that in the inner zones, where the vehicle traffic is heavy, it is much safer and pleasanter for passengers to get on or off at the curb, as may be done with the bus.

While individual lines operating on four-minute headway are not common outside of large cities, there are many cases where two or more lines converge on one street at a distance of 2 or 3 miles from the business center, giving a total service of fifteen or more cars per hour. With joint railway and bus operation, bus local service would have to be at least as frequent as ten cars per hour, and the railway service could hardly be reduced below twelve, making a total of twenty-two units per hour to be operated as compared with fifteen. However, the railway speed would be increased by fully 20 per cent, reducing the number of cars in operation on the section by 20 per cent, and the cost of operation of a one-man bus is substantially less than that of a two-man car such as is used on most heavy traffic streets.

If the principle be accepted that better service attracts more business, then this plan of operation should get a further credit, for it will bring the outlying districts from three to ten minutes closer to the business center, dependent on the length of the express run, and affords a more attractive local service in the congested zones.

An enlargement of this plan of operation on long lines with heavy travel would be to run express service on the railway for the entire distance, with stops not less than three-quarters of a mile apart and with buses doing the local work and transferring to and from the cars at the express stops. This arrangement is similar to that in the four-track section of the New York subway.

On single-track lines, where the traffic at some

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periods requires more service than can be operated properly on single track, buses can be used to good advantage to supplement the railway service, thus obviating the necessity for second tracking or for relocating turnouts. In this case the buses should be spaced between the cars on that part of the line where the load is gathered, and care must be taken to prevent bunching of service at such points, due to the cars waiting on turnouts.

An important feature of this plan is that the route of the buses in the business district can be extended beyond the railway route if desired to reach important traffic points not reached by the railway route.

Supplementing Railway Service in Rush Hours

The bus can be made a valuable adjunct of the railway in handling rush-hour traffic. In cities of more than 200,000 population and in some smaller cities there are main arteries on which the track capacity is fully taxed and, therefore, increases in service cannot be made when needed. The bus as an adjunct can be used on such streets where tracks exist, but a great field of usefulness is on parallel streets not occupied by tracks. When it is proposed to run buses on such streets the selfish plea is sometimes set up that these streets must be reserved for private automobiles. As observed in several representative localities, private cars carry on an average less than two persons per car. It is, therefore, preposterous to devote a valuable thoroughfare to such wasteful use when the great body of the public is confined to the remaining overburdened streets. The streets should be used for the greater general good.

Taking into account the necessary carhouse and shop facilities, substations and feeders, but not the track, the investment in a double-truck car seating fifty-five passengers is about $25,000, or about $450 per seat. A good single-deck bus seating twenty-eight involves an investment of about $10,000, or $350 per seat. With a standing load equal to the seated load the electric car costs as much per passenger as the bus with half as many standing as seated. With a double-deck bus seating about sixty-five the investment is only $200 per seated passenger.

When the extra cars are on the street in the rush hours it is hard to maintain schedules on many crowded sections of track. It is a practicable matter in many such cases to take the point off the peak with buses. Due to the flexibility of buses they can be routed to avoid the most congested corners and to use streets which cannot be used by the railway.

Auxiliary Routes in Thickly Settled Zones

One of the most trying and baffling of sights to the electric railway man is to stand near the boundary of his central business district and see the swarms of pedestrians, particularly at the rush hours. There is no quarrel with those who walk for their health, but a large percentage of these people would ride if the transportation company had the goods to offer. What are the goods?

1. A rate of fare in some measure proportioned to the length of the ride.

2. Car capacity. During the rush hours it is generally hard to get on cars leaving the business district and very uncomfortable when once on.

3. In the thickly settled zones, as the railway lines cannot run on every street, there are many people for whom the combined ride and walk is less convenient than a direct though longer walk between business district and home.

How two of these problems can be helped by coordinated bus service is shown by the following diagram:

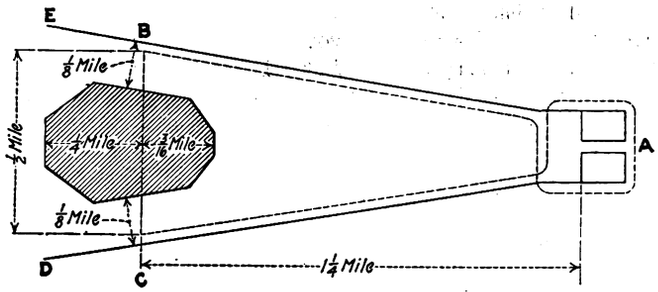

Diagram Showing Possibilities of Auxiliary Route in Thickly Settled Zones

AE and *AD* represent radiating railway lines. *ABC* is a bus route operated in both directions. The population in the shaded area live within walking distance of the edge of the business center and to use the street cars they must walk from ⅛ to ¼ mile. The result is that a large number walk, making the average rides per capita low.

The proposed bus route if operated both ways on ten-minute headway would require the regular patronage of about 3,000 population with transportation expenditures of $18 a year to support it. The shaded area, which may be considered as served most conveniently by the bus line, contains 40 acres, and to accommodate 3,000 population would require a density of 43 per acre, which is not an unusual figure for districts within 1¼ miles of a business center or more than 100,000 population.

A bus route of this character would further provide added capacity past the maximum load points on the two main railway lines. There are many cases where outlying local business centers occur at points like *B* and *C*. In such cases the bus route would accommodate cross traffic, which is seldom sufficient in volume to warrant a railway line.

Auxiliary Service to Important Traffic Points

At large factories, ball grounds and other important traffic points extra cars are often provided. Unless the traffic is large enough to warrant spur tracks, these extra cars must wait on the main line and generally interfere with schedules. Buses are ideally adapted to such extra service. They can wait without impeding other traffic; they can be routed when desired to avoid the congested business center, and in many cases by reason of routing flexibility they can make two trips where street cars could only make one. Further, they can be made to accommodate different points on different days as needed.

Substitution for Railway Lines Which Do Not Earn Operating Expenses

If the average operating expenses on a given railway be, say, 40 cents per car-mile (including replacements), there will be found many lines or routes earning substantially less. The traffic on such light traffic routes could be handled readily by one-man buses, the total cost of service being not more than 30 cents per bus-mile, with labor at 60 cents per hour. It would often

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pay to substitute buses for cars on such lines if the paving be suitable and particularly if the railway track be below the average. One-man cars can be operated at about the same cost as buses if the track is in good condition, but if the investment in track be taken into consideration, bus operation is generally cheaper. In case of substitution, the net salvage on the track is small so that the railway would still have to carry fixed charges on a large part of it. If the track is in good shape, so that the maintenance cost is not above the average and so that single-truck one-man cars can be operated satisfactorily, then there is no advantage in the use of buses. If, however, new one-man cars have to be purchased, it would generally be preferable to substitute buses.

Each case of this kind should be carefully figured out. It is safe to say that there is not an electric railway of importance in the United States which does not have one or more lines on which it would pay to substitute buses for cars.

Quality Service

It is a great mistake for the public as well as for the railway to attempt co-ordinated bus service at the same rates of fare as the railway in every case for this seriously curtails the usefulness of the bus in the public service.

In one particular a higher rate of fare will enable bus lines to be established in more thinly settled territory.

Of fully as much importance, however, is the fact that a higher rate of fare will enable the buses to give a better quality of service for which there is a real demand. This may take the form of a seat for every passenger, or of shorter headways, or of more convenient deliveries in the business district. The consideration of rate of fare is secondary to that of service and there is plenty of evidence that a considerable proportion of the people are willing and glad to pay more than the regular railway fare to secure better accommodations. It is hardly possible to differentiate the service as between lines or cars on a street railway, but with co-ordinated bus service a great field in this particular is opened.

Pleasure Riding

Analyses of traffic of bus lines operating double-deck buses indicate that as much as 25 per cent of the travel is for pleasure. Less than one-half of the families in the United States own automobiles, and in the larger cities the proportion is much smaller, running down to one in four or five. The majority of city dwellers therefore have no way of participating in the enjoyment of parks and drives. Every city has drives which it is practicable to make available to the public by the use of motor buses. Such lines can be operated as regular all-day routes if there be regular traffic demand, but it is also feasible to operate them only on nights, afternoons, Sundays and holidays in summer. There is a ready use for the buses in winter to supplement the railway service in the rush hours.

Special Chartered and Emergency Services

In years past electric railways did an important business in chartering cars. With the much greater traveling range of the motor bus, there should be a great field for this class of service. In securing rights to operate buses, the freedom to cultivate this business should be provided for. School and hotel service comes under this head.

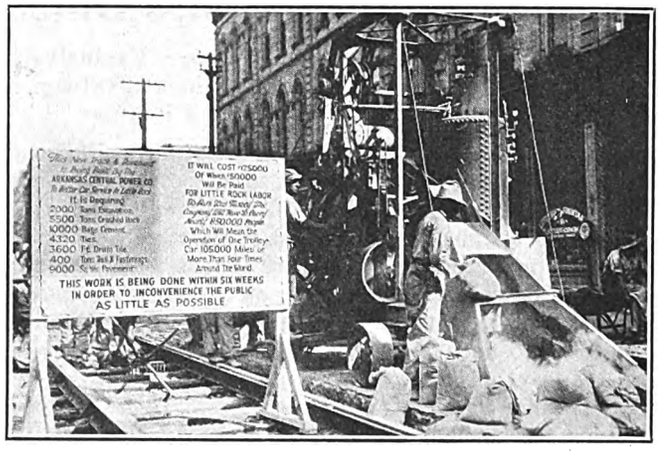
The bus will become invaluable to help out electric railways in handling large crowds to and from special points, in carrying special crowds from railway stations to sports or conventions, and in operating special relief routes when the regular routes are interfered with by parades or otherwise. A further use of this nature is to have one or more buses at a central dispatching point to inject into the schedule when a car becomes overdue on account of accident or other case, or when unexpected loads present themselves.

Necessity for Railways to Keep Abreast of Bus Developments

Electric railway managements owe it to their stockholders and themselves to keep abreast of bus developments with first-hand knowledge and experimentation rather than hearsay opinion. The bus is in an early stage of development. While its field may be somewhat limited at present, a small gain in efficiency will put it on a par with electric railways under any conditions and it behooves the street railway industry to keep its eyes open.

Good-Will Publicity During Construction Work

CONSPICUOUS signs have been placed in the streets of Little Rock by the Arkansas Central Power Company in an endeavor to win the good will of the public at a time when a certain amount of inconvenience is experienced due to torn-up streets. In this way the company is taking advantage of the opportunity of telling the public what is being done when street construction work is under way.



Sign Displayed in Little Rock, Ark., to Win Public Good Will During Track Construction Work

One of these signs which was used in connection with trackwork on Markham Street and which is shown in the illustration reads in large letters:

"This work is being done within six weeks in order to inconvenience the public as little as possible."

Emphasis was also placed on the fact that $50,000 was being spent and would go to Little Rock labor. The quantities of various materials required were listed so as to interest the public by pointing out the extent of the undertaking.

A similar sign was displayed during construction on East Fourteenth Street, calling attention to the year's work in this manner:

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"When this job is finished, it will complete the work this company has been doing in the last year to improve the street car tracks and pavements and which has cost $275,000. This includes the relaying of 4 miles of tracks and repaving of one-third of all the pavement between our tracks in Little Rock."

The Markham Street job, which was started Aug. 14 and completed the night of Sept. 22, consisted of the removal of one mile of double track and two blocks of single track, removal of pavement and concrete foundation under the track, excavation, reballasting and relaying of track, putting in of concrete foundation and Warrenite paving between the track and 2 ft. on each side. Traffic was continued during construction by using one track at a time. The city made the street a one-way street and the company co-operated so that no cross streets were blocked for more than two hours at a time. The cost of the extra traffic policemen required was paid by the company.

The East Fourteenth Street job consisted of the removal of 3,500 ft. of track, together with the work of excavation, reballasting and paving with concrete between tracks and for 2 ft. on each side. This section was practically at the end of the line, and traffic over the portion of the line being rebuilt was suspended for the two weeks required to complete the work.

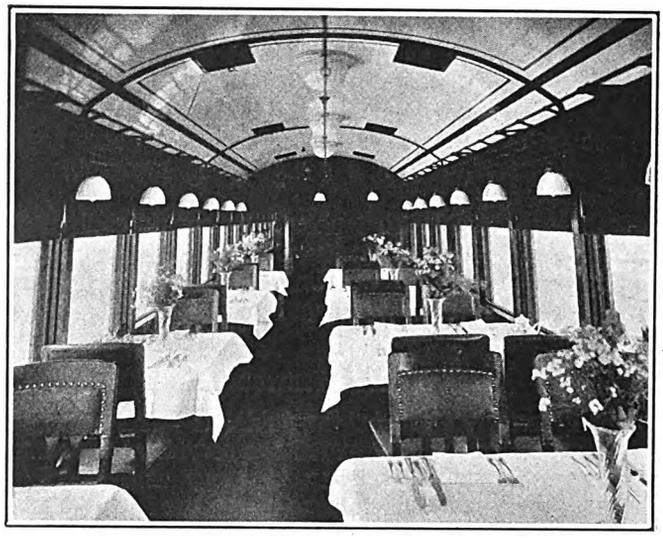
During the time that rail service was interrupted, buses were operated by the company on a parallel street one block away. These buses were operated on the same schedule as that which had been maintained by the cars and free transfer privileges were extended to passengers in both directions.

Latest Type North Shore Diner

New Cars Are Designed for This Purpose Exclusively and Arrangements Follow Closely Those of Steam Road Diners—Service Has Proved Popular

THE Chicago, North Shore & Milwaukee Railroad began its dining car service with a design of car that could be used both as a diner and as a club car. People who bought their meal en route were permitted to remain in the car for the entire journey, and the car was also used purely as a club car on some runs between the meal hours. But the patronage of the diner service has grown to such an extent that several sittings are served and people come in from and go back to their seats in other cars as on steam roads. Hence it was necessary to provide some diners of larger capacity than the combination club-diner cars. The newest type diners are planned exclusively for dining service and are operated only on the meal-hour runs.

The new diners are four-motored cars of characteristic North Shore design and weighing 102,000 lb. The exterior resembles very closely the North Shore passenger cars with the exception of the ventilators and flues on the top over the kitchen compartment. The North Shore green color is used on the outside, with the ends of the car painted orange, as is done on all cars used in "limited" service. The interior finish is in natural mahogany, with which the chairs and tables harmonize. The ceiling is of steel finished in a light cream color. A heavy nap green plush carpet adds to the appearance of the interior. In place of the heavy leather-stuffed armchairs previously used in the club-



Pleasing Appearance Marks Interior of New Dining Cars of North Shore Line

diners, neat, straight chairs without arms and with leather upholstered seats and backs have been provided.

The heating facilities of the car are identical with those in the observation cars described on page 56 of the ELECTRIC RAILWAY JOURNAL for July 14, 1923.

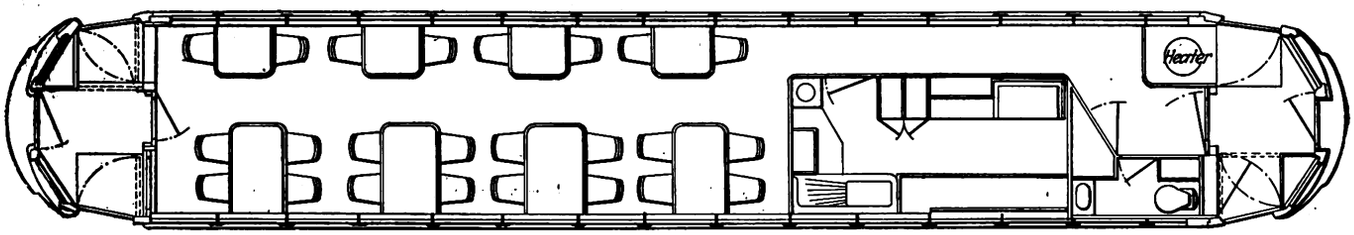
The kitchen represents the utmost in convenience and compactness and contains every cooking utensil and facility necessary in the preparation of palatable food. Service from the kitchen to the waiters is made through a window in the panel of the kitchen on the aisle side. This, to a large extent, eliminates the confusion encountered in dining kitchens where the waiters must enter the kitchen to secure the orders.

There are now fourteen trains operating between Milwaukee and Chicago giving de luxe service which carry special equipment either in the form of diners or observation cars. Six of these trains are in addition to the regular hourly service between the two cities.

Dimensions and other data are given below:

GENERAL DIMENSIONS

Length over all	55 ft. 3½ in.	Bulkhead door opening	26 in.
Length over train door posts	53 ft. 6½ in.	Seating capacity	24
Length over body	44 ft. 2½ in.	Truck centers	32 ft. 8 in.
Length of platform	5 ft. 6½ in.	Wheelbase	7 ft. 0 in.
Extreme width	9 ft. 0 in.	Wheel diameters	36 in.
Rail to top of trolley boards	12 ft. 7½ in.	Post centers	35 in.
Rail to bottom of side sills	3 ft. 4 13/16 in.	Type of roof	Arched
Rail to first step	16 7/16 in.	Interior finish	Mahogany
Width over side sheathing	8 ft. 8 in.	Type of heater	Hot water and electric
Vestibule door opening	29 in.	Type of ventilators	Garland C-I
Train door opening	26½ in.	Sash	Brass



Floor Plan of Latest North Shore Diner Showing Compact Kitchen Layout and General Arrangement

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One-Man Cars in Sweden

Separate Entrance and Exit Doors Are Provided—Cars Are Double-Ended, with Bulkheads, and Rear Platform Is Used for a Smoking Compartment

ONE-MAN cars have been introduced into the service of Malmö, Sweden. A description of the type used is given in *Verkehrstechnik* for July 1, 1923. In order to reduce the labor of the motorman, several interesting features have been incorporated. The cars are of a double-end type and incoming and outgoing passengers are kept separate by having distinct entrance and exit doors and a pipe barrier on the platform. The entrance to the platform is always open, but hinged end doors are provided between the platform and the body of the car. The operation of these doors is controlled by the motorman. The exit door when unlocked is opened by the passenger pushing on it, and it closes automatically after the last passenger leaves the step of the car. The various movements and interlocking are controlled by the motorman from the operating end. By turning a lever 30 deg. toward the front, a stop signal light is displayed, the exit door is unlocked and the fare box is swung into a convenient position for receiving fares. At night a number of lamps for illuminating the platform are also switched on.

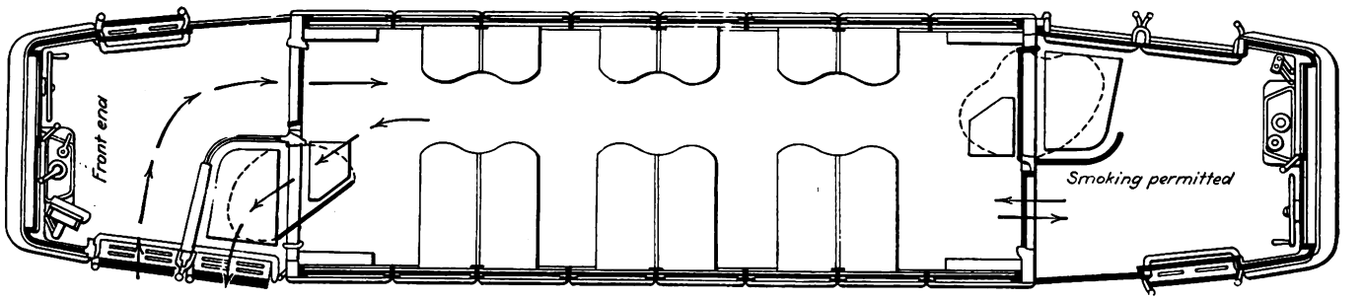
When passenger interchange has finished, a return of the lever again locks the exit door, swings the fare box back and extinguishes the lights on the platform. This entire operation is accomplished mechanically without the use of compressed air or electricity.

This arrangement of doors between the platform and car body provides a convenient compartment for smokers in the rear. On most of the lines where this car is operated, passengers board and alight at each stop and the double door arrangement has been very successful. The fare boxes automatically sort copper and silver coins and may be carried from end to end or taken off the car. On lines where boarding and alighting are rarely done simultaneously standard cars are being used, and the exit as well as the entrance is through the same door.

One-man cars are also operated in Augsburg. They were introduced in order to meet the increased operating costs. The city is a trade and manufacturing center with a population of 160,000. The car lines are single track, with a total length of 18 miles. Sidings are provided about every 0.4 mile. Standard cars were first operated by one man in 1922, but as the rush hour traffic is quite heavy, two men are used between the hours of 6 to 8, 11 to 2 and 4 to 8. When operated by one man the rear door is kept closed and entrance and exit are through the front door opening. The introduction of one-man operation has reduced the schedule speed, but by increasing the number of cars the public is better served and the operation is much more economical.

One-man cars operated in the city of Brandenburg are equipped with automatic ticket selling machines. Upon entering the passenger drops a token into the box and receives his ticket. The tokens are of a circular design and have a groove on each side to fit into a special slot in the machine.

Tokens are made in two different colors, yellow and white. Yellow tokens can be purchased from the motorman upon entering, and the white kind can be obtained in advance at a 20 per cent reduction in cost. The tickets permit a single transfer and must be punched in order to be valid.



Type of One-Man Car Used in Malmö, Sweden

Chicago Elevated Operates the Greatest Number of Trains on Single Track

ACCORDING to the latest available figures, the maximum number of trains operated in a single direction on a single track is on the Chicago Elevated between Grand Avenue and Chicago Avenue northbound during the evening rush hours. Between 5:15 and 6:15 there are seventy-one trains, of which sixty-six are operated by the Elevated and five by the Chicago, North Shore & Milwaukee Railroad.

The second greatest number of trains scheduled or operated is at Charing Cross Station of the Metropolitan District Railway, London. At this point there are forty-one trains westbound during the maximum hour. Next in point of density is the operation of the Hudson & Manhattan Railroad from the Hudson Terminal, New York City, where there are forty trains per hour over a single track. At several points the Euston & Hampstead section of the London Electric Railway operates thirty-five trains an hour in one direction. At Times Square, New York City, the Interborough Rapid Transit Company has thirty-three scheduled trains in an hour, although this schedule is rarely attained.

When the number of cars per hour is considered, the Chicago Elevated leads again, but by a smaller margin. There the greatest number of cars passing a single point during the maximum hour is 387. At Times Square, the maximum schedule of the Interborough calls for 330 cars per hour. The Metropolitan District Railway operates eight-car trains, giving 328 cars per hour west bound at Charing Cross. At Hudson Terminal the number of cars per train is also eight, making a total of 320 cars per hour at that point.

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Sleeper Service on Interstate

Cars to Be Operated as Trailers Between Indianapolis and Louisville—Berths Will Be 3 In. Longer than in Pullmans, and Uppers Will Have Windows

NEW sleepers for the Interstate Public Service Company, Indianapolis, are now under construction by the American Car & Foundry Company at Jeffersonville, Ind. The new cars will be operated as trailers on night runs between Indianapolis and Louisville, and their operation will mark another step in the program instituted by the Interstate for providing the last word in electric railway service between the two cities. It is the intention, since these cars will be operated at night, to haul them with the new express motor cars which are also under construction. The sleeper trains will leave the two terminals along toward midnight and then will be left just outside the terminal city until picked up later by another train to arrive about 7 a.m.

The general construction of these sleepers will be practically identical with that of the new club cars which were recently put into service and described in this paper, issue of Dec. 22, 1923. The intention is to adhere very closely to the same underframe design for all new passenger equipment built in the future.

PROVISION FOR PASSENGER COMFORT

Liberal provision will be made for the comfort and accommodation of passengers. The berths will be built on 6 ft. 5 in. centers, making them approximately 3 in. longer than a standard Pullman berth. Another innovation will be that the upper berth will have a window so that the upper berth passenger can regulate his ventilation as well as the lower berth passenger. The berths can be made up into seats as on a Pullman for daylight travel.

Because of the limited width of the car, the men's smoking room, as now laid out, will extend across one end of the car, and it is the intention to load and unload passengers at the opposite end only. A train door has been provided at the men's end, however, so as to allow trainmen to pass through if necessary. Unusual facilities for comfort and privacy are included in the arrangement of the ladies' washroom.

In addition to overhead lights and berth lights, floor lamps will be provided along the aisle at alternate berths so as to illuminate the floor when the rest of the car is in darkness at night. There will be deck ventilators spaced at frequent intervals and, in addition, electric fans mounted on the bulkheads at each end of the main compartment and also in the men's smoking room.

Daily Quotation on Street Car Fares

STREET car fares have changed so rapidly in Germany, because of the varying value of the mark, that some railways have been obliged daily to post up the fare in force on that day. Such a poster, issued by the Berlin street railway system, is reproduced below. As has been explained in recent issues, the Berlin system is operated by a corporation, although actually owned by the municipality.

Berliner Straßenbahn-Betriebs-G. m. b. H.

....., den .....1923.

Umrechnungskurs
für Schatzanweisungen des Deutschen Reichs
(Goldanleihe und Notgeld der Stadt Berlin u. der Industrie usw.)

Papiermark in Milliarden

1 Dollar = 4,20 Mark Gold = ...
½ „ = 2,10 „ „ = ...
¼ „ = 1,05 „ „ = ...
1/10 „ = 0,42 „ „ = ...

Fahrpreise:	in Goldpfennig	Papiermark in Milliarden
Einzelfahrschein		
Kinderfahrschein		
Hochbahn-Uebergangsfahrschein ..		

Daily Quotation on Fare Charged, as Issued by Berlin Street Railway

A translation of this poster is as follows:

BERLIN STREET RAILWAY OPERATION, INC.

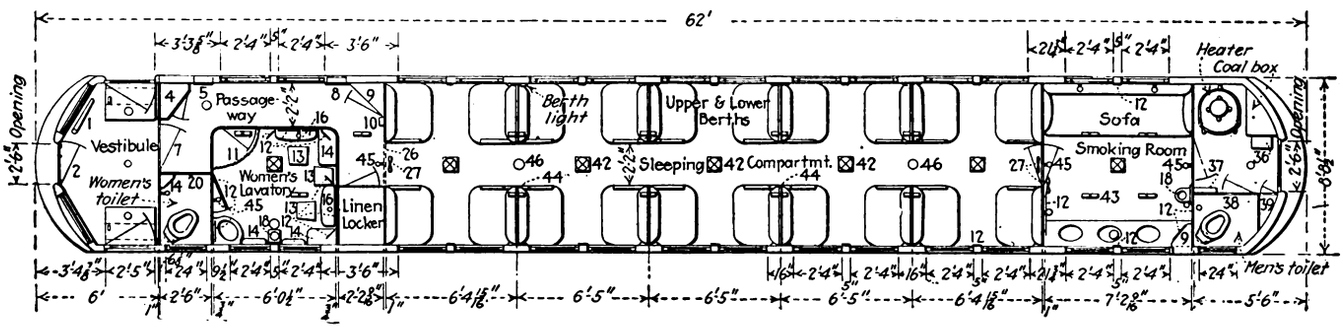
....., of.....1923

Exchange Schedule
For the currency of Germany
(Gold certificates and currency issues of the City of Berlin and industries, etc.)

Paper Marks in Billions

1 dollar = 4.20 gold marks = ...
½ dollar = 2.10 gold marks = ...
¼ dollar = 1.05 gold marks = ...
1/10 dollar = 0.42 gold marks = ...

Fare	In Gold Pfennigs	Paper Marks in Billions
Single fare for adults.....	.....	.....
Single fare for a child	.....	.....
Transfer ticket to the elevated railway	.....	.....



Probable Floor Plan of New Interstate Sleepers

1. Handbrake.
2. Train door with drop sash.
4. Switch locker.
5. Wrecking tools.
7. Hinged screen outside; drop sash.
8. Time table holder.
9. Water cooler; locker below.
10. Cup container.
11. Portiere.
12. Mirrors.
13. Chairs.
14. Shelf.
16. Dressing tables.
18. Dental bowl.
20. Overhead tank.
26. Illuminated "Women" on transom.
27. Fans.
36. Folding seat.
37. Annunciator.
38. Overhead water tank.
39. Locker.
42. Center lamps.
43. Exhaust ventilator.
44. Floor lights.
45. Bracket lamp.
46. Pendant.

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Association News & Discussions

Railroad Transportation Features A. I. E. E. Meeting

Operating Problems of the Steam Railroad and Possibilities of Electrification Main Topics of Afternoon Meeting—At Evening Session Prominent Speakers Treat of the Broad Conception of the Transportation Business

TWO sessions, afternoon and evening, were given to the subject of railroad transportation at the midwinter convention of the American Institute of Electrical Engineers, held in Philadelphia on Feb. 5.

The afternoon session, at which N. W. Storer, general engineer Westinghouse Electric & Manufacturing Company, presided, was on the subject of railroad operating problems and possibilities of electrification as a means of solving them.

L. G. Coleman, assistant general manager Boston & Maine Railroad, summed up the problem of the operators as one of lost motion. The old style locomotives not only employed simple steam engines, but only a few auxiliaries were included. There were no complications, and they could be kept on the road 75 per cent of the time. Modern steam locomotives, on the other hand, have more parts and greater complication. It has not been found possible to have them available for service more than about 45 per cent of the time. On his road it used to be possible to turn an engine at the end of its run in two hours, but this cannot be done with locomotives of the modern type. Furthermore, the cost of taking care of such engines is four times as great, and although the loads handled by an engine have increased greatly, the maintenance cost per ton-mile has at least doubled.

The first cost of locomotives has increased greatly in recent years, and freight cars have also gone up in cost about equally fast. This emphasizes the need of getting more intensive use of the plant in order to keep down transportation costs. One suggestion made by the speaker is to use containers of some sort, so that the body or "chassis" of the car can be kept moving while the container is being loaded or unloaded.

The field for improvement is open, concluded Mr. Coleman. Electrification may be the solution, although railroad men have not yet been convinced that its use will pay.

N. & W. Electrification Has Increased Capacity

Experience on the electric division of the Norfolk & Western was given by J. E. Crawford, assistant general manager. The territory electrified is a very heavy originating section for freight, consisting principally of coal. That section of the railroad has many grades, and determines largely the carrying power of the entire system.

The constant-speed locomotive has given very good results in the nine years of service, said Mr. Crawford. The actual cost of operation with electricity is about 8 per cent less than with steam for doing the same amount of work. This figure is based on the tractive power of the electric locomotive. It does not include any indirect savings, nor does it allow anything for the increased capacity of the entire line accomplished by electrification of this section. On the other hand, it does not cover capital charges. The economy of the electric service at the present time, he said, comes from postponing heavy expenditures on capital account that would have to be made were the capacity of the system to be increased while using steam power.

The cost of repairing and maintaining locomotives of the two systems is difficult to compare, partly on account of the difference in capacity, and partly because the electric locomotives were at first too light and had to be rebuilt. The original weight was 63,000 lb. per driving axle. Changes which have been incorporated have increased the weight to 68,000 lb. per driving axle and have made the locomotives capable of much greater mileage and quicker turning.

The constant torque feature of the electrics has proved of great value in acceleration. A train weighing 3,300 tons can be started from rest on a 2 per cent grade and brought up to 14 m.p.h. in about two minutes. It takes some ten minutes with steam engines to get the same train up to a speed of 8 m.p.h.

Electric Locomotives Have Greater Availability

An electric locomotive should be able to make about twice the mileage possible with a steam locomotive, said Mr. Crawford. After finishing a run the electric locomotive can be turned in forty minutes and started out on another trip. This can be kept up day in and day out for a period of some two weeks, at the end of which time it is necessary to give it a thorough inspection. Experience on the Norfolk & Western is that a steam locomotive can be kept in service some 50 per cent of the time, and an electric locomotive 85 per cent. In addition the electric can make a higher speed, thus getting a still greater proportional advantage.

The Norfolk & Western bought twelve locomotives twelve years ago.

The Most Powerful Locomotive in the World for Freight Service. It Will Handle a 6,300-Ton Train Up a 1 per Cent Grade at 20.6 M.p.h.

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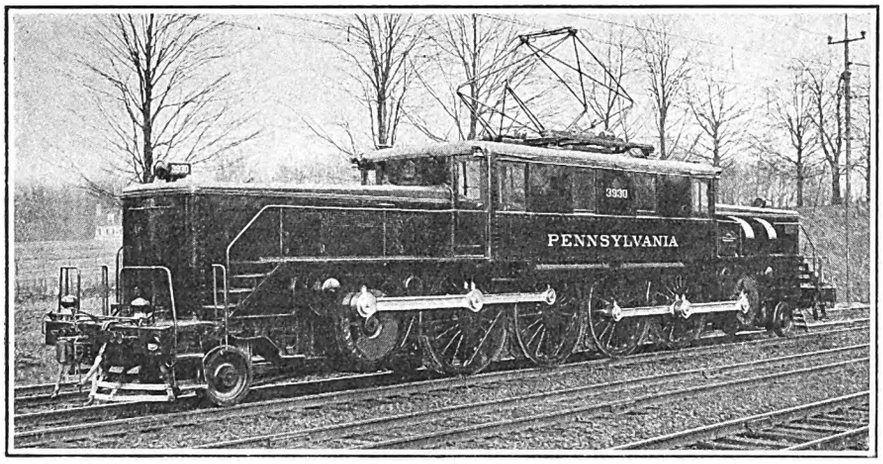
The cost, pound for pound, was just twice as much as that for a steam locomotive. The company has just purchased four more, with a tractive effort of 140,000 lb. at a price equal to twice the price per pound of a steam locomotive. So the difference in cost persists. There is no saving from the use of electrics in capital investment, but there are great savings due to the quicker turning and the higher speed. This results in a greater capacity of the road than was possible otherwise.

The cost of repairs in the last year was 37 per cent greater for the steam locomotives. Prior to that it was higher for the electrics, but this was largely on account of the rebuilding to strengthen them, referred to previously.

The installation is a special one for very heavy service on heavy grades. The power demand factor is poor on account of the limited extent of the electrified division. The fuel saving shown has been 12 per cent. Under favorable conditions Mr. Crawford believes it should run as high as 25 to 30 per cent. The regenerative braking is a factor in this, as one electric locomotive can handle a train down a grade without the use of air brakes, and return energy to the line.



This Pennsylvania Railroad Preference Freight Locomotive Weighs 200 Tons and Has a Tractive Effort of 100,000 Lb.

The line troubles experienced have not been very great; in fact, they have been less than was anticipated. The entire installation has proved very reliable. All the failures of the entire electric system have been no greater than those with the locomotives alone under steam operation. Troubles from broken drawbars have been much reduced.

The economy of the installation has been from the increased capacity of the line, the higher speed, and the reduced time for turning engines. The company is at the present time extending the electric operation 20 miles, and it is expected that soon electrification will be extended over the entire division.

Other Merits of Electricity Brought Out in Discussion

Mr. Ballantine, of the Seaboard Air Line, stated that he was impressed with the lack of correlated information on the subject of electrification. A railroad is built to handle a certain peak load, he said. It is not what the system can do the year around that counts, but what the service will be during the peak. An increase of 50 per cent in speed is a big factor in moving tonnage during the peak, and cuts the investment that must lie idle the rest of the year. The steam locomotive is actually in use but two hours fifty minutes out of the twenty-four, averaged over the year. There are, however, possibilities of increasing this use. One railroad is making engine runs of 600 miles, and another, runs of 800 miles. These records are, however, made with oil-burning engines.

In reply to a question, Mr. Coleman stated that the limits to the railroad's capacity are the strength of bridges, the length of sidings and passing tracks, and the weight of rail. There is no practical limit to speeds of freight cars. Most of them can go 40 to 50 m.p.h. if necessary. Modern steam freight locomotives, however, cannot safely run more than 40 m.p.h. without excessive maintenance.

With the electric system, in addition to the cost of the locomotives there is some 90 to 100 per cent investment for power and auxiliaries. On account of the limitations that exist Mr. Coleman could not see that there is any economical way to electrify except an entire engine division at a time.

Some of the conditions applying to the Southern Pacific Railroad were outlined by A. H. Babcock, electrical engineer. The railroad man wants to install a double track first of all, so as to have freedom from delays that may occur if the single track is blocked. Then after the capacity of the double track line is exceeded electrification is desired, provided that it will show an economy. Electrical engineers, said Mr. Babcock, have not been able to show economies that will be worth while.

W. S. Murray, New York, stated that he has made many estimates of savings from electrification. On a certain line he recently has calculated that with two engine divisions electrified, and with every conceivable overhead charge added, there still is an indicated saving of 15 to 20 per cent over steam operation.

The limitations on the capacity of steam roads, referred to by Mr. Coleman, are not likely to be raised for many years, in the opinion of William Elmer, superintendent of the Harrisburg-Altoona division, Pennsylvania Railroad. Drawbars have been standardized by the Master Car Builders' Association for a maximum of 400,000 lb. pull without failure, and the underframes and draft gears are designed for the same limit. Bridges are designed for Cooper's E-60 loading, or 60,000 lb. per axle. The high train weights reached on some roads are attained only by the use of special cars, that are not generally available. With ordinary cars the length of train to get these high capacities becomes so great that the crew cannot handle it efficiently. Some 100 cars, giving a train length of 4,500 ft., seems to be about the economical limit.

Some figures on locomotive performance were given by Mr. Elmer. When 50 per cent of the steam locomotives on his division make 3,000 miles per month or better it is considered good performance. Of the passenger engines some show as high as 10,000 miles per month, and the average is more than 5,000 miles per month. A good locomotive, he said, should do 160 miles per day.

Mr. Coleman stated that, based on Mr. Elmer's figures, the availability of the steam locomotive is less than 25 per cent. Under federal control the number of hours available for service of all steam locomotives was 36.75 per cent. He thinks that any standard mainline steam railroad will have an availability factor for its motive power of well under 45 per cent, the figure quoted by one of the speakers.

Transportation an Essential Industry

Railroad transportation in its broad conception, both past and present, was the topic of the evening session at the Metropolitan Opera House. The meeting was presided over by President Harris J. Ryan of the Institute, and the speakers were: E. G. Buckland, vice-president and general counsel New York, New Haven & Hartford Railroad; F. H. Sisson, vice-president Guaranty Trust Company, New York; Ralph Budd, president Great Northern Railroad; H. B. Thayer, president American Telephone & Telegraph Company, and A. J. County, vice-president Pennsylvania Railroad. The entire meeting was broadcasted over the radio from stations all over the East and as far west as Hastings, Neb. It was a very splendid piece of publicity work for the railroads.

Pennsylvania Railroad Exhibit

An interesting feature of the convention was an exhibit by the Pennsylvania Railroad of several types of its latest and most powerful steam and electric locomotives. Among the steam engines were the most recent Pacific and Mountain type passenger locomotives, and the heaviest Mikado and Mallet freight engines. The Type FF1 electric locomotive, said to be the most powerful locomotive in the world for freight haulage, was shown. It weighs 250 tons, and has a rating of 4,800 hp.

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Alongside it was the new L-5 locomotive described in the ELECTRIC RAILWAY JOURNAL for Jan. 26, page 133. This is a locomotive for preference freight, and, with a change in gearing and control, it also is suitable for passenger service. Both of these locomotives are illustrated herewith. Between them was the latest type of Brill gasoline rail car. A two-car train of the standard multiple-unit cars used in the local suburban service out of Philadelphia also was exhibited.

Western Society Takes Up Traffic and Transportation Problem

THE Western Society of Engineers met in Chicago this week Wednesday and Thursday in its third annual convocation, the subject this year being "Transportation and Chicago Development." Various aspects of the general problem of providing better transportation and relieving street congestion were treated in a number of papers, some of which are published here, with a report of the proceedings and others papers to follow in a later issue.

Through Streets to Relieve Traffic Congestion*

BY E. S. TAYLOR
Office Manager Chicago Plan Commission

TO RELIEVE street congestion and reduce accidents, the Chicago Plan Commission believes that Chicago needs a scientific, well-designed and inclusive system of "through streets" to take the place of the present expedient. Such through streets as have been established bear no relationship one to another. They do not extend continuously through the city, and they were set aside before a study of the traffic needs of the city as a whole had been made.

Many street accidents are caused because the traffic is a mixture of slow-moving, horse-drawn vehicles, rapid-moving automobiles, street cars, trucks, wagons and the like, all jumbled together indiscriminately. Records compiled by the safety commission of the Chicago City Council show that fewer accidents occur on boulevards than on ordinary streets. Boulevard traffic moves much faster than the traffic on other streets because it is limited to a single class of vehicles and has the right of way over cross traffic, which must come to a full stop before crossing the boulevard.

According to the technical experts of the Chicago Plan Commission, the solution of the accident problem lies in segregating traffic into similar classes; in providing separate routes for the different classes; and particularly in keeping through automobile traffic off car line streets. Since every important street in Chicago has a car line upon it, it has been a real task to find other streets which can be set aside as "through streets." These streets would take care of rapid-moving traffic, leaving the car line thoroughfares free for street cars, slow-moving commercial vehicles, and local traffic.

Little or no opposition to the establishment of these "through streets" is anticipated. The street car company and the merchants of the city will favor it, it is believed, because it will speed up street car service, will increase the efficiency of commercial vehicles, and will save time and money for every one. At present our business streets are filled with vehicles which do not properly belong there, but which must use these thoroughfares because there are no others for them to use. When these through-bound vehicles have been given better facilities on other thoroughfares, the congestion on the business streets will be lessened, street cars can move faster, and local traffic will be better able to stop and do business along the street.

Automobile users will also favor through streets as it will enable them to make better speed, not being hampered by slower classes of vehicles.

By providing a dozen or more "through streets" on each side of the city instead of only one or two as at present, traffic will no longer be as highly concentrated on a few streets as it is now, but will be diffused generally throughout the entire city, thus relieving congestion on our main thoroughfares and boulevards and providing room for future expansion. Such "through streets," of course, must be adequately marked and lighted, and steps toward this end have already been taken by the city's department of gas and electricity.

*Abstract of paper presented before Annual Convocation Western Society of Engineers, Chicago, Feb. 6 and 7.

Second-Story Sidewalks*

Would Relieve Traffic Congestion While Waiting for Subway Construction by Removing Bulk of Pedestrians from Surface Grade So That Vehicles Could Make Faster Speed Safely

BY J. H. SAWYER
Bridge Design Engineer, City of Chicago

THE average number of stories for buildings in the present iron Loop in Chicago is approximately eight. A Chicago daily paper stated a year ago that the traffic during the Christmas shopping season was 100 per cent of the street capacity and that in two or three years the streets would be as crowded every day as during the 1922 Christmas shopping period. Of course, the paper went on to advocate subways. But subways are delayed for a number of reasons:

First—More than half the frontage on most of the streets must be placed on caissons before digging could be begun and this, of course, is not a small expense. And may I ask why should owners of old buildings build new high buildings on caissons with street traffic so near the maximum? For only a few more new high buildings could be rented.

Second—The objection to Loop subways from outside business centers is growing—not diminishing.

Third—A subway plan that would please all interested parties seems difficult to obtain.

Subway construction must provide utility galleries for all utilities, both for present and future growth. All utilities for a street must be moved temporarily to adjacent streets and alleys before construction begins. In the aggregate, this expense will be considerable.

A subway does not and cannot provide for pedestrian traffic in the Loop. It will only bring in more people but it does not provide for their getting about in the Loop.

To discuss the growing difficulty in street crossing in the Loop, to life, limb and patience, is hardly necessary, for everyone who has to walk about in the Loop has hair-breadth escapes. You come to the street crossing, wait until the policeman blows the whistle, and as you start to cross the street you are stopped by cars and vehicles coming around the corner. Before these cars stop, the policeman has again blown his whistle, and in sheer desperation, you start on the run to dodge between the moving cars. When at last you are fortunate enough to reach the other side, out of breath, perhaps, you may have at least to face the sarcasm of some motorists. Or, if you are motoring through the Loop, you wonder why "the persons on foot are always in the way; surely they should be killed."

One thing is certain, the pedestrian's and motorist's point of view are very different, and as long as they are in each other's way, why not separate them, if possible. A second-story level street for the Loop district has been suggested by one engineer; and this may be by far the more economical way of building the subway.

But, let me ask again, why build subways if an average of eight stories has filled the street to capacity? Subways would bring more people to a place already too full and too dangerous to get about and do business in.

But until subways are built, to assist in handling pedestrian traffic while they are being built and to handle pedestrian traffic after they are built, I am suggesting another feature, showing you its faults and how to meet them and what I believe to be some of its many good points.

Suppose the street cars are placed in subways, the motor cars on the street (we are not going to banish them) are still a menace to the pedestrians crossing streets and the pedestrians are more in the way than ever.

With the street cars gone from the streets, the motor cars could go as fast as they now do on Michigan Avenue, except for the pedestrian who will still refuse to go down in tunnels to cross streets, as is now the case at Randolph Street, where an understreet passage is available to aid in reaching the Illinois Central suburban station.

It might be well to say here that the

*Paper presented before Annual Convocation Western Society of Engineers, Chicago, Feb. 6 and 7.

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Western Society of Engineers has been fathering the investigation of this idea —let me insist, the *investigation* of the idea. In October, 1921, it was arranged that I present a paper on this idea, which I did in February of last year.

Since that time some of the newspapers have been interested, as you know, and not later than Jan. 16 and 17 of this year, Col. Harvey W. Corbett, a New York architect connected with the Sage Foundation, read a paper before the American Society of Civil Engineers advocating second-story walks for pedestrians and a separation of the three kinds of traffic—foot traffic, wheel traffic and rail traffic.

Suppose we had a sidewalk on both sides of every street, streets with street crossings at the street intersections, but all at the second-story level, with second-story shops and shop entrances as on the present ground level. And suppose this sidewalk extended over the entire loop and connected to the elevated stations at their street-crossing level, directly under their tracks. Could not this increase, if not double, the pedestrian capacity of the Loop?

The second-story sidewalk could be as wide as, or wider than, the present ground-level sidewalk, and not interfere with it—simply be an awning for it.

From steel buildings the walks could be cantilevered out from the steel work. In front of old buildings slender steel columns could be placed 20 ft. or more apart, out near the curb, but always well protected. If necessary, there can be another column at the building. The construction should be of light, shallow steel girders and small beams, wire mesh reinforced concrete slabs with plenty of prismatic glass. Drainage would be to a post or down the face of the building in adequate downspouts.

But why discuss details? You can see how easy it is. Of course, details must always be modified as much as possible to accord with the adjacent building. The height above ground must be that of the average second-story height for that block and side of the street.

But at the street crossings, the bridges should be built just high enough so that the trolley wires can pass under them. At the ends of these bridges, there would be a step or two up or down, as may be necessary to connect with the second-story sidewalk for that block.

Details of stairs and escalators down to present street level sidewalks would be worked out, as well as openings for stairs and elevators in buildings for the convenience of pedestrian traffic; also details of building store fronts, etc.

There will also be easy connections to elevated railway stations; there will be bridges across streets between street intersections midway in the block; from these bridges, in wide streets, possible stairs lead down to landing platforms for loading and unloading trains of street cars. This idea has been suggested for subways. All these and many other details will suggest themselves to you.

But someone says with some justice, what is it going to look like? Yes, and unless it were handled by a competent commission with an iron hand, what would it look like?

It can be done and done at a very low cost and still look very well. Careful studies of each block should be made so as to do the least harm architecturally to the fronts and still maintain efficient traffic.

In a few instances it may be difficult, if not impossible, to make a pleasing appearance without considerable alteration in the front. But in the shopping district we see continual alterations and changes in store fronts to meet demands of new tenants or changed conditions.

What owner would refuse to alter one or two stories of his building front if he could rent two stores in the same building instead of one?

The pedestrian capacity of the Loop can be nearly, if not quite, doubled. There will be no waiting at street crossings; wide bridges will handle the crowds. There will be no boxes and barrels at the curb or tracks unloading merchandise.

The average height of the buildings can be sixteen stories and the caissons along the street will be built by the owners for their new buildings and not from the subway funds.

Vehicles Should Move in Defined Lines at Fixed Speeds*

By William G. Beard
Yellow Cab Company, Chicago

After studying traffic for years, we have come to the conclusion that the orderly movement of vehicles, rather than more room to move them in, is the solution of the whole problem. Traffic control, rather than wider roadway, is the thing.

No matter what improvements are put into effect—witness the widening of Sheridan Road—traffic tangles are not eliminated. The more room motor cars get, the more they pour into that room and the less carefully they drive. The more room you give them, the less supervision you can give them.

The Michigan Avenue signal system, which was our own idea and was paid for out of our own pockets, is the best proof I can offer of how engineering control of traffic has operated in a restricted area to speed up and order the movement of cars.

I have no doubt that many of you fretted and fumed at the Michigan avenue lights when they first were put into effect. I know I did and I had more or less to do with their installation. Of course, we had more or less of a selfish motive in getting them installed. Our cabs were moving too slowly. We were tied up in heavy traffic at the peak load of our business. Our wheels were not turning at the time when turning them would be most profitable.

Now most of this lost motion occurred between Twenty-second Street on the south and Lake Street on the north. On either side, traffic was comparatively unhampered. So, when Mr. Hertz proposed the light system, he made his offer to include those points.

Formerly, it took our cabs an average of twenty-seven minutes in the rush hour to get from Twelfth Street to Randolph Street. It took everybody else that long, too. Traffic was in a hopeless snarl all the time, regulated as it was from corner to corner.

Traffic Control Increases Speed

Today, with one less lane of traffic through on each side of the street, the trip from Twelfth Street to Randolph Street takes a little less than eleven minutes, which is a net gain of sixteen minutes. And this was accomplished by making the street narrower for traffic. The turning lanes down the center of the street cut down the through lanes from four to three, while synchronous control, worked out by engineering brains, more than doubled the traffic capacity of the street.

We figure, among other things, that a taxicab engine idling will use up a gallon of gasoline per hour. This one stretch of highly traveled roadway, automatically controlled, saves us at least an hour a day per cab or 2,600 gal. of gasoline. What it saves us must necessarily be reflected in the savings to others.

However, such savings are beside the question of the tremendous importance of moving the traffic. There is no doubt in our minds that synchronous control of street traffic, affecting both the motor vehicle and the pedestrian, are eventual. Whether this will be controlled by hand or by clockwork mechanism, I am not prepared to say. But we are firmly of the opinion that automatic control is the thing and that it will be developed only by engineering brains.

We have proved among our own men that orderly movement at a slower speed makes for quicker delivery. In other words, slower driving in controlled lanes gets you where you want to be faster than speed and traffic running wild.

It is agreed that the present method of handling traffic in archaic. Every widely-used street in Chicago eventually must be put under a central control. The entire city can and should be timed from one or two spots where traffic is the heaviest.

If a single system, loose at both ends and without control as to its input can straighten out a traffic tangle and double its output in a given space of time, it stands to reason that a universal system would do a lot more. There are not going to be less vehicles, but more. And we cannot widen streets fast enough to take care of the greater number of cars. We can provide an orderly control that will do the only feasible thing, which is to make all vehicles move in defined lines at definite speeds and with definitely synchronized stops and turns. It is up to an engineer to do this.

*Abstract of paper presented before Annual Convocation Western Society of Engineers, Chicago, Feb. 6 and 7.

Central Accountants' Meeting

The annual meeting of Central Electric Railway Accountants' Association will be held at the Hotel Keenan, Fort Wayne, Ind., Feb. 29 to March 1.

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Various Suggestions for Easing Traffic Congestion in Chicago*

Ideas Expressed for Traffic Relief as Applied Are Suggestive for Use in Other Cities—Regulation of Pedestrian Movement Advocated—Signal System Has Made Street Crossings Safer

By Z. C. Elkin
Chicago Motor Club

EACH class of transportation is to a certain extent dependent on every other class that may use the streets. For instance, you cannot hope to speed up street car traffic in the crowded area of the central business district unless you take motor vehicles and horse-drawn vehicles off the street car tracks, and you cannot speed up automobile traffic if you allow a major portion of the highway to be blocked with parked autos and wagons loading or unloading. The surface lines carry approximately 74 per cent of the street level passengers into the Loop and they constitute but 10 per cent of the vehicles, and any regulation must be based on the theory of the greatest good to the greatest number.

It is the purpose of this article to point out what the present facilities are and how they can be utilized to the fullest extent by a segregation of the different classes of traffic.

It is obvious that with the present trend of increased capacity of the buildings in the Loop, a greater load will be placed upon our transportation service. If this service is unsatisfactory today it consequently may be stated that additional buildings without increased transportation facilities mean additional congestion.

What we are constantly trying to do is to crowd the traffic into thoroughfares that were laid out to accommodate only a small fraction of the present number of vehicles. Major R. F. Kelker, Jr., expresses this thought in his report when he says:

> There are about 9,500,000 sq.ft. in the Loop proper; that is the area bounded by Lake Street, Franklin Street, Van Buren Street and Michigan Avenue. Of this superficial area, 40 per cent was allotted for street purposes. Estimating roughly that each floor in a building has the same area as the lot on which the building is erected for the purpose of comparison, we find that if the lots are improved to an average height of five stories, the percentage of area for street use falls to about 10 per cent; for twelve stories the area of the street represents about 5 per cent; and for twenty stories, 3 per cent.
>
> I simply call your attention to these percentages in a general way in order that you may more clearly realize that the increasing improvements in buildings with its resultant additional street business, points to absolute stagnation.

With the loop district less than half built up to the height allowed under the present ordinances and considering the present congestion, we can easily see that as population increases congestion must increase. It is doubtful if any means of transportation could be devised that would adequately handle the Loop traffic, when the time comes that this area is solidly built up to its capacity.

But it is also very doubtful if the Loop will ever be built up to the legal limit. There is very distinct movement under way to expand the central business district, and as improved traffic arteries are opened up, new business districts similar to Michigan Avenue north of the bridge will spring up. We must not only prepare now for a much larger volume of traffic in the Loop, but also look forward to the time when the increase in the outlying business districts will carry a larger volume of through traffic through or around our present Loop district.

With streets laid out to take care of the horse-drawn vehicles of twenty-five years ago, it is unreasonable to suppose that we can continue to load them up with the ever-increasing traffic of today. It is beyond reason to suppose that we can widen the streets in the Loop to take care of the additional traffic, but we can make it possible to utilize the present streets to their fullest capacity and provide for a continuous flow of traffic into and out of the Loop.

This congestion can be relieved to a very marked extent by a just and proper regulation of pedestrian traffic.

Pedestrian Movements Should Be Controlled

There is no more reason for the pedestrian to be permitted to run wild on that portion of the street set aside for vehicles than there is for vehicles to drive on the sidewalk. A rigorous jay-walking ordinance will prevent pedestrians from crossing in the middle of the block, and they should not be allowed to cross traffic at street intersections where traffic officers are directing traffic. When the whistle blows for the movement of vehicular traffic in one direction, it will clear the corner much quicker if not interfered with by pedestrians.

Painting loading zones on the pavement at busy corners and allowing traffic to pass outside these loading zones while street cars are loading will not increase the hazard to the pedestrian. This method is being used to advantage in many cities.

According to some authorities, street cars in the Loop district move 3 miles per hour, and it is up to the city to clear the way for the cars to attain greater speed between street corners. The flow of traffic is held down to a snail's pace by horse-drawn vehicles which haul hundreds of thousands of tons of freight through the Loop that could be moved by means of the underground tunnel; and all fuel, ice, water, laundry and similar supplies for Loop buildings could be delivered between midnight and 6 a.m. with a decreased delivery cost in the time saved and at the same time relieve traffic conditions to a great extent.

According to Major Kelker's figures, there is parking space in the Loop area for 3,800 cars, and the City Council has turned over to the taxicab companies more than 10 per cent of this space. There is no more reason for furnishing cab companies a permanent parking space in the Loop than there is for furnishing it to any team or automobile owner. These taxicabs would serve the public just as efficiently if they kept on the move as they do by occupying cab stands on the most important corners and streets in the Loop. One solution of the problem is absolutely to prohibit any vehicle from stopping in the Loop area except to load and unload, and prohibit delivery of merchandise and supplies during the heavy traffic hours.

Instead of bending all our energies to the problem of crowding practically all our traffic through the Loop, we should aid the development of outlying business districts, thus relieving the central business district. The plan of double decking streets and elevating sidewalks is ridiculous and impractical. The recent improvement of Michigan Avenue to the north shows that proper traffic outlets will solve the Loop congestion problem, and the increased valuation of property will pay increased taxes enough to pay for the improvements.

It is estimated that 25 per cent of the vehicles entering the Loop daily are through bound, so any attempt at the betterment of traffic conditions should include some plan to take this traffic out of the Loop proper to expedite that portion and relieve the already overcrowded streets of everything that does not necessarily have to stop in the central business district.

We have run wild on the question of "Through Streets," without any regard to the part they are to play in our ultimate traffic plan. Through streets should only be created when they are properly paved and lighted; when they actually "go somewhere," and provide an outlet for through traffic. They should only be created when they are part of a major plan for traffic regulation. With through traffic streets, the through traffic would not be held back by local traffic. It would be well to give serious consideration to extending the traffic signal tower system now in operation on Michigan Avenue not only on the boulevards but elsewhere in the crowded districts.

Synchronized Signals Discussed

This tower signal system has probably slowed up traffic to a very slight extent as far as Michigan Avenue is concerned, but it has undoubtedly made traffic safer and it is also true that it has speeded up traffic from the cross streets entering Michigan Avenue from the Loop.

The greatest good it has accomplished is in teaching the pedestrians to wait for the signal before crossing the street, and a general extension of this system throughout the central business district will not only result in a large decrease in the number of accidents, but we believe will actually speed up traffic generally by educating the pedestrian to wait for the signal.

The time is ripe for a change in the police administration of traffic. The

*Abstract of paper presented before Annual Convocation Western Society of Engineers, Chicago, Feb. 6 and 7.

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creation of a "Traffic Division" that would be city-wide in its operation, with a competent traffic engineer in supreme command, would be in order. The head of this traffic division should have jurisdiction over all the city, full control over all traffic regulation with full power to make any changes necessary in routing traffic. He should direct the placing of all traffic signs, etc. The job is big enough to require the entire time of an expert with a competent corps of assistants.

Our present streets under the absolute direction of a competent traffic division would handle 50 per cent more traffic and give us time to partly catch up with the ever-increasing traffic requirements for more rapid transportation.

American Association News

Special Train New York to St. Louis

DEFINITE arrangements have now been made for a special train from New York City to the Midyear Meeting of the American Electric Railway Association at St. Louis on March 4. The train will be run by the Pennsylvania Railroad, leaving the New York terminal at 4:50 p.m., Saturday, March 1, as a section of the St. Louisan, arriving in St. Louis about 5 p.m. Sunday evening.

A special car from New England to be attached to the New York-St. Louis special train in New York City is contemplated; and the special will also pick up delegations from other cities at various points along the route. Arrangements are being made to provide entertainment for the party both Saturday evening and during the all-day run Sunday. Those desiring to join the party are urged to make reservations with Carl H. Beck, Westinghouse Traction Brake Company, 165 Broadway, New York; Cortlandt 8311.

Midyear Committee Keeps Things Moving

AT ITS weekly meeting on Feb. 1, W. H. Sawyer, chairman, and the local members of his committee on arrangements for the Midyear Meeting reported progress on all the details. Hotel reservations are coming in rapidly and are being taken care of at the Hotel Chase and neighboring hostelries. It was planned to invite the Louisville Inspectors Quartet as one of the entertainment features. It was agreed that practically all entertainment should take place during and not after the dinner.

Mr. Sawyer appointed the following on the Civic Host Committee: Rolla Wells, chairman; L. Wade Childress, W. Palmer Clarkson, W. Frank Carter, Herman C. Stifel, C. L. Holman, Louis H. Egan, F. E. Allen, Edwards Whattaker, George W. Neidringhaus, Breckinridge Jones, A. L. Shapleigh, F. O. Watts, Festus J. Wade, Clarence H. Howard, Henry Miller, H. J. Pettengill, Murray Carlton, Senator Selden P. Spencer and W. K. Bixby.

Purchases and Stores

A MEETING of the committee on purchases and stores of the Engineering Association was held at New York on Jan. 21, with the following present: J. P. Dick, chairman; J. F. Fleming, C. A. Harris, H. H. Lloyd, A. A. Ordway, W. S. Stackpole, W. H. Staub, A. H. Kennedy, and E. L. Farris, visitor.

The subjects assigned to the committee are: (1) Method of classification and sale of scrap materials to increase the revenue therefrom; (2) proper place for the purchasing and stores department in a company organization; (3) review of existing standards.

It was decided that the second subject be interpreted to consist of the relations of the purchasing and the stores departments and their organization and control. In opening the discussion the chairman read an editorial from the January, 1924, issue of *Railway Purchases and Stores*, dealing with the functions of the supply department and emphasizing the need of keeping to a minimum the investment in materials and stores. All the members concurred in the ideas expressed in the editorial.

Mr. Lloyd suggested that a questionnaire be sent to all member companies regarding the position of the storekeeper in the railway organization, but it was brought out that a question in *Aera* had brought forth many answers which declared that the storekeeper should report to the purchasing agent.

A recommendation was tentatively adopted that the stores department should be under the supervision of a general storekeeper responsible for the custody, care and distribution of all material not in actual use, including scrap and reclaimed material; and that the purchasing department and the stores department should report to the same executive officer, if operated separately, or if operated as one unit then the storekeeper should report to the purchasing agent.

The committee then took up consideration of the first question, that of scrap material. Mr. Harris described the methods followed by the Pittsburgh Railways. Mr. Fleming called attention to a meeting held recently under the auspices of the United States Bureau of Standards, of representatives from the National Association of Purchasing Agents and the National Association of Waste Material Dealers, Inc., for the purpose of drawing up and agreeing on standard specifications for ferrous and non-ferrous scrap. Mr. Fleming also presented the standard classification for old metals, effective Nov. 1, 1923, as adopted by the latter body. C. A. Harris was appointed chairman of a sub-committee with Mr. Fleming to draw up a tentative classification of scrap materials.

In accordance with a suggestion by Mr. Lloyd at a meeting of the purchasing agents and storekeepers at the Atlantic City convention last October, it was decided that each committee member should get in touch with the purchasing agents and storekeepers in his vicinity, and if possible hold a meeting prior to the next committee meeting to discuss their common problems, for the purpose of getting the views of other purchasing agents and storekeepers not represented on the committee.

It was decided to hold the next meeting at St. Louis on March 3.

City Operation and Interurban Operation

A JOINT meeting of the committee on city operation and the committee on interurban operation has been arranged for at Indianapolis, Ind., March 1, at 11:30 a.m. The place of meeting will be in the office of Harry Reid, chairman of the interurban committee, in the Wilde Bank Building.

It is expected that the regional vice-chairmen will have definite reports to make at this time.

Special Reports Available

SPECIAL reports and compilations on the following subjects prepared by the American Electric Railway Association staff during the month are now available to member companies upon request.

Trend of Electric Railway Fares, 1917-1923.—Shows the fares in effect in each of the 288 cities having a population of 25,000 or more in the years from 1917 to 1923, the average cash rate of fares in these cities in these same years and the number of cities in which each rate of fare was in effect in each of these years.

Electric Railway Franchises.—Analysis of eight electric railway franchises recently granted, giving a comparison of the provisions in each covering service, fares, return, taxes, conditions governing use of streets, paving, duration, forfeiture, renewals, etc.

Motor Vehicle Regulation. — A summary of court and commission decisions made under existing laws involving motor vehicle common carriers, both passenger and freight, covering such subjects as issuance of certificates of convenience and necessity, competition with railways, abandonment or extension of routes, through routes, service requirements, etc., preceded by an analytical index making possible ready access to decisions on all phases of motor vehicle operation.

Securities Issued by Public Utilities in 1923. — A list of the new securities issued, divided between electric railways and other public utilities, showing the type of security, amount issued, maturity date, interest rate and offering price.

In addition to the above, supplements to the Wage Bulletin and Cost of Living Studies have been prepared, bringing them down to date.

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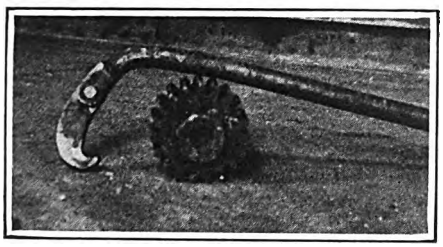
Maintenance of Equipment

A Handy Pinion Tool

IN THE removal of the pinion nut from the armature shaft it is often very difficult to keep the armature shaft from rotating with the wrench. This difficulty has been overcome somewhat by the use of a tool which engages the teeth of the pinion and provides a purchase for holding the armature shaft during this operation.

This tool is the design of A. P. Bischmann, master mechanic Chicago & Joliet Electric Railway, and it is made up of a 4-ft. length of 1-in. pipe for a handle with a jointed hook at one end. The hook is made ½ in. thick, of wrought iron, and shaped to fit in between the teeth on the pinion. The inside of the hook has a curvature corresponding to the addendum circle of the pinion.



Tool for Holding Armature Shaft as Nut Is Removed

The lower end of the handle also conforms to that curvature.

In practice, the hook engages a tooth of the pinion, the handle being brought around in the direction of rotation and held in one hand while pressure is applied with the other hand to the wrench engaging the nut. Thus it is possible for one man to perform this task.

Plowing Track Trench with Work Car

BY W. L. WHITLOCK
Superintendent of Way, Denver Tramway

DURING the years 1921 and 1922 the way department of the Denver Tramway constructed a second track on certain streets where a single-track line was in operation. In several instances the streets were surfaced with a mixture of slag, gravel and loam that had "packed" through years of use so that it was almost impossible to break it with horse-drawn plows in order to make the trench for the new track. In these instances a hole was dug in the street by the men to give the plow a start and then a four-motor work car was used for motive power to plow the street.

Using Work Car to Plow Street for New Track

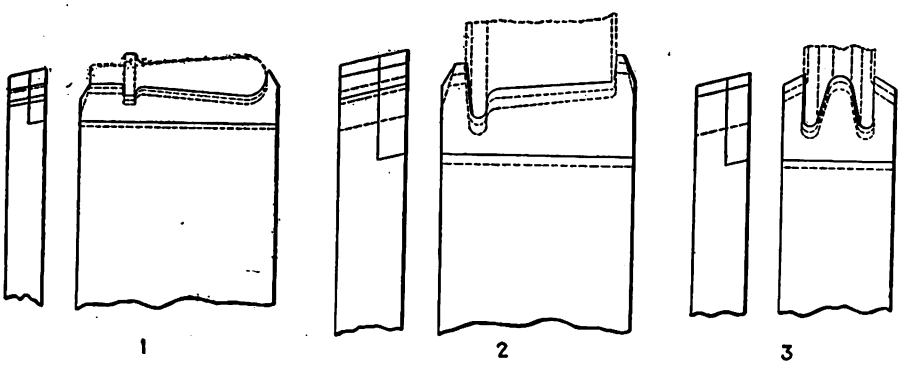
A 12-in. x 12-in. x 18-ft. timber was chained across the body of the car and a special steel-constructed plow with a steel beam was attached to the timber with a chain sufficiently long so as not to pull the plow out of the ground. Trackmen held the plow and the car had no difficulty in plowing the street, as indicated in the photograph.

This work was done under a fifteen-minute headway with practically no delays to car traffic. Care was exercised by the work car motorman so as not to overheat the car resistances. The motors were used in the series position only.

Special Shapes for Tipped Tools

BY FRANZ SCHWOPE
Berlin, Germany

THE method of welding tips of high-speed steel to ordinary steel shanks, as described in the ELECTRIC RAILWAY JOURNAL for Aug. 11, 1923, has found extensive use in Germany with very good results. This is particularly true where special forms for the tips are needed. The accompanying illustrations show several special forms of tips which have been used to make a turning tool for metal handles, a tool for turning tires of car wheels and a turning tool for trolley wheels. Such tools are easy to handle, and a single turning operation enables the work to be particularly well done. Also, much time is saved by having tools made to the particular form desired, since



Special Forms of Tips Made of High-Speed Steel and Welded to Ordinary Shanks
No. 1—Turning Tool for Metal Handles. No. 2—Tool for Turning Tires.
No. 3—Tool for Turning Trolley Wheels

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in turning with an ordinary tool several measurements would be necessary on each piece of work, while with tools of the form shown no measurements are necessary after the tool is once constructed.

Testing Bus Engines with Dynamometer

By P. V. C. See

Superintendent of Equipment Northern Ohio Traction & Light Company, Akron, Ohio.

THE usual method of running in a gas engine after it has been overhauled in the average garage is to put it into the automobile and drag the automobile around the streets with another car until the bearings are worked in. The automobile manufacturing plants and the larger automobile maintenance companies are using an electric dynamo to run the overhauled engine against so that they can adjust the engine and make sure that it is able to develop its full rated horsepower.

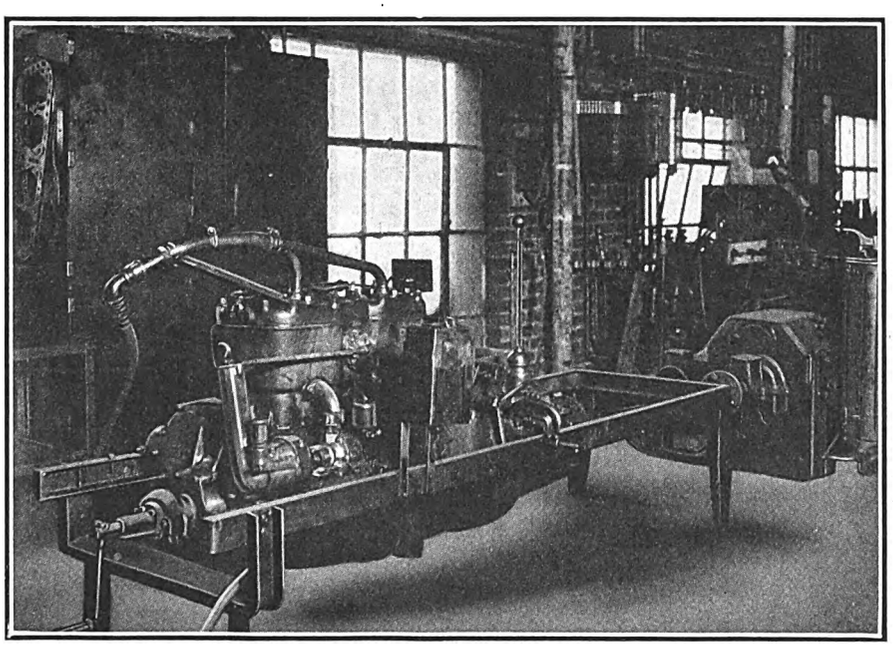
When the bus engines of the Northern Ohio Traction & Light Company became old enough to require overhauling, it was felt that such a device was needed so as to make sure that when the engine was once put into the bus it would be in perfect adjustment. But it was soon found that the cost of a factory dynamometer was prohibitive.

It was therefore decided to design and build a testing set in the shop from equipment on hand. The company has a great many old GE-67 railway motors, of 50-hp. rating. These are, of course, series wound, so that it was necessary to rewind the fields for shunt operation. These fields were wound with No. 22 double cotton covered wire, enough turns being placed on the fields so that they could be connected directly across the trolley circuit with a field rheostat in series for adjustment. Six banks of safety car resistance grids were connected in series with the armature, to permit of operation at very low speeds. An ammeter and voltmeter were connected up in the motor circuit.

The procedure for testing an overhauled bus motor is to mount it in an I-beam frame and connect it up with flexible fabric joints to the rebuilt motor. The motor is then started as a shunt wound motor with the use of an ordinary K-6 street car controller. The first notch of this controller will run the motor at a speed of about 100 r.p.m. Speed is read by a tachometer connected to the motor.

This arrangement obviates any necessity of cranking the gas engine. It is then run at this low speed for several hours to make sure that none of the bearings are too tight. A small gasoline tank having been connected to the carburetor, the ignition is turned on, so that the gas engine starts to operate itself. A switch is thrown into the reverse position, transforming the motor into a shunt-wound dynamo. The engine is then allowed to develop in the neighborhood of 10 hp. against the safety car resistance.

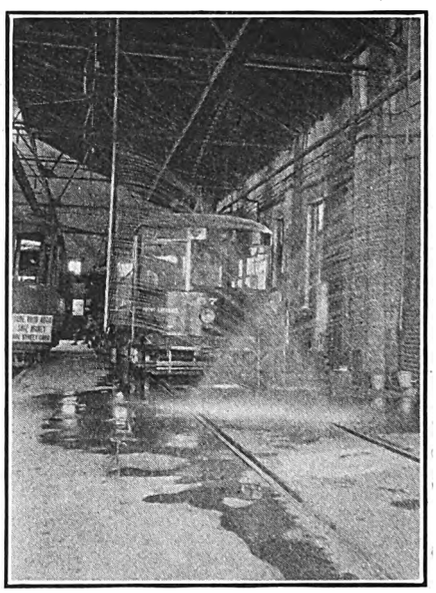
As a final test, the carburetor is opened wide and the engine is allowed to develop its full power. Any adjustments that are necessary on valves, carburetor, etc., can be done on the testing block instead of in the bus, so that when the engine is ready for installation it is sure to be in perfect shape.



This Dynamometer for Testing Bus Gas Engines Uses a Rewound Railway Motor for Load

Cars Spray-Washed in Evansville

THE Southern Indiana Gas & Electric Company, which operates the city cars in Evansville, Ind., uses a simple spraying device for washing safety cars.* One of the tracks in its principal carhouse is assigned for washing purposes, and on each side of it a spray pipe is suspended from the roof trusses. This is of 1¼-in. pipe size and it is filled for 8 ft. from its lower end with holes about 5/16 in. in diameter and 1 in. apart drilled in a straight line. When it is in operation the sprays are adjusted so that they overlap, as shown in the accompanying illustration, when the car is not between the pipes. A control valve is located behind the brick pilaster seen at the right in the picture.



This Form of Spray Washer Used in Evansville, Ind., Is Simple and Effective

In the washing operation the car is passed slowly through the water jets twice, a period of five minutes being occupied in the process. The officials of the company are highly pleased with the operation of this device, which was installed by the master mechanic, A. Newhouse.

*See issue of this paper for Oct. 28, 1922, page 705, for a description of the practice of the Detroit Municipal Railway along this line.

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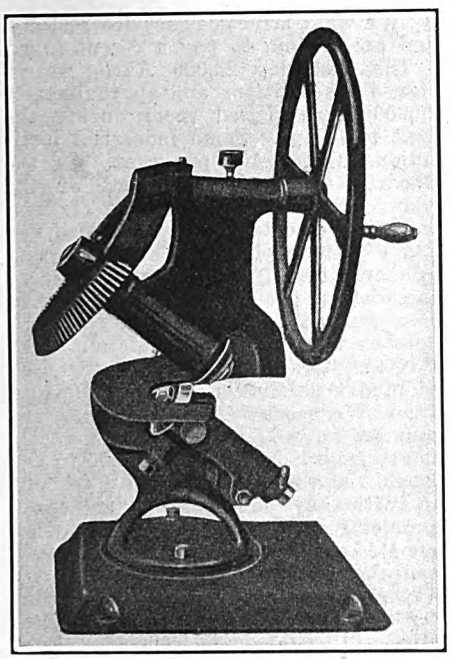
New Equipment Available

Rotary Type Sheet Metal Shears

A NEW line of shearing machines is being marketed by the Marshalltown Manufacturing Company, Marshalltown, Iowa, under the trade name of the Throatless Shears. These are of a rotary type built in several different sizes, the largest having a capacity for ½ in., and the smallest for No. 18 gage and lighter sheets. The shears are built for hand power, belt and motor drive, and the three smaller sizes can be furnished with or without pedestal.

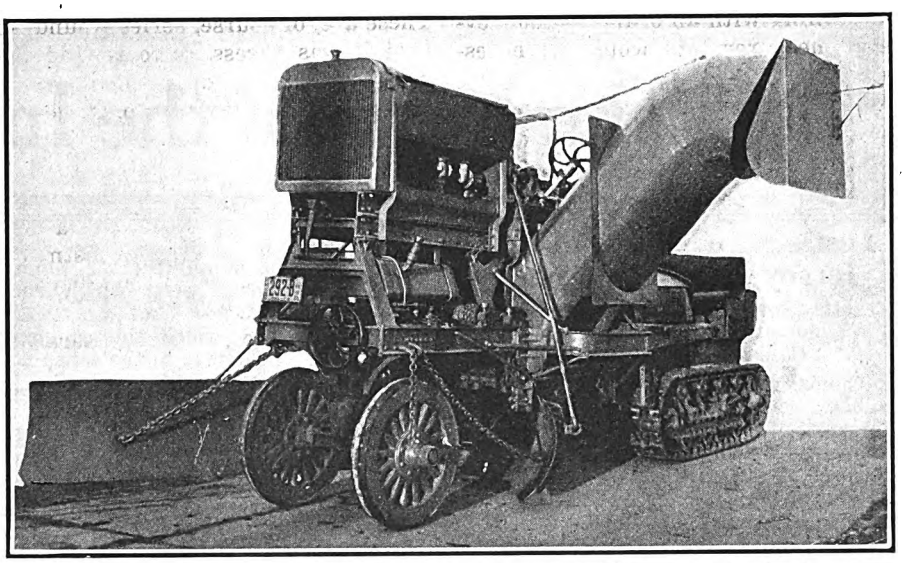
Some of the particular features of these machines are their ability to cut sheets of any size and they are adapted for cutting in and out curves, complete circles, or straight splitting. The head of the machines and the essential parts are made of cast steel. The cutters are set almost perpendicular and are made of special tool steel 1⅛ in. thick and 10 in. in diameter, tempered. One of the cutters is knurled and driven, which makes the shears self-feeding.



Rotary Type Shear for Sheet Metal Work

With motor drive, a friction clutch gear enables the operator to stop the shear with the motor still running.

The machine shown in the illustration is the No. 12-BH size with a capacity of No. 12 gage and lighter. It is shown arranged for bench mounting and hand power, but pedestal mounting and either belt or motor drive can be furnished.



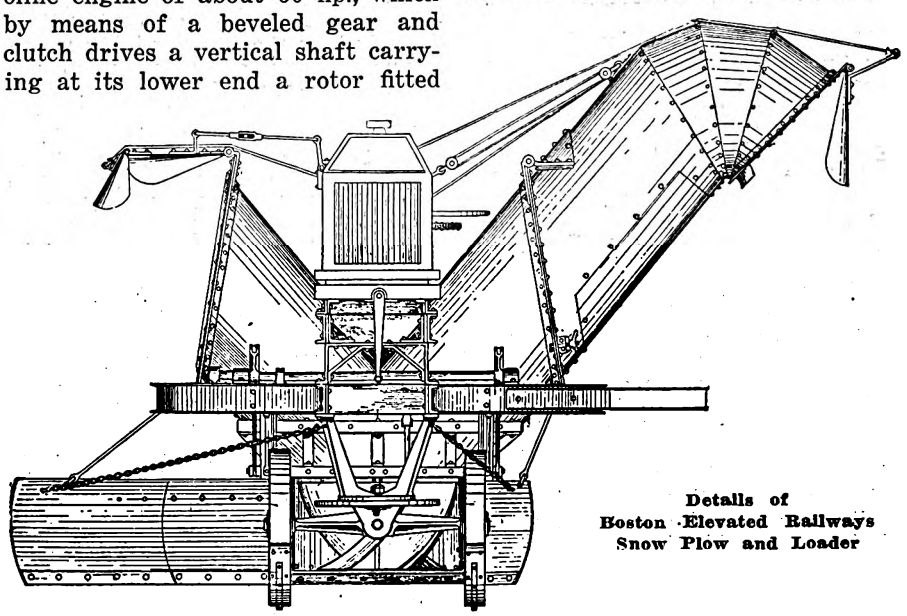
This Plow and Loader Collects the Snow and Discharges It Through Deflectors Into Loading Trucks

Snow Plow and Loader in Boston

THE Boston Elevated Railway has recently purchased the rotary snow plow and loader shown in the accompanying illustrations and built by the Eastern Tractors Company of Boston. This machine is propelled by a tractor with a 40-hp. motor and can be used either as a plow, with wings, or as a plow and loader. As a plow, it has a capacity of about 4,200 cu.yd. per hour, and its loading capacity is about 480 cu.yd. per hour.

The loading apparatus is driven by an independent four-cylinder gasoline engine of about 60 hp., which by means of a beveled gear and clutch drives a vertical shaft carrying at its lower end a rotor fitted with high carbon steel intake blades. This rotor is 34 in. in diameter and runs at 1,000 r.p.m. and its blades gather up the snow and propel it through a deflector to any point desired. It is claimed that these rapidly rotating blades will pulverize lumpy or frozen snow so that it, with the light snow, is carried almost instantaneously from the street line to the loading truck. Slush is also handled as well. Two men are required to operate the plow and loader, one driver and one lever man.

The tractor can easily be detached from the plow, if desired, so that it can be used in warm weather or at other times for any other service, if desired. The weight of the machine, when fitted with a 5-ton tractor, is about 15,000 lb. It has a length of 19 ft. over all, width of 74 in. and height out of service of 6 ft. and in service of 8 ft. 6 in.



Details of Boston Elevated Railways Snow Plow and Loader

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The News of the Industry

Jersey Fare Unchanged

Results Now Unsatisfactory, but Management Hopes Economies and Co-ordination May Help

Thomas N. McCarter, president of the Public Service Corporation of New Jersey, with several associates had a comprehensive discussion with the members of the Board of Public Utility Commissioners on Feb. 7 on all the problems facing the development of service rendered by the operating companies in the Public Service group, which include the Public Service Railway, the Public Service Electric Company and the Public Service Gas Company.

Attention of the board was directed to increase in size of the financial picture involved in the proper development of these properties, which includes capital requirements for this year of approximately $34,000,000. Assurance was given that at the proper time a plan would be presented to the board for improving the corporate structure of the companies so that the large financing could be more economically accomplished than under a continuance of hitherto existing methods, which are not adapted to matters of such magnitude.

Mr. McCarter further told the board that notwithstanding the fact that the 5-cent fare, which has been in affect during the trial period, had caused the railway a very substantial loss, he was of the opinion that it should be continued at least for the present until further results under it were available. He added that there is good reason to hope that certain changes and economies and the co-ordinating of bus and railway service may make it possible to continue this rate indefinitely.

$2,500,000 A YEAR SAVED TO PUBLIC

It was further stated by Mr. McCarter that in the judgment of all connected with the companies the present rates for gas and electricity are not affording a full return upon the value of the property devoted to the public use, either by the gas company or the electric company, and that a proper valuation of the respective properties would so demonstrate; however, the ascertainment of such valuation would require a long time and involve much expense and that after a careful study of the respective companies' finances and those of the whole Public Service financial structure, the directors were satisfied that some substantial reduction could voluntarily be made by the company, both in gas and electric rates without interfering with the financial necessities of those companies. Accordingly a promise was made that within a reasonable time the companies would submit in writing their views of what reduction they could make along these lines and would further submit the pertinent data upon which such views were based.

The reductions which the company has in mind would save to the consumer of the gas company approximately $1,000,000 a year and to the consumers of the electric company approximately $1,500,000 a year, or a total of $2,500,000 a year.

Akron Bus Men Ask Seven Cents

Find Nickel Fare Unprofitable—City Negotiating a New Franchise with Bus Operators—Accidents on Increase—Weather Favors Auto Operation

BUS men operating in Akron since Feb. 1 have appealed to the city for permission to charge a 7-cent fare, claiming they cannot make expenses at 5 cents. The city is negotiating with a New Jersey bus firm for a new franchise. The bus operator is asking a minimum fare of 7 cents. The bus service at the close of the week is no better that it was on the first day street cars ceased running.

H. S. Firestone, of the Firestone Tire & Rubber Company, has given the motorization plan his financial backing. A mortgage for $30,741 has been made to the Firestone Company by the new Akron Rapid Transit Company to cover eighty Fords turned over to the company by Firestone.

Numerous minor injuries have followed in the wake of the attempt to motorize the city, but fortunately no serious injuries have resulted. Weather conditions, with the exception of light snow Thursday, are still favorable to bus operation.

Akron closed the first week of its "exclusive" city bus transportation with severe cold weather and much worse transportation service than on Feb. 1, the day railway service was removed. Between sixty and seventy buses, seating from eight to eighteen passengers are in service, most of them furnished by the Cleveland-Akron Bus Company from equipment previously retired from service. They are supplemented by about eighty-five jitneys.

Early on Sunday morning, Feb. 3, the city police and members of the street department, acting under orders of Mayor Rybolt, placed trucks and street sweepers on all interurban tracks of the Northern Ohio Traction & Light Company at or near the city limits. This action was taken under cover of darkness. The company learned of the city's action after the early morning runs had left Silver Lake Junction, Canton and Kenmore. The trains were stopped before the obstructions were encountered. Application was made at once to a state court for an order restraining the city from interfering in any way with further operations of suburban and interurban cars. Service was resumed at noon through the city. All the company's buses were used Sunday forenoon to transfer passengers across the city between interurban and suburban lines.

On Monday the company carried page "ads" in Akron papers telling of the blockading of the tracks, pointing out that the criminal laws of the state had been violated and the lives of hundreds of innocent passengers jeopardized. "Was this done to save the car riders of Akron a penny?" the advertisement asked.

Monday the idle trainmen, shopmen and roadmen circulated petitions addressed to the Mayor and City Council in which they said:

"We want street-car service restored and are willing to pay a 6-cent fare."

The first day 23,000 Akron voters signed the petitions and approximately 20,000 more signed them during the next two days. Some industrial institutions signed 100 per cent. In the Goodrich plant 70 per cent of the Akron employees signed. The car-men were refused entrance into the Goodyear and Firestone plants. They were told by employees of these plants who were accosted on the outside that they had been warned against signing the petitions on the penalty of dismissal. After a bitter fight the Goodyear "Senate" adopted a resolution favoring the bus.

On Wednesday Mayor Rybolt announced he would "motorize the city at all hazards." The plea made to the people is that they "ought to put up with any suffering in an effort completely to motorize the city, because Akron, being a rubber city, should lead the way." It is pointed out by Mayor Rybolt and Mr. Firestone that if Akron is completely motorized, other cities will be forced to follow.

Meanwhile the Mayor is saying in public statements that he was forced to provide transportation on a day's notice and that if given time he will finally get a sufficient number of buses to meet the needs of the people.

Two weeks before the cars stopped the Mayor said in a public statement:

"We will have the finest transportation system in the world on a 5-cent fare, with free transfer, on Feb. 1, when the cars stop."

This accounts for some of the present dissatisfaction and public condemnation of what is termed "the Mayor's Bus System."

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Conditions Acute in Oklahoma

Railways in Both Oklahoma City and Tulsa Are Confronted with Trying Problems

Important developments are expected soon in connection with the existing situations with respect to railway affairs in both Oklahoma City and Tulsa. In Oklahoma City the question is: Who, if any one, is to continue operating the city lines? In Tulsa the question is: Will the State Legislature pass a bill intended to remove in whole or in part the jitney curse?

The Oklahoma Railway operates city lines in Oklahoma City and the interurbans between Oklahoma City and Guthrie, Oklahoma City and El Reno and Oklahoma City and Norman. That company failed to earn interest on its bonded indebtedness in 1923. John W. Shartel, president, announced several months ago that the company could hope to continue operation of the city lines only through such benefit as would accrue to it from an increased fare, revision of traffic ordinances to permit speeding up of service, and curtailment of service on certain lines.

Mr. Shartel's presentation of the facts to the City Commissioners failed to bring any definite evidence of willingness on their part to co-operate with the railway in solving the problem confronting it. The City Commissioners let it be known informally that they would not oppose any rate revision that the State Corporation Commission, after investigation, might hold the railway to be entitled. There was an unwillingness to revise traffic laws or otherwise co-operate. The company stated that operation of the interurban lines was sufficiently profitable to present no baffling problem, but indicated its intention to appeal to the State Corporation Commission for permission to abandon service and dismantle the city lines.

The company has indicated its willingness and desire to turn over to the city or to a committee representing civic organizations or to any group of citizens willing to undertake the operation of the city lines under a trusteeship, limited as to duration, the full management of the property and service, looking to the possible working out of some permanent plan. As yet, however, the company has not filed its threatened application for permission to abandon and dismantle the city lines.

In Tulsa that city's newspapers are attempting to convince the public that the jitney competition must be done away with if railway service there is to continue. Heretofore there has been no state law under which city officials have had authority to prevent or restrict jitney competition with electric railways of the city. A bill introduced into the House makes automobiles operated for hire within cities subject to reasonable regulation and control by cities, but prohibits the cities from enacting or enforcing unreasonable or oppressive ordinances. The bill has been passed by the lower house and is pending in the Senate. This bill provides that regulation by cities may include the requirement of insurance to protect the public, but provides that no city shall charge an unreasonable occupation tax nor enforce any regulation clearly prohibitive in character. It provides that the city may exclude the operation of automobiles for hire upon and along streets occupied and used by a street railway paralleling the same, and upon and along the first two streets on either side of a street occupied and used by a street car line. This action, however, does not pertain to automobiles operating under a state permit issued by the Corporation Commission authorizing service between towns or cities.

This measure seems to be sufficiently indefinite to be of only limited value as a protection to electric railways. So far as the larger cities are concerned it would seem not to be difficult to evade the law entirely by making one terminus of the jitney line outside of the limits of the city. The Tulsa jitney interests are at the capital for the purpose of preventing the adoption of any drastic regulation of their operations.

Mr. Sawyer Speaks of Buses and Taxes

Tells St. Louis Business Men Unfair or Undue Competition Is Ruinous Not Only to Companies, but to the Public Served—Invites Them to Attend Midyear Meeting

W. H. SAWYER, president of the East St. Louis & Suburban Railway, East St. Louis, Ill., addressed the Electrical Board of Trade of St. Louis, Mo., on Jan. 29 on various aspects of the electric railway situation. One or two excerpts from his address may be of general interest to electric railway men, his talk being primarily for the purpose of enlightening local business men. In regard to the competitive situation between railway and bus in St. Louis, Mo., Mr. Sawyer had this to say:

"City transportation must, from an economic standpoint, be a monopoly. Unfair or undue competition is ruinous, not only as the final answer to the companies but to the public served. I hold very definite views along this line. I am using gasoline-driven buses. I am using them because for the place and the purpose intended they are better than electric street cars, but there is no place over on the east side for a separate bus company paralleling our tracks and taking away the cream of our traffic.

Transportation Should Be Co-ordinated

"Do not misunderstand me. I am not criticising the receiver of the United Railways because legal counsel in its wisdom ruled that a receiver has no right to operate buses; nor am I criticising Dick Meade, the president of the People's Motorbus Company, from whose public relations policy I have learned many lessons. But buses as operated today in St. Louis are wrong, uneconomical and fundamentally unsound. No one can tell me that it is good business to have buses operating on Washington Avenue on a cold winter's night, competing with the street cars running alongside for a few straggling passengers. The public has to pay too high a price for such duplication. So long as the buses and street car systems continue to be operated in St. Louis as they are today, we have not a co-ordinated transportation system. and a co-ordinated transportation system is essential for the best interests of civic welfare and the riding public.

"At least this is my own personal thought, and if any one cares to differ with me, that is his privilege. But I am perfectly willing to have it written on the record definitely that competitive, unco-ordinated systems of transportation, serving the same streets in the same district, in the same community, are fundamentally unsound, and that goes whether it refers to bus competition in St. Louis or elsewhere."

Later, in his talk, Mr. Sawyer turned to the subject of taxation. He called attention to the fact that the United Railways of St. Louis pays in direct taxes, federal, state, county, municipal, school, franchise, and mill tax, and similar items, a total of more than $1,850,000 a year. It carries approximately 285,000,000 adult paying passengers per year. He said that this meant that every one of these passengers pays in his 7-cent fare over 0.6 cent for direct taxes. Every passenger pays ⅛ of a cent for franchise tax, which is purely a relic of the days when franchises were company assets which could be capitalized and sold. The car rider in St. Louis pays 0.1 cent for the mill tax, which he said was unfair and discriminatory, in that the car rider is taxed through the mill tax for the benefit of the city at large.

Mr. Sawyer said that the gross earnings from operation of the United Railways is approximately $20,000,000 a year. This means that 9 cents out of every dollar taken in from street car fares is paid out for direct taxes. He asked the business men present what they would think if they had to pay out taxes at that ratio.

Referring to indirect taxes, Mr. Sawyer said that local street car riders could have a 7-cent cash fare and 6⅔-cent ticket fare and provide the company with the same net that it now has if the company were relieved of the paving tax, which amounts to $685,000 a year.

Adding direct taxes and the indirect paving tax together, Mr. Sawyer pointed out that one-eighth of all the revenue from electric car rides is paid out by the company for taxes—12½ per cent. He referred also to the necessity of carrying policemen and firemen free and said that this cost the other car riders $100,000 a year. He asked why it should not be expected that the clothing man give away uniforms to the policemen and firemen, the shoeman provide them with shoes, and the grocer

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give them food, so that the city might benefit.

Mr. Sawyer concluded his remarks with the following:

"The electric railways have been damned and a lot of the damning was coming to them, but efficient operation, fair dealing and a broad public relations policy, coupled with newspaper advertising, is rapidly and rightfully changing the public attitude. The electric railway executives of 1924 merit the respect and the confidence of you other business men. I know these executives and I want you to know them. That is why I want you to come around to the American Electric Railway Association midyear meeting at the Hotel Chase on March 4, 1924."

Electrification of Staten Island Lines Discussed

Plans for the electrification of the Staten Island Rapid Transit Railway and the Staten Island Railway Company lines on Staten Island, N. Y., were outlined by R. D. Wright, general manager of the first-named company, at a hearing before the Public Service Commission in New York City on Feb. 8. Chairman Prendergast presiding. According to the statements of Mr. Wright, if the proposed electrification plans go through, the trains of these two companies will be operated to Brooklyn under New York Bay via the tunnel now being constructed, there to connect with the lines of the Brooklyn-Manhattan Transit to Manhattan Island. In order that this may eventually be done, the Staten Island lines will be equipped with 600-volt direct-current supplied by a third rail, this being the power now used by the B.-M.T. Energy will be purchased, it is said, unless present negotiations for buying power fail. In this event the companies will furnish their own energy.

At the conclusion of the hearing Chairman Prendergast assured the railway representatives that the commission's decision on the desirability of the electrification method outlined would be forthcoming at an early date so that the plans of the companies may proceed.

Twenty-six Cents More an Hour Asked in Des Moines

Union trainmen employed by the Des Moines City Railway have filed thirty-day notice of a request for changes in wage and working conditions at the expiration of the present agreement on March 1.

An increase to a maximum of 80 cents an hour is the principal demand. The present maximum is 54 cents an hour, granted in the so-called Owen award of nearly two years ago. At that time the men protested against the award of the arbiters, but on account of the contract provisions finally accepted the terms.

The new wage demands provide 74 cents for the first three months of service, 77 cents for the next nine months and 80 cents over one year. F. C. Chambers, president of the company, has made a counter proposal naming 44, 47 and 50 cents for the periods specified.

In all, the trainmen's proposal covers twenty-seven different points. Among the other demands are time and a half for Sundays and holidays, with eight hours as a basic day; seven days vacation on full pay each year; inclosed compartments for motormen and the placing of large disks back of block lights.

In the event that the men and the company are unable to arrive at an understanding the matter will go to arbitration in accordance with the terms of an agreement existing between them.

Rosalie Retires

Incarcerated in Police Garage to Await Further Developments in Oakland Fuss

Oakland's one-man cars are still running, but the city's one-man bus, which has been municipally operated for the past four months, has ended its runs and is now laid up in a police garage awaiting further developments.

The abandonment of city bus service was involuntary. It was forced by the refusal of the city auditor to pay the bill for the Rosalie, as the Safety Coach was called by its sponsors, Mayor John L. Davie and Commissioner William Moorehead.

In turning down the bill of $8,250 for the bus, presented by Mr. Moorehead in behalf of the builders, the auditor ruled that the Rosalie had been illegally acquired in that competitive bids had not been called for, as provided by the city charter. He ruled further that the words "Safety Coach," as applied to the Rosalie in the bill of sale, constitute a trade name, thus pinning the city down to the purchase of a particular type of bus, which is contrary to the Oakland laws.

Commissioner Carter, one of the majority members of the Council who has opposed the operation of the Rosalie from the start, expressed public opinion when he said:

> This is the result of jumping into something in a hurry, without taking time to learn what is proper legal procedure. The city's motor transportation venture, apparently, was not thoroughly planned. It has been a regrettable venture.

Commissioner Moorehead called it "petty politics." He added:

> We have decided to withdraw the bus from service until a definite decision has been made as to its payment. The purpose of its purchase was to better transportation conditions in Oakland. This we have done. In the four months the bus has been in operation it has traveled about 18,000 miles, carried 60,000 passengers and cleared $600 over and above expenses.

In the meantime the question has arisen: Who gets the $600?

When the Rosalie appeared on the streets its sponsors were very enthusiastic. They predicted that the coach was merely a forerunner of a whole fleet of city buses. It was even pictured to press and public that the time had arrived to tear down trolley wires, rip up the tracks, end the so-called traction monopoly and have the city go into the transportation business on a big scale.

These views, however, met with a cold reception from the people of Oakland. Many improvement clubs passed resolutions hostile to this plan and the Mayor was advised to "go slow." He and Mr. Moorehead, however, campaigned for their project and lined up one newspaper with them. The other three members of the Oakland City Council opposed the proposition and were backed by the City Auditor, who has refused to sign all warrants for expenses incurred in the operation of the bus.

The bus was a direct challenge to the one-man cars, to which the Mayor and Moorehead are violently opposed. The cars, however, were approved by the State Railroad Commission and they have since been put on six months probation in Berkeley, where an ordinance forbidding their operation has been lifted for that period.

Want One-Man Operation in Springfield, Ohio

Springfield, Ohio, may adopt one-man cars as the best method of bolstering its street railway system, which has not had a profit for some time. Officials of the Springfield Railway have told members of the City Commission that they must have some relief if they are to continue operating.

Under present conditions the railway company pays $500 a month to the city in franchise taxes, paves between its tracks and furnishes first-class service on all lines. The City Commission is considering the proposition and will examine the results of one-man car operation in other cities before arriving at a decision.

One-Man Car Praised at Hearing in Sioux City

The one-man car has come to stay in Sioux City, Iowa, as long as the present fare of 6¼ cents is in effect. This was the declaration of W. J. Bertke of the Sioux City Service Company before approximately 200 citizens who attended a hearing before the City Council.

It was brought out that since the investigation was started the company has maintained an extra car to Leeds during the rush hours when people are returning home from their work in the evening; that smoking on the cars is gradually being eliminated, and that the "school car" from Leeds has not been so overcrowded for a few days, as a "tripper" has followed and picked up the overflow patrons.

After hearing all complaints, Mayor Short summed up the situation as centering on the one-man cars.

C. M. Feist, master mechanic of the Sioux City Service Company, discussed the economic value of the one-man cars. He pointed out that the one-man car reduced operating costs, cut down accidents and enabled the company to exist on a paying basis. He declared that there were 34 per cent fewer accidents with the one-man car than with the two-man car.

Mr. Bertke stated that the company put on all the cars it possibly could and tried its best to accommodate the public. He said that the company runs between 90 and 100 cars on its lines between 5 and 6 o'clock every evening.

The investigation committee will be continued.

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New York City Would Disclaim Responsibility

The plea that New York City is not responsible for injuries caused by its trackless trolley system on Staten Island was put forth as a defense this week in the trial of a suit against the city for $75,000 for negligence. The plaintiff, Mrs. Eva Chrampanis, alleged that her husband, while riding a bicycle on the right side of the road on March 10, 1923, was killed by careless operation of one of the municipal trackless trolley buses, which run on Richmond Turnpike and other streets on Staten Island.

No defense alleging contributory negligence was set up. Instead, the city attorney put forth the claim that the State Court of Appeals had decided the city had no right to operate the line. Hence the city is not responsible for accidents. The presiding judge upheld this plea and took the case from the jury.

If this defense of the city is upheld by the court when the case is again tried in the Supreme Court, plaintiff's counsel avers he will include Mayor Hylan and other city officials in an amended complaint, holding them personally responsible for the operation of the line. He also said he might probably institute injunction proceedings restraining the city from further operation of the line unless he is assured by the city officials that they will obtain from the Legislature the proper authority to maintain and operate the trackless trolley system.

Indiana Union Suffers Serious Accident

A head-on collision occurred on Feb. 2 on the Union Traction Company of Indiana between Fortville and Ingalls. It resulted in the death of thirteen persons certainly, and perhaps three or four others, and the injury of a number of other persons. Each train consisted of a motor car and trailer. All cars were of wood, and took fire. Three of them burned, thereby causing several of the fatalities. The statement made by President Brady on Feb. 3 to the press follows:

The investigation of the cause of the deplorable accident has not been completed. The collision was between Train 21 westbound and Train 24 eastbound. The regularly scheduled meeting point of these trains shown by the official time-tables in the hands of all trainmen is at Siding Mur, which is at the east edge of Fortville. It is the duty of each train to remain at the regularly scheduled meeting point until the opposite train has been met.

The accident occurred east of Siding Dent, which is about 1 mile east of Siding Mur. The dispatcher's records show an order to Train 21, the westbound train, to meet Train 24 at Dent. They show no order to Train 24 to proceed east of Mur, the dispatcher stating that on the arrival of Train 24 at Mur and the non-arrival there of Train 21 he expected on telephone report by the No. 24 trainmen to give them an order to proceed to Dent, and there meet Train 21.

Train 24 did not stop at Mur, but proceeded past Dent, and thereby collided with Train 21, which was proceeding to Dent as authorized by its order. The trainmen on Train 24 say that they received an order at Lawrence directing the meeting of Train 21 at Goul, which is about 9 miles east of Fortville. The order actually received by these trainmen is supposed to have been destroyed by fire, but the records of the dispatcher do not bear out the statement of the trainmen as to this order. The investigation has not been completed, and may not be for a few days.

The automatic block signals between Mur and Ingalls were not in operation Saturday, and had not been for some days, and this fact had been bulletined to all trainmen on the Indianapolis-Muncie line, and was understood by them. The non-operation of these signals was due to work on the high-tension transmission line between Fortville and Ingalls. The block signals are a delicate apparatus, and it is not unusual for them to be inoperative for short periods because of transmission line work or other causes. In such cases it is the well understood practice to bulletin the fact to trainmen, notifying them to disregard signals until notice of their being again in operation is given. It was expected to have the Mur signals in operation again by Monday or Tuesday.

The motormen on both trains were experienced employees, one having been in the service of the company for twenty-five years, and the other for fourteen years. They were regarded as trustworthy and well qualified men.

Improvement Program Announced

A tentative program announced by the Department of Street Railways of the city of Detroit includes extensions, improvements and rehabilitation of street railway lines and equipment estimated to cost between $1,250,000 and $2,000,000. It is planned to commence the work in the spring and it is estimated that the extension program will take about two years to complete. It is planned by the commission to spend such amount of money as is made available out of the $5,000,000 bond issue voted by the electors of Detroit last April, and at the same time continue financing its rehabilitation program from the earnings of the system. As approximately $900,000 is available annually for rehabilitation purposes, the total to be spent during the next two years, including amounts from bond sales and earnings, will approximate $3,000,000.

Twelve new lines or extensions are proposed, the most of which will be extensions into new city territory not now served by the street railway lines. Plans for the track extensions have been completed and only the Mayor's and the commission's approval are needed.

Republican's Transit Bills in New York Legislature

Majority Leader Simon L. Adler of Monroe County on Feb. 6 introduced in the Assembly a bill amending the public service commission law adding a new article eight creating a board of transportation for the city of New York to consist of three members to be appointed by the Mayor of the city of New York.

The bill reflects the Republican idea on transit matters. It was introduced as a party measure ahead of the Democratic bill, which has not yet made its appearance. The measure does not abolish the present Transit Commission, but transfers to the newly created body jurisdiction over subway lines and allows the city of New York to operate itself lines which have been on a paying basis for a period of two years. There is no 5-cent or any other specified rate in the bill. On the other hand, provision is made for adjusting the fare charged so as to meet certain requirements of earnings, fixed charges, interest, amortization of securities, etc.

Guilty Employees of International May Appeal

Federal Judge George S. Morris, who presided at the trial of the four striking platform employees of the International Railway, Buffalo, found guilty of conspiracy in connection with the dynamiting of the Buffalo-Niagara Falls high-speed line train at Ellwood during the strike in August, 1922, signed a writ of error which enabled the four convicted men to appeal to the United States Circuit Court of Appeals. They have been released under $20,000 bail each pending the appeal to the Court of Appeals.

The trial of State Senator Robert C. Lacey, John M. Parker, president of the Buffalo local of the Amalgamated; Clarence F. Conroy. business agent, and Vincent Tuero, financial secretary, on charges of conspiracy in connection with the dynamite outrage, has been adjourned until the March term of United States district court. Additional charges of a more serious character have been brought against several of the alleged conspirators in the dynamite outrage by the Niagara County authorities.

Edward C. Sands of Buffalo, another striking platform employee of the International, was indicted by the Niagara County Grand Jury on charges of burglary, larceny and criminally receiving stolen property in connection with the theft of large quantities of dynamite in Niagara Falls just previous to the dynamite outrage on the Buffalo-Niagara Falls high-speed interurban line at Ellwood Station in August, 1922. When arrainged before Judge Charles Hickey, Sands pleaded not guilty and was released on $2,000 bail.

Hearing Brings Out Defects of New York Home Rule Measure

Another hearing at Albany appears to be likely on the so-called home rule measure for New York State. At the hearing on Jan. 30 under the auspices of Governor Smith's Home Rule Commission critics of the measure said that under the provisions of the bill as drawn mayors would become petty czars, local legislative bodies would be in a position to perpetuate themselves in power indefinitely, regardless of the popular will, and taxpayers would be at the mercy of spendthrift city administrations. However, praise was mingled freely with censure. Practically every one who appeared to criticize had words of commendation for the painstaking labors of the Home Rule Commission in the difficult task confronting it.

The Home Rule Commission is composed of Republicans as well as Democrats, with the latter, however, in the majority. Its chairman is James J. Hoey. He has said he was greatly impressed with many of the recommendations which were made at the hearing and intimated that possibly the bill, when revised, would come up for discussion at another public hearing prior to its introduction in the Legislature.

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Financial and Corporate

Cleveland Goes Behind

Receipts Under Service at Cost with Five-Cent Fare $1,147,159 Less than Expenditures

Expenses of the Cleveland Railway for the year 1923 under the service-at-cost grant exceeded receipts by $1,147,-159, according to the annual report made to the company's stockholders by John J. Stanley, president.

The company's gross income during 1923 was $16,494,312 as compared with $17,082,393 in 1922. This decrease was due to the fact that the rate of fare charged during the year was, for the most part, 5 cents cash, eleven tickets for 50 cents. Since Dec. 1, however, the company has been operating at its maximum rate of fare allowed by the franchise, namely 6 cents cash or nine tickets for 50 cents.

The company's passenger income per fare in 1923 was 5.35 cents, as compared with 5.81 cents in 1922 and

FARE FUND DEFICIT $41,792

The deficit in the interest fund, which is the company's fare barometer, at the beginning of the present year, was $41,792. This fund originally was established at $500,000 and the rate of fare cannot be reduced until it tops $700,000 again.

The company operated 38,282,973 car miles during 1923 and its total riders numbered 417,405,905 as compared with 402,262,233 in the year previous.

During 1923 the company paid out $4,610,536 in wages to its conductors, motormen and trainmen and $1,582,-596 for injuries and damages. Its tax bill amounted to $1,082,195 while its stock and bondholders received $2,-018,411.

In his report to the stockholders Mr. Stanley pointed out that the sort of service rendered by the company was entirely up to the City Council and that its financing for new additions was also a problem for the city to work out. He pointed out likewise that if the city wishes to purchase the lines it could do so by paying $110 a share.

Such capital as the company expended in the year, with but one exception, came from the sale or retirement of property, and such extensions and betterments as are listed are, of course, but a change in the item or character of the property. The exception was the construction of the East Seventy-ninth Street line. The cost of this work was financed by the owners of the abutting property or by concerns directly benefited by the extension of the service, who subscribed and paid for $100,000 of the railway stock. In this connection Mr. Stanley said:

> This was the only stock which the company sold during 1923. The range of prices in the local market was not as extensive in 1923 as in the previous year, the stock not once touching par, nor did it drop below 87⅜. As I have previously said to you, the range of prices for the last four years, while indicating perhaps some tendency toward reaching a figure at which we can hope to finance extensions and betterments, is still pointing to the futility of doing so in the immediate future. So that the form of financing followed the last few years, namely, taking the value of property the city has authorized us to retire and with it paying for other property, the purchase of which the city approves, will continue to go on indefinitely. I have already said that this does not injure either the security of your investment or impair our ability to earn the return on your stock. Because of the limited amount of capital that can be thus used, it does restrict development of the property, making for change without expansion.
>
> This, more than at any time in the last ten years, depends very largely on our partner, the city. Twelve years ago the city by its daily interest and co-operation in our operations created "the best transportation at cost" (and that cost exceptionally low) to be found anywhere in this country. Its attitude on growth and development of the system was likewise most helpful. Should this administration take up anew its responsibilities and carry out its obligations to us and to the public, we will be enabled properly to serve the communities which are Greater Cleveland and to extend and improve our facilities for the making of a Greater Cleveland.
>
> We are committed to the building of a few track extensions and to the completion of the power stations now under way. We should have more cars, at least four new operating stations and, when the city shall have built elevateds or subways, the equipment with which to operate them. But service and growth rest, for the immediate future, with the city rather than with us. The maintenance and operation of the property will continue to be as efficient as we can make them. That we owe both to you and the city.

New Interests Will Continue Massachusetts Lines

A new street railway is being organized in Massachusetts. Charles Melhado and associates have formed the Gardner-Templeton Street Railway, and have purchased at a receiver's sale a part of the Northern Massachusetts Street Railway. To finance the deal they have petitioned the Massachusetts Department of Public Utilities for authority to issue $90,000 of stock. This petition was granted on Jan. 29, after the department had made an appraisal of the physical property, as is required under Massachusetts laws. The property was found to be worth $143,871. The new company will operate that section of the defunct railway which extends from Greenwood's shop in South Gardner to Riley's switch in Templeton.

Voters of Athol, Mass., on Feb. 4 ratified the plan for municipal purchase of the Athol & Orange section of the Northern Massachusetts Street Railway. Action on a bond issue for the purchase will be taken at the annual appropriation meeting on Feb. 21. The section of road is 6.76 miles long. Approval of the sale of a parcel of the railway with equipment for $18,484 to the town of Athol was given recently by Justice Braley of the Massachusetts Supreme Court; also of 500 tons of rails to Henry Lewis & Company, Philadelphia, for $10,000, and 110,000 lb. of copper wire to the Snyder Corporation, Rochester, N. Y., for $30,000.

Pittsburgh Goes Ahead

Owners Preparing to Carry Out Rehabilitation Now that Receivers Have Been Discharged

The property of the Pittsburgh Railway has been returned to its owners. This was done on Feb. 1 under court degree, referred to previously in the ELECTRIC RAILWAY JOURNAL. The court, however, retains certain technical jurisdiction. The degree of this jurisdiction is specified by it in its formal order. Perhaps the most important thing still to be done by the receivers is to file their final report. This they are directed by the court to do before April 1. The account which the receivers are to file will show all their receipts and disbursements from their last accounting, together with a schedule of all claims, debts and liabilities.

The new agreement with the city under which the company will operate will run for ten years. It was drawn up in the fall of 1921 after prolonged negotiations and has only been awaiting the lifting of the receivership to be put into effect. The terms of the measure were reviewed at length in ELECTRIC RAILWAY JOURNAL for Nov. 26, 1921, page 967. Naturally they have come in for comment recently principally by the Mayor in a most favorable light in a formal statement which he made and in a speech by him before members of the local Chamber of Commerce.

Briefly the capitalization of the company will be reduced from about $156,-000,000 to $62,500,000. On this sum the annual return permitted to be earned by the company has been fixed at $3,750,000. A board of control will have a voice in the affairs of the company. Two members of this board will be appointed by the city of Pittsburgh, one by the other municipalities to the agreement and one by the company. Five million dollars is to be spent for rehabilitation. A fixed payment is to be made by the company in place of tolls, taxes and other charges. The claims of the city against the company are settled for $526,091. Fares are to be reduced if there is a surplus from operation and increased if there is a deficit. In other words, there is to be a start anew under modified service at cost.

Declaration of Brooklyn City Stock Dividend Approved

At a special meeting of the stockholders of the Brooklyn City Railroad on Feb. 6 the proposal was approved to increase the capital stock from 1,200,000 shares of $10 par value to 1,600,000. Application will be made to the Transit Commission for authority to issue the additional capital stock as a 33⅓ per cent stock dividend. A quarterly dividend of 25 cents a share was declared on the capital stock, payable March 1, 1924, to stockholders of record Feb. 15, 1924.

As explained in the ELECTRIC RAILWAY JOURNAL for Feb. 2 after the Brooklyn City Railroad, formerly leased to the Brooklyn Heights Railroad, was returned to its owners dividends were

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withheld and capital expenditures in excess of $4,000,000 were made out of earnings. It is now proposed to issue the stock against these expenditures.

Sale of Chicago & Oak Park Line Confirmed

Sale of the Chicago & Oak Park Elevated Railway to the new Chicago Rapid Transit Company, which is a consolidation of Chicago's four elevated lines, has been approved by the United States District Court.

The Chicago & Oak Park has been in receivership for several years, and the other three lines, the Northwestern, Metropolitan and South Side, had arranged to consolidate some time ago.

The organization of the Chicago Rapid Transit Company was referred to at length in the ELECTRIC RAILWAY JOURNAL for Jan. 26, page 156.

Long Island Traction Company Abandons Service

In accordance with an order of Gen. Lincoln C. Andrews, confirmed by the courts, service on the New York & Long Island Traction Company from the Brooklyn city line at Grant Avenue to Lynbrook, L. I., was suspended on Feb. 5. Borough President Connelly of Queens has asked Grover A. Whalen, Commissioner of Plant and Structures, to institute bus service in Queens to relieve the situation. Gen. Andrews in referring to the abandonment said that the matter had been considered from every angle and that the operation of the line was impracticable and impossible under existing conditions. He said that the company would build up the other lines where the patronage was of assistance to it. A committee from the South Ozone Park Civic Club has gone before the Public Service Commission asking for relief. This section was the principal sufferer from the shutdown.

North Carolina Public Service Sold to Holding Company

W. S. Barstow & Company, New York, announce the purchase of the North Carolina Public Service Company by the General Gas & Electric Corporation. Charles B. Hole, his brothers and associates in the North Carolina company retain a substantial interest, but the company will be under the same policy and management as all other properties of the General Gas & Electric Company, the president of which is W. S. Barstow.

The North Carolina Public Service Company was incorporated in 1909 under the laws of North Carolina with a perpetual charter. It owns and operates the electric light and power, gas and electric railway properties in Greensboro and suburbs, the electric light and power, gas and electric railway business serving Salisbury, Spencer and East Spencer and the electric railway business at Concord.

Additional 8 per cent preferred stock of the General Gas & Electric Corporation is being offered at $101.50 per share to finance the purchase.

Issue of $7,000,000 of Common Stock Authorized

By the vote of three to two, the Commission Council of New Orleans, La., has approved the ordinance authorizing the New Orleans Public Service, Inc., to issue $7,500,000 in common stock to be sold at par and to pay dividends not to exceed 9 per cent.

The ordinance carries with it the authorization also to pay a dividend of 9 per cent on the old common stock, amounting to more than $8,000,000, which formerly could pay legally only 8 per cent.

A third provision authorizes the corporation to issue preferred stock at par and with the consent of the Commission Council, as the opportunity arises.

Mayor McShane and Commissioner Ray voted against the ordinance and Commissioners Black, Murphy and Maloney for it.

The Electric Bond & Share Company controls the outstanding common stock in the Public Service, Inc., and will purchase, it is expected, the new issue just authorized.

Those who advocated the issuance of common stock in preference to the sale of additional bonds with which to obtain the funds necessary to undertake the improvement and extensions advance the following reasons for opposing a further sale of bonds:

1. That the matter of allowable dividend rate upon the common stock does not affect the agreed allowance to the earnings on the investment as a whole, which remains at 7½ per cent.
2. That it is highly important to the citizenry of New Orleans that the company be placed in a position to make at the earliest possible time the improvements and additions necessary to effect economical and efficient production of its three classes of service.
3. That the handling of the additional finances by means of a stock issue will make unnecessary the taking out of its earnings $6,187,500 cash in the next twenty-five years and be a more economical method than the issuance of twenty-five year 5 per cent bonds. Bonds will necessitate the amortization and payment of interest and losses due to handling and marketing the bond issue totaling $17,562,500 dividend as follows: par value of bonds, $7,500,000; handling charge, estimated at 5 per cent, $375,000; loss which the company must stand in selling its bonds to meet the market, $1,312,500; and interest for twenty-five years, $8,375,000. Under the stock plan, the company in twenty-five years will pay out of its earnings $11,375,000 as follows: Additional 1 per cent dividend rate on present $8,000,000 common stock, $2,000,000; dividend on new $7,500,000 issue, $9,375,000. In addition it will benefit and the public will benefit through reduced cost of operation through a new equipment to be installed with the new capital.

Formal New York Railways Reorganization Plan Expected

Plans for reorganizing the New York Railways, which operates surface lines in the Borough of Manhattan, were reported on Feb. 8 to have been agreed to by virtually all parties concerned. The properties have been under control of the court for almost four years. The reorganization will be so arranged that the fixed charge and interest obligations will be scaled down to a point where the likelihood will be forever removed of the company's again entering the bankruptcy court. Capitalization of the new company will be low enough, in other words, to permit of ample earnings on a 5-cent fare. The $58,500,000 bond and the $17,500,000 stock structure of the old company did not permit this. The successor company under the reorganization will be divorced from the Interborough, which formerly owned it. A majority of the new common stock, which will be of nominal amount, will be held by banking interests.

Auction Sales in New York.—At the public auction rooms of A. H. Muller & Sons there were no sales of electric railway securities this week.

Messrs. Butler and Taylor Elected at Atlanta.—At the annual meeting of the stockholders of the Georgia Railway & Power Company, Atlanta, Ga., on Jan. 29, Frank L. Butler, vice-president and general operating manager, and W. H. Taylor, vice-president and general manager, were elected members of the board of directors.

Hearing in Connection with Move to Lift Receivership.—A hearing was set to be held before the Public Service Commission of New York at Albany, on Feb. 6, on the petition of W. G. Phelps, receiver of the Binghamton Railway, for permission to issue $700,000 of five-year 6 per cent refunding bonds as one of the steps now under way to transfer the railroad property from the hands of the receiver to the corporation and its stockholders. The application for the extension during the next twelve months of the 6-cent fare agreement between the railway and the city is still pending.

New Director Elected.—C. H. Rembold, business manager of the Cincinnati *Times-Star*, has been elected a director of the Cincinnati Street Railway, to succeed the late Judge Rufus B. Smith.

Ohio River Railway to Be Sold.—The property of the Ohio River Electric Railway & Power Company is to be sold at foreclosure sale at Pomeroy, Ohio, on Feb. 26. It consists of about 13 miles of track, built about twenty years ago, extending from Hobson, Ohio, to a number of towns and villages, together with all rails, poles, wires, cars, etc., used in the operation of the property. Included in the sale is the outstanding common stock of the Pomeroy & Middleport Electric Railway, a subsidiary which supplies electric current for light, heat and power purposes in the village of Pomeroy and territory east of it. The receiver is Harry Hartwell, who, besides his office in Pomeroy, has an office at Room 1034, 120 Broadway, New York. The company has been in the hands of a receiver since 1919.

Net Receipts Lower in Boston.—The trustees of the Boston Elevated Railway have filed with the Massachusetts Legislature a statement for the year ended Dec. 31, 1923, showing receipts exceeded cost of service by $679,631, compared with $1,412,189 in 1922. Total receipts were $34,096,813, against $32,699,176, while total cost of service was $33,417,181, compared with $31,386,987 in 1922. The principal factor contributing to the extra expense during the year was the increase in wages.

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Traffic and Transportation

Anti-Parking Regulations Recommended

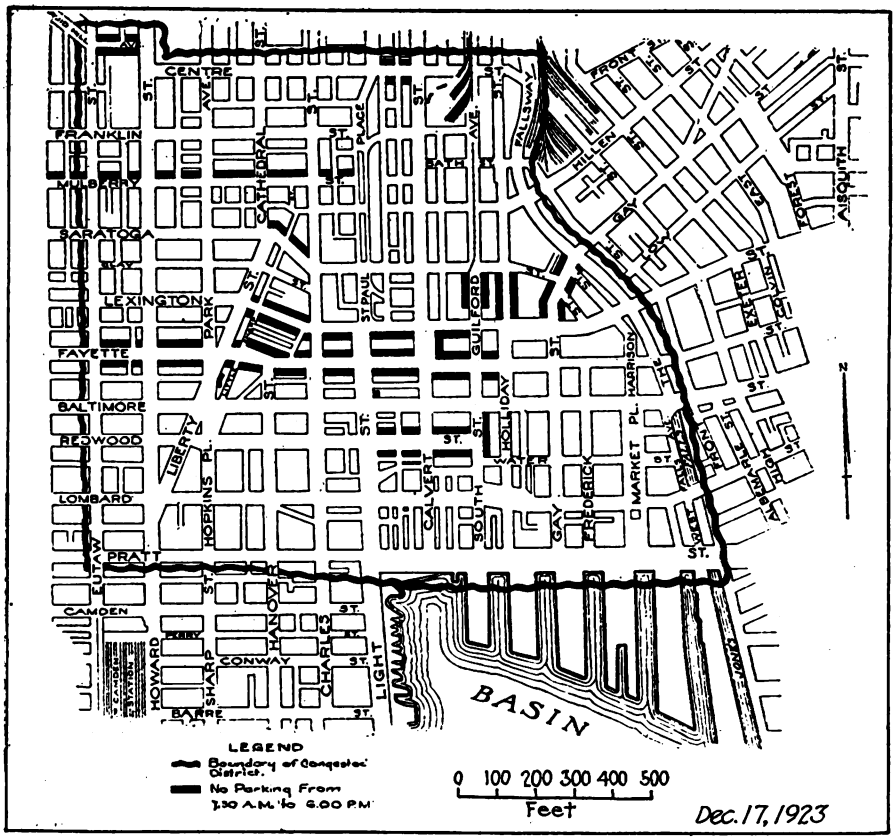
Rules of Pedestrians and Changes of Car Routes Proposed in the Traffic Report Presented in Baltimore

Street congestion in Baltimore is now as bad and if not worse than before millions of dollars were spent by the city after the great fire in 1904 to widen the streets. This declaration is made in the report of the Mayor's committee appointed to investigate the conditions affecting vehicular traffic in that city. A large part of this congestion is brought about by automobile parking, which at present is stopping the flow of commerce—the "lifeblood" of the city.

In the congested district the committee believes that parking should be prohibited between 7:30 a.m. and 6 p.m. on the important streets indicated in black in the accompanying map, also that there shall be no parking between 7:30 and 9:30 a.m. and between 4:30 and 6:30 p.m. on any double car track street within the congested area shown on the map, or on Cathedral, Liberty and St. Paul Streets. On other streets, in the district, within the rush hours named, thirty-minute parking is to be permitted, and between 9:30 a.m. and 4:30 p.m. two-hour parking. Some other restrictions are recommended, and parking is defined as not including the stopping of commercial vehicles for a sufficient length of time to load or unload and passenger vehicles to take on or let off passengers. Power to formulate and enforce traffic regulation should be lodged in the Police Commissioner, subject to the approval of the Mayor.

Within the congested district pedestrians should cross the street only at street intersections, and in all cases at right angles with the street. Those waiting for street cars should remain on the sidewalk until the car is within 200 ft. or less of the stopping point, except where safety zones are established.

The question of street cars in the downtown section was considered, but any idea of their removal "was found to be simply out of the question" because of the dependence on them by the public to reach the business section. A few changes in route were suggested, with the cutting out of some stops on Fayette Street. Other recommendations included a limited amount of street widening, especially at corners, erection of safety aisles, a study of what might be done to reduce the number of steam railroad grade crossings, greater supervision over the licensing of taxicab drivers, etc.



The Mayor's Committee in Baltimore Recommends Strict Anti-Parking Regulations Within the Central Business District as Shown on This Map

Another Atlanta Hearing

Opposition to Plea of Company for Ten-Cent Fare Shows Itself Vindictive —Railway May Use Buses

Descriptions of the Georgia Railway & Power Company, Atlanta, varying from "an organization of public-spirited men striving unselfishly to serve Atlanta" to "a set of hypocrites who would carry public partnership only for public gain" characterized the fourth public hearing on Jan. 29 on the company's petition to the City Council for permission to apply remedies to overcome the alleged critical financial condition on its railway lines.

Dr. Thornwell Jacobs, president of Oglethorpe University, urged that the petition of the railway be granted. He reviewed the history of public enmity for public service corporations and declared that the public, little by little, had throttled the enterprise which was serving it. He came out flatfooted for the granting of a 10-cent fare so as to permit the company to make a fair return on its investment and in turn give the public better service. Any curtailment of service would injure Atlanta's educational institutions.

Myer Goldberg, Atlanta attorney, voiced opposite sentiments. He charged the company with having ulterior motives, and said that the petition should have been carried direct to the Public Service Commission, which body would decide whether or not the appeal was worth considering.

L. N. Parks, an ex-jitney operator, sprang the surprise of the hearing when he declared in favor of a 10-cent fare and a 2-cent charge for transfers by the railway. Mr. Parks said that he had operated a jitney line for a number of months, charging the regular fare of 10 cents per passenger. Even at this rate, he claimed, jitney operation did not pay.

Chairman Atkinson of the board in a recent public address said the company was ready to start bus operation as soon as the earnings of its railway department were sufficient to enable it to borrow the necessary money. He said that the lines under contemplation would be of two sorts—lines connecting up with car lines in suburbs to which the railway had not yet been extended and bus lines supplementing the regular railway lines where the traffic was too heavy.

The railway is asking 10 cents for single cash fares, tickets to be sold three for 20 cents; a 2-cent transfer charge, and the elimination of jitneys from all streets upon which street cars are operating. Final jurisdiction, however, rests with the state commission.

Bus Companies Also Want to Operate on Concourse

Two bus companies, in addition to the Third Avenue Railway, have applied for franchises to operate buses on the Grand Concourse, New York City, and have submitted offers to the Board of Estimate.

The Audubon Transportation Corporation wants a five-year franchise and proposes to divide the Concourse route into two zones, charging a 5-cent

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fare for each, with tickets for school children at twenty tickets for $1.

The Boulevard Transit Corporation asks for a five-year franchise at a 10-cent fare, and declares that, if granted an exclusive franchise, it will invest from $600,000 to $1,000,000 to put in service 150 double-deck buses.

Niles Increases Fare to Ten Cents

The City Council of Niles has passed an ordinance increasing fares on the lines of the West End Traction Company from 5 cents to 10 cents. Retention of car service in Trumbull County seems now assured as the action of the Niles Council has held up settlement of the controversy between the West End Traction Company, a subsidiary of the Pennsylvania-Ohio Electric Company, and the cities of Niles, Girard, Warren and Youngstown. The commission had already granted permission to the company to suspend service. The company's contention was that for the past four years operation had been conducted with an actual loss. When the company threatened suspension the city of Warren authorized the 10-cent fare. Similar action followed later by Girard. The details of the matter have been given previously.

Experimental Service With Hired Buses Proposed for Toledo

Buses rented from private owners are to receive a six-months trial on two routes suggested to the Toledo Council for a crosstown line. In this way the Council hopes to have a referendum of the riders on which route is preferred. Street Railway Commissioner Cann has insisted on the Fearing Street route while the city plan commission has favored the Hawley Street route. The commissioner has received bids and told the Council that it will cost $310 a day to lease twelve buses for the experiment.

It is hardly probable that the crosstown line will be put into service as soon as Council anticipates because the Community Traction Company has not been consulted as yet. B. C. Adams, president, has informally advised the commissioner that the attitude of the company is unfavorable to the bus experiment until the stabilizing fund had been replenished.

Mr. Cann has estimated that the bus experiment will cost between $6,000 and $7,000 a month more than revenues available from the service.

The power problem has become a veritable "Chinese puzzle." The company has filed with the Public Utilities Commission its present rate, which calls for demand charge of $23,000 a month and 0.9 cent per kilowatt-hour. This amounts to a rate of about 1.6122 cents per kilowatt-hour on the basis of amount of power consumed. The commissioner estimates that the rate should be 1.25 cents, or a saving of about $10,080 a month on the total power bill. Court action appears likely.

The 8-cent fare with a token rate of four for 30 cents has resulted in an increase of about 10 per cent in revenues, indicating that the riding public has willingly accepted the higher rate.

Hearing Likely on Connecticut Fare Matter

The Public Utilities Commission of Connecticut is expected to meet at Hartford at a date to be announced later for a hearing on the petitions which some of the cities of the State indicate they will file asking relief from the increase in fares on the lines of the Connecticut Company effective Feb. 10.

Chairman Higgins of the commission is reported to have said that since practically every community will be represented it has also been decided that the petition of the Connecticut Company seeking to increase fares in Bridgeport will be indefinitely postponed and will probably be heard at this time.

It is understood that it is the intention of the commission to take one petition and make a test case, but each city's plea will be heard separately.

The company is seeking to restore the rate of three tickets for 25 cents formerly in effect for the present rate of two tickets for 15 cents.

Ticket Fare Rate Increased in Grand Rapids

Ticket fares on the Grand Rapids Railway, Grand Rapids, Mich., were advanced on Feb. 1. Passengers had been paying 50 cents for seven tickets, but now pay 50 cents for six tickets. Cash fares remain at 10 cents. The increase in fare is made under the new service-at-cost franchise which provides that when the equalization account shows a debit of $50,000 the fare shall increase one step. At any time the account shows a credit of $50,000 the fare automatically will decrease a point.

Whenever the fare increases under the franchise the rate of return allowed the company decreases. The rate allowed under the former fare was 8 per cent on the valuation. With the increase in fare the rate allowed is a fraction more than 7 per cent.

Final Action Expected on Feb. 14 on Philadelphia Bus Proposal

That no charge should be made the Philadelphia Rural Transit Company, bus operating subsidiary of the Philadelphia Rapid Transit Company, for the use of the city's streets by its buses is the opinion of Mayor Kendrick of Philadelphia. This statement was made by him in answer to criticism leveled at the proposed ordinances now under consideration by the City Council granting free franchises to the company for five bus routes in the northeastern district of the city.

The ordinances were approved by the Council committee on transportation and public utilities on Feb. 5 after a stormy three-hour debate. The Council cannot act on the proposals until its regular meeting on Feb. 14. Three amendments were approved by the committee. One of these reserves to the city the right to grant bus franchises to other companies. The second provides that the city has the right to run its own bus lines if desirable later on, and a third provides for payment by the bus company of $250 a year for each bus operated after 1930 and makes possible cancellation of the franchise in 1937.

Express Bus Service Started.—The Public Service Railway started the operation of express automobile coach service on its Fairview line in Camden, N. J., on Jan. 29.

Buses Will Replace Cars.—The City Commission of Astoria, Ore., has authorized its city manager to advertise for bids for a franchise to operate buses in Astoria, to replace the railway service of the Pacific Power & Light Company, which has surrendered its franchise.

Will Oppose Barring Order.—The Motor Bus Owners' Association of Springfield, Mass., facing the prospect of its members being barred from operating in the city after May 1 through the Mayor's refusal to approve a renewal of licenses for any applicant except the Springfield Street Railway, recently sent letters to various manufacturing concerns of the city urging them to support the bus operators in their appeal for a reversal of this policy. The bus owners contend that the Mayor would exceed his rightful authority in arbitrarily barring all independent buses.

Wants to Charge Five Cents.—The Glendale & Montrose Railway has filed an application with the California Railroad Commission for authority to cancel the commutation fare between Glendale and Eagle Rock, Los Angeles County, amounting to 3⅓ cents a ride. The company wants to charge the regular fare of 5 cents a ride.

New Rates Announced.—The ticket rate on the lines of the Hutchinson Interurban Railway, Hutchinson, Kan., is two for 15 cents and seven for 50 cents in accordance with the recent approval of the Public Utilities Commission. As was announced in the ELECTRIC RAILWAY JOURNAL, issue of Feb. 2, the new rate is 8 cents for a single ride instead of the old 6-cent charge, which was blamed by the company for the heavy loss in 1923. The company had asked for a 10-cent fare, but Emerson Carey, president of the company, accepted the suggestion of Judge Reed of the commission, who, with Jesse Greenfield, heard the case.

Traffic Regulations in Force.—The new traffic regulations affecting Chestnut and Walnut Streets, Philadelphia, were recently adopted by the drivers of vehicular traffic. The new regulations restrict motor and horse drawn vehicles to the left-hand side of the two streets, with no parking permitted on either side of the street within the zone. Conductors of the Philadelphia Rapid Transit Company said that for the first time in many months they had been able to keep up to their schedules as a result of the new regulations. President Dunbar of the Philadelphia Rapid Transit Company told Traffic Director Fritz that he would be more than willing to co-operate with the police in helping to straighten out the congested traffic problem which has confronted the city.

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Book Reviews

"Studies in the Economics of Overhead Costs"

By J. Maurice Clark. University of Chicago Press, Chicago, Ill., 1923. 502 pages.

The author describes this book, in the preface, as "a bit of research into the principles of dynamic economics," and he says that its central theme is unused capacity. Electric railway readers know what this means because of the expense to which they have to go in providing cars and distribution and power capacity for use during only a very short time during the day, namely, during the rush hours. They do not always realize that this same condition of peak load and unused capacity occurs with many other lines of business, with variations sometimes daily, sometimes weekly, sometimes seasonal, and sometimes varying according to the prosperity of the country or fashion. In fact, most lines of business have their peak loads, all the way from farming, whose fluctuations are seasonal, to laundries, where the peak load seems to come during the first part of the week. In discussing the relation of overhead costs to production, the volume discusses other factors as well as fluctuations in production, and a special chapter is given to public utilities.

The Construction of Vitrified Brick Pavements

Published by the National Paving Brick Manufacturers' Association, Cleveland, Ohio, January, 1924.

This ninety-two-page volume describes a number of types of brick pavement for highway construction. Recommended specifications and methods of construction are included. One entire chapter is devoted to vitrified brick pavements with street railway tracks.

Standards of the Electric Power Club—Electric Power Apparatus

Fifteenth Edition. Published by the Electric Power Club, Cleveland, Ohio, October, 1923.

This handbook of electric power apparatus standards, now in its fifteenth edition, is issued for the first time separate from the Year Book of the club. It is a reference work of practical information concerning the manufacture, test, and performance of electric power apparatus and control equipment. The book contains standardized practice in the United States, following the standardization rules of the A.I.E.E.

New sections have been added for the standardization effected with electric drills and reamers, electric arc welding machines, storage batteries for mining and industrial locomotives, synchronous motors, abbreviations and symbols for use in wiring diagrams. Definitions relating to power switchboards and oil circuit breakers have been added, and certain standard transformer ratings have been made preferred ratings.

An Investigation of Powdered Coal as Fuel for Power Plant Boilers

By Henry Kreisinger, John Blizard, C. E. Augustine and B. J. Cross. Bulletin 223 of the Department of the Interior, Bureau of Mines, Washington, 1923. 92 pages, illustrated.

This bulletin gives the results of a series of thirty-six tests made on a 468-hp. Edge Moor boiler fired with pulverized coal at the Oneida Street station of the Milwaukee Electric Railway & Light Company. The bulletin describes the equipment and gives the results that can be obtained with this fuel under a power plant boiler. It also discusses the effects of variables such as type of burner, fineness of coal, moisture, furnace temperature and admission of air. The results of the tests show that an over-all boiler efficiency of 80 to 83 per cent can be obtained.

A Survey of Electric Power and Light Companies of the United States

Published by Bonbright & Company, Inc., New York, 1923.

This survey, which has been compiled by the publishers, presents a series of maps and tables by means of which the electric companies operating in cities and towns of 2,500 population and over are listed. These companies serve practically the entire urban population of the United States. The capitalization and earnings of the larger companies are set forth in tabular form, and an additional series of maps shows all transmission lines in the United States operating at 11,000 volts or over. A few characteristic facts about each state are included in the volume, so that the general type of activity of the inhabitants of the territory may be quickly visualized. The relative sizes of the cities and their rate of growth are also presented to give a rough indication of the trend of power demands.

The United States census of 1920 has been used as the primary source for the list of cities and towns and population statistics. Much of the material has been obtained through the cooperation of the officials of the larger power and light companies, the McGraw-Hill Company publications, and the various statistical agencies.

Jubilee of the Glasgow Tramways, 1872-1922

Published by the City of Glasgow, Scotland, 1923. 107 pages, illustrated.

It is eminently desirable that the Glasgow Corporation should put in permanent form a record of the historical addresses and other features of the jubilee of the Glasgow Tramways, which was celebrated Aug. 19, 1922, when this system completed its first fifty years of public service. The system started as a horse line of 2¼ miles in length, on which the fare was 2d. When the franchise expired in 1894, there were 32 miles which were taken over by the city and equipped with electricity. There are now 128 miles, including 6¼ miles of subway and 21¾ miles in Paisley and two other outlying towns, soon to be joined up as part of the Glasgow system. The revenue has increased more than ten times. Besides the interesting matter contained in the text, the book is illustrated with portraits of some of the men who have been prominent in the affairs of the tramways, a view of the jubilee procession led by one of the early horse cars, and other interesting views.

The Regulation and Management of Public Utilities

By Charles Stillman Morgan, Ph.D., Boston and New York: Houghton, Mifflin Co., 1923. 362 pages.

The change which has come over the utility from an independent competitive enterprise to one whose activities are controlled, whose profits are limited, and whose return is guaranteed to some extent by the state, may not always be appreciated by those engaged in utility work, because they have seen the transformation come gradually. Nevertheless, the change is profound in its effects, and the purpose of Dr. Morgan's book is to consider the influence which it has had on utility management.

In his book the author has classified utility managers, for want of better terms, as entrepreneurial and non-entrepreneurial. The former, through extensive ownership of securities in the company, are identified in interest and motives with similar owners of industrial and other business enterprises. The non-entrepreneurial manager may have a small proprietary interest in the undertaking, but is primarily a professional manager chosen by the owners for the attainment of the best results. The latter type of manager is becoming increasingly numerous, and one of the principal problems considered in the book is to determine, with this class of management, and with the conditions and limitations following commission regulation, the means by which efficient management in public utilities may be retained. There are many stimuli to this result, among them professional zeal, opinion of others similarly engaged, etc., and it is interesting to note that the author suggests the possibility of a national prize or number of prizes to those managers who in a given interval, as in a year, make the largest contribution to the science or technique of management in the utility field.

Service-at-cost franchises are also considered as regards their effect on company management, and the different incentives or lack of them in various such franchises are discussed, including the plan of rewarding the management in distinction from the capital in the enterprise for signal efficiency. Much of the discussion in the book relates directly to electric railways, so that the book appeals particularly to electric railway readers.

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Personal Items

J. S. Bleecker Leaves Ohio Electric

Joins Management Corporation in Philadelphia—Messrs. Pogue and Zimmermann Advanced

Completion of the separation of the various traction lines in the old Ohio Electric Railway system, which at one time comprised more than 600 miles of track, was announced on Feb. 5, together with numerous changes in the management of the Indianapolis, Columbus & Eastern and Columbus, Newark & Zanesville lines.

The two companies have been operated by one management for the last two years, but under the new arrangement each is resolved into itself with separate management and offices.

John S. Bleecker, who has been general manager for the two concerns, is leaving to become associated with the management department of Day & Zimmermann, public utility operators, with headquarters in Philadelphia.

J. M. Pogue, Springfield, who has been purchasing agent for the joint management, becomes general manager of the Indianapolis, Columbus & Eastern with headquarters at Springfield and R. Z. Zimmermann, who has been local manager at Zanesville for the Columbus, Newark & Zanesville, becomes general manager of that company with headquarters at Zanesville.

The two properties have been operated jointly for the respective bondholders by the Day & Zimmermann organization ever since the old Ohio Electric Railway system, of which they were a part, was thrown into the hands of a receiver and dissolved on order of the federal court.

During the last two years Mr. Bleecker, as general manager of the properties, has devoted his efforts toward re-establishing the lines in the confidence of the public as common carriers. Largely as a result of the efforts of the personnel directed by him it is said that the two companies are now on a better financial basis than at any time in recent years.

Desire of the bondholders to exercise more immediate control over their own properties is given as the reason for the segregation of the lines.

The Indianapolis, Columbus & Eastern extends from Dayton to Columbus via Springfield and the Columbus, Newark & Zanesville line from Columbus to Zanesville via Newark. The Indianapolis, Columbus & Eastern also operates a line between Springfield and Lima.

Toledo & Western Changes Announced

C. A. Brown has assumed the duties of superintendent of the Toledo & Western Railroad, Sylvania, Ohio. Mr. Brown has been for a number of years master mechanic of the Community Traction Company of Toledo. P. W. Peugeot, formerly superintendent of the Toledo & Western Railroad at Sylvania, has been appointed assistant master mechanic of the Community Traction Company. It is understood that W. A. Smith, formerly assistant master mechanic, has been made master mechanic.

Staff of Chicago Surface Lines Reassigned

Guy A. Richardson has been elected vice-president and general manager of the Chicago Surface Lines. He became identified with that organization a year ago as vice-president in charge of operation.

Frank L. Hupp has been appointed assistant to the president as well as secretary of the Chicago Surface Lines. Mr. Hupp has been associated with President Henry A. Blair for many years. He entered the service of the old Chicago Union Traction Company in 1903 as secretary and later was continued as secretary of the Chicago Railways until 1920, when he was elected secretary of the Chicago Surface Lines.

Joseph V. Sullivan, who has been assistant to the president of the Chicago Surface Lines since 1920, has been appointed assistant to the vice-president and general manager. John E. Wilkie has been given a similar title. Both will assist Mr. Richardson with specially assigned duties.

Halbert O. Crews has been appointed supervisor of publicity of the Chicago Surface Lines. Mr. Crews comes from Springfield, Ill., where he has been engaged in publicity work for a number of years.

William Kiefer Elected President

At the regular stockholders' meeting of the Shamokin & Mount Carmel Transit Company, held on Jan. 21, William Kiefer was made president and general manager of the company. Mr. Kiefer has been associated with the company for the past sixteen years as treasurer. He replaces E. W. Samuel, who resigned on Feb. 1, because of failing health.

D. C. McClure Appointed General Superintendent

D. C. McClure, superintendent of the electrical department of the Public Service Company of Denver, Col., has been named general superintendent of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo. Mr. McClure, a graduate in electrical engineering, Rensselaer Polytechnic Institute, has been connected for many years with the Denver Gas & Electric Company (Public Service Company). He has supervised many big undertakings for the Public Service concern, his ability and untiring zeal winning for him the advancement to his new position.

E. B. Meissner Heads St. Louis Car Company

Executive Long Vice-President of Car Manufacturing Company Is Promoted to Succeed Mr. Beggs

Edwin B. Meissner, vice-president of the St. Louis Car Company, was elected president and general manager of the company on Feb. 2, succeeding John I. Beggs, who at his own request was made chairman of the board. Mr. Beggs stated that the advancement of Mr. Meissner was in recognition of exceptional services rendered in the building up of the business of the St. Louis Car Company during the thirteen years of Mr. Meissner's administration of its affairs. Mr. Meissner went to St. Louis from Milwaukee to become associated with the St. Louis Car Company on Feb. 1, 1911.

Started to Work at Thirteen

On Jan. 1, 1899, a little more than twenty-five years ago, at the age of thirteen, Mr. Meissner entered the service of John I. Beggs, then president of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., as messenger and office boy at $8 per month. Prior to that time he attended public school, and one semester of high school, but he had to discontinue studying during the day because of financial reverses occurring at that time to his father. As an auxiliary to his office boy wage income Mr. Meissner had a morning paper route and other minor interests in magazine and similar selling schemes customarily utilized for the earning of so-called pin money for boys.

Soon after entering the employ of Mr. Beggs as office boy in 1899, Mr. Meissner took up a night school course in shorthand, typewriting, bookkeeping and commercial law; that completed, he took a three-year course at night equivalent to university training in electrical engineering, and after that a law school extension course, completing his night studies at the age of about twenty.

Transferred from Milwaukee to St. Louis

He gradually advanced in Mr. Beggs' employ through the accounting department, purchasing department, and finally to the position of chief clerk to the president, which position Mr. Meissner occupied when he was transferred from Milwaukee to St. Louis, still to continue in the service of Mr. Beggs as assistant to the president in the administration of the affairs of the St. Louis Car Company. On Jan. 1, 1916, he was promoted to vice-president of the St. Louis Car Company. As previously stated, Mr. Meissner, now only thirty-nine years of age, has been advanced to the post of president and general manager of the car building company. This company, by the way, is one of the most important manufacturers of rolling stock equipment and appurtenances for both electric and steam railroads in the United States. It is a $3,000,000 concern with a 60-acre plant on North Broadway in the so-called Baden district.

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New Pittsburgh Railways Department Heads

Careers of Messrs. Fitzgerald, Phillips and Boyce Reviewed Briefly—On These Men Will Fall Responsibility to Carry Out Details of Rehabilitation Program

ANNOUNCEMENT of the appointment of Thomas Fitzgerald, Frank R. Phillips and William H. Boyce to the Pittsburgh Railways now that the receivership has been lifted was made by Arthur W. Thompson, president of the company, on Jan. 31. As noted briefly in the ELECTRIC RAILWAY JOURNAL for Feb. 2, page 198, Mr. Fitzgerald is general manager, Mr. Phillips mechanical and electrical engineer and Mr. Boyce commercial manager. All the other officers and employees of the company will continue in the service in their respective capacities subject to the regulations governing the responsibilities of their positions.

Mr. Fitzgerald is familiar with the system in Pittsburgh, having made a survey of the district the last three years as consulting electric railway engineer. It is expected that he will put into effect, as soon as possible, many features which have been discussed by the city and company for the improvement of service.

Mr. Phillips, in charge of mechanical and electrical developments, will follow the expansion of the company facilities, particularly the 300 new cars, the greater facilities needed to house them and many other developments.

Mr. Boyce in his capacity as commercial manager, which corresponds to the sales manager of industrial establishments, will devote his time to the merchandising and transportation, fare systems, quality and quantity of service, public relations and such other duties as may be assigned by the general manager.

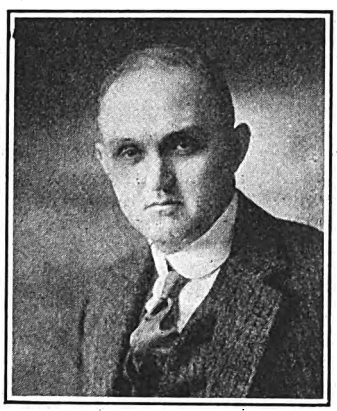
Mr. Fitzgerald was born and educated in Baltimore, graduating from Johns Hopkins University with the degree of Bachelor of Arts in 1898, after which he took one year of post-graduate work. The following year he served as inspector of the Third Avenue Railroad, New York, and then accepted the position of superintendent of the Fairmont & Clarksburg Electric Railroad in charge of railway and electric lighting activities, a position he held until 1902. During the next year he was made general superintendent of the Portsmouth district of the Norfolk, Portsmouth & Newport News Company, in charge of railways and electric lighting in Portsmouth, and Norfolk county ferries, operating between Norfolk, Portsmouth and Berkley, Va. He also was engaged in special work reporting on physical and operating conditions of the Roanoke Railway Company.

From 1903 to 1905, Mr. Fitzgerald served as general manager of the Lexington Railway, Lexington, Ky. In 1908 he transferred his activities to Cincinnati, becoming purchasing agent and assistant to vice-president of the Ohio Traction Company, Cincinnati Traction Company, Cincinnati Car Company, Cincinnati Northern Traction Company and the Indiana, Columbus & Eastern Traction Company. He was promoted in 1907 to assistant general manager of the Ohio Traction Company and Cincinnati Traction Company, which post he retained until 1913, when he was made general manager of these two companies. While serving as general manager he was called upon to make a number of reports on the operating and physical condition of the Columbus, Buckeye Lake & Newark Electric Railway, the Columbus, Newark & Zanesville Electric Railway, the Indianapolis & Northwestern Traction Company and the Columbus & Lake Michigan Railroad.

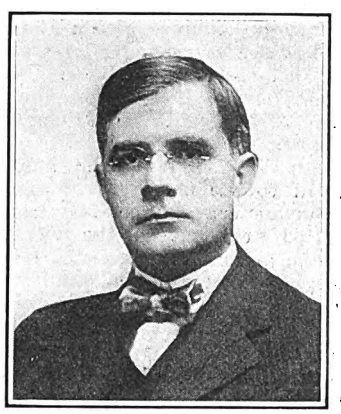
Mr. Fitzgerald's traction activities were interrupted by the war, but following his discharge from the army as lieutenant colonel in 1919, he opened offices in Pittsburgh as consulting electric railway engineer. During the past few years he has made a comprehensive study of the Pittsburgh Railways system and assisted in the plans for the reorganization.

Mr. Phillips is one of the most widely known engineers in the electric railway industry. He has been connected with the Pittsburgh Railways for many years. Last December he was elected president of the Pennsylvania Street Railway Association. Before going to Pittsburgh, he was master mechanic of the Cleveland Railway in 1894, after leaving high school in Cleveland. He has served the Pittsburgh Railways in many capacities, becoming superintendent of equipment in 1910 and retaining this position until his appointment by the receivers as general manager.

Mr. Boyce began his street railway experience in February, 1902, as a trainman on the railways of the electric light and street railway company of Terre Haute, Indiana. He later became shopman and interurban car dispatcher and in March, 1903, was transferred to the Dallas Electric Light & Power Company of Dallas, Tex., where he became meter man and superintendent of the meter department and eventually assistant superintendent of the company. In September, 1905, he became superintendent of the Sherman Gas & Electric Company of Sherman, Tex., and went to Pittsburgh in February, 1906, to become division superintendent and assistant superintendent of transportation of the Pittsburgh Railways Company. On Aug. 1, 1909, he was made superintendent of the Beaver Valley Traction Company and Pittsburgh & Beaver Street Railway, being elected general manager of those companies April 15, 1920. The work that Mr. Boyce has done along the lines of selling transportation has raised him to be a figure of national prominence along this line, so much so that his services are in almost constant demand among companies other than his own as a transportation consultant.



Thomas Fitzgerald



F. R. Phillips

W. H. Boyce

Wisconsin Promotions Announced

Orman Koenes, for the past four years manager of the Wisconsin Gas & Electric Company at Kenosha, Wis., has been promoted to the position of electrical engineer of the northern division of the company. Here he will be in charge of construction and engineering work of the company in Waukesha, Burlington, and Whitewater as assistant district manager, working under the supervision of George W. Boteler, who was recently promoted from man-

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ager at Waukesha to district manager of the above-mentioned divisions.

Mr. Koenes' place in Kenosha will be filled by H. M. Pauley, who for five years has been superintendent of the electric light and power systems at Racine. He will also include in his activities the management of the railway property. Mr. Pauley joined the electric distribution department of the Milwaukee Electric Railway & Light Company of Milwaukee about ten years ago. He went from there to the city of Racine.

Coincident with the announcement of these promotions it is stated that Mr. Pauley's position will be filled by Peter Van Susteren, who has been assistant superintendent of the company's street railway and electric distribution lines in Racine.

Obituary

Granger A. Hollister, president of the Hollister Lumber Company, Ltd., and vice-president of the Rochester Gas & Electric Corporation, died suddenly in Rochester. Mr. Hollister assisted in the formation of practically every traction and lighting corporation in the vicinity of Rochester.

Dorsey Dallas Denton, for twenty-two years a supervisor with the United Railways, St. Louis, died recently. He entered the employ of the St. Louis property in 1896 as a conductor and six years later was promoted to the office of supervisor.

William D. Dwyer, general counsel of the Twin City Rapid Transit Company, Minneapolis, Minn., died Jan. 30 at his St. Paul home. Mr. Dwyer was born sixty-four years ago in Liberty, N. Y. He took degrees at the normal school in Albany and at Cornell University. At the age of twenty-one he was admitted to the bar and became a special county judge. In 1908 Mr. Dwyer became chief counsel for the St. Paul City Railway and in 1917 general counsel for the Twin City Rapid Transit. He had been active in the hearings on the valuation of the Minneapolis company before the Minnesota State Railroad & Warehouse Commission.

James Raymond Hammond, district manager of the division of construction and engineering, Stone & Webster, Inc., with headquarters at Cleveland, Ohio, died recently at Cleveland. Mr. Hammond was forty-seven years of age. He had been connected with Stone & Webster since 1909. A large part of his work was performed in Texas, where he was active in electric railway construction.

George H. Benjamin, for many years trainmaster for the Boston Elevated Railway, died recently. He was born in Wallace, Nova Scotia, in 1861 and went to Boston when a young man. He entered railway service with the old Cambridge Street Railway, driving a horse car between Harvard Square in Cambridge, and Bowdoin Square, Boston. Later he operated one of the first electric cars for the West End Street Railway in Boston.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Status of Trade Associations

Such Bodies May Lawfully Compile and Publish General Economic Information—Law Interpreted

Trade associations may lawfully collect from individual members statistical data necessary to the compilation of general information, and the latter may be properly and lawfully as well as beneficially published by them. Wilson Compton, secretary and manager of the National Lumber Manufacturers' Association, made this plain in a letter to Stephen B. Davis, solicitor of the Department of Commerce.

This letter constitutes the first public statement on behalf of a national industrial association in interpretation of the requested informal opinion on the subject given to Secretary of Commerce Hoover by Attorney-General Daugherty and recently made public. This opinion has been variously interpreted, owing to apparently conflicting statements contained therein. Mr. Compton holds that the law and the Attorney-General's opinion are:

1. Trade associations may lawfully gather from members individual detailed information on production, orders, shipments, stocks and prices, but this individual detailed information may not be given to the public or distributed to members.
2. General information showing the conditions of an industry and changes in supply of and demand for its products, such as the total production, shipments, stocks on hand and the average price or range of price, etc., may be compiled from the information obtained as above and may be published.

It will be recalled that Mr. Hoover wrote to Mr. Daugherty to ask his opinion as to whether, in view of recent court decisions and decrees, trade associations could collect and publicly disseminate fundamental information in regard to their trades. There has been great diversity of opinion as to the meaning of the reply, some associations even taking the position that it means that the Attorney-General considers it unlawful for trade associations to collect and publish that general information in the absence of which business generally and the economic direction of the country's affairs will necessarily be without intelligent guidance.

Mr. Compton asserts in his letter to the Solicitor of the Department of Commerce that no other conclusion than that stated makes it possible to reconcile the several statements in the Attorney-General's letter. He says:

A natural, and if you please, I might say a common-sense, interpretation of the Attorney-General's letter is that the Attorney-General has plainly, although indirectly said, that the activity in question—the compilation and publication by trade associations, of current trade information—is not *per se* unlawful. For example, the Attorney-General says:

"In my judgment the effect of general information as to the conditions of an industry, such as the total production, shipments, stock on hand, and average price or range of price, is entirely different from that resulting from each person engaged in an industry receiving directly or through a common medium reports which reveal to him the exact condition of the business of his competitors. When thus informed each one is invited and is naturally inclined to imitate the conduct of his most successful competitor; and the spread of comradeship created by the confidential exchange of information of this character necessarily prevents the free competition between them, which would otherwise prevail."

As Mr. Compton sees it, the Attorney-General draws a sharp distinction between the two sorts of information—first, the general compiled information descriptive of the industry's conditions, and, second, the intimate detail description of the condition of the business of each competiitor individually. Mr. Compton points out that it is the latter, namely, the detailed information disclosing the identity of individual competitors and the intimate details of a competitor's business, which the Attorney-General holds cannot legally be distributed, although it may be collected, for he says in his letter to Mr. Hoover:

I see no objection to its being gathered by an association, provided it be strictly guarded and the association prohibited from distributing it among its membership.

New Type Gasoline-Electric Car Sold

The first of a new type gasoline-electric passenger car intended for use in railroad service has been sold to the Chicago Great Western Railroad and will be demonstrated some time in May or June. This car was developed by the co-operation of the General Electric Company with the St. Louis Car Company, the Electromotive Engineering Company of Cleveland and the Winton Engine Company. It will seat fifty-six persons, has 100 sq.ft. of baggage room, is arranged for double-end operation and will be capable of maximum speeds up to 60 m.p.h. The car will weigh, complete, and "ready to roll," approximately 54,000 lb. It will have capacity sufficient to handle a 35-ton trail car behind it.

Metal, Coal and Material Prices

Metals—New York	Feb. 5, 1924
Copper, electrolytic, cents per lb	12.562
Copper wire base, cents per lb	15.25
Lead, cents per lb	8.20
Zinc, cents per lb	7.00
Tin, Straits, cents per lb	51.125
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$5.075
Somerset mine run, Boston, net tons	2.175
Pittsburgh mine run, Pittsburgh, net tons	2.00
Franklin, Ill., screenings, Chicago, net tons	1.825
Central, Ill., screenings, Chicago, net tons	1.35
Kansas screenings, Kansas City, net tons	2.25
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$6.60
Weatherproof wire base, N.Y., cents per lb	17.00
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal	$0.95
White lead, in oil (100-lb. keg), N.Y., cents per lb., carload lots	11 74
Turpentine, (bbl. lots), N. Y., per gal	$1.02

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Paving Brick Industry Active

A sharp increase in unfilled orders for vitrified paving brick in December is reported to the United States Department of Commerce by the National Paving Brick Manufacturers' Association.

Unfilled orders in December had jumped to 60,624,000, as against 54,535,000 for November, and this is considered an accurate gage of the demand for early spring and summer shipments. Stock on hand exceeds the total of unfilled orders. It is interesting to note, also, that contractors and engineers are assisting in relieving the seasonal aspect of the paving brick industry by asking for winter deliveries, shipments for December amounting to 12,979,000.

Kansas led in consumption for December, followed closely by Ohio. In the distribution of unfilled orders Oklahoma leads the list, with Ohio, West Virginia, Pennsylvania and Illinois following in order.

Rolling Stock

Dallas Railway expects to receive on March 1 the thirty cars ordered some months ago. The detailed specifications of these cars follow:

Builder of car body	C. C. Kuhlman Car Company
Type of car	Peter Witt
Seating capacity	50
Total weight	34,000 lb.
Bolster centers, length	26 ft.
Length over all	45 ft. 8¾ in.
Truck wheelbase	5 ft. 4 in.
Width over all	8 ft. 5 in.
Body	Semi-steel
Interior trim	Cherry
Roof	Monitor
Air brakes	General Electric
Axles	Brill
Bumpers	Angle iron
Car signal system	Faraday bell signals
Car trimmings	Bronze
Center and side bearings	Brill
Conduits and junction boxes	Duraduct
Control	General Electric-K
Curtain fixtures	Curtain Supply Co. ring fixtures
Curtain material	O'Bannon
Designation signs	Hunter
Door operating mechanism	National Pneumatic
Fare boxes	Johnson
Fenders or wheelguards	H. B. Life Guard
Gears and pinions	General Electric
Hand brakes	Brill
Heater equipment	Consolidated Car Heating
Headlights	Golden Glow
Journal boxes	Brill
Lightning arresters	General Electric
Motors	4-G. E. 265 inside hung
Paint	Enamel
Sanders	Ohio Brass
Sash fixtures	Bronze
Seats	Brill
Seating material	Wood slat
Springs	Brill
Step treads	Feralum
Trolley retrievers	Knutson
Trolley base	General Electric
Trolley wheels	General Electric
Trucks	Brill-77-E
Ventilators	Railway Utility Company
Wheels	Rolled Steel 26 in.
Special devices, etc.	National Pneumatic interlocking door control with conductor-motorman signals.

Birmingham Railway, Light & Power Company, Birmingham, Ala., through its superintendent, is rushing delivery on twenty new cars which are expected to reach Birmingham about March 1.

Warren Street Railway, Warren, Pa., has purchased two new cars.

Cleveland Railway in 1923 added sixty-four cars to its equipment.

Wheeling Traction Company, Wheeling, W. Va., ordered in 1923 two interurban two-man cars from the Cincinnati Car Company. The total weight of the cars was 48,000 lb. and the seating capacity was seventy-two.

Track and Line

Cleveland Railway during 1923 renewed 11.67 miles of single track and built 6.13 miles of extensions.

Wisconsin Public Service Corporation, Green Bay, Wis., will spend approximately $3,000,000 during 1924 in carrying out its improvement program, which includes extensions and additions.

Southern Pacific Company, San Francisco, has been granted permission by the California Railroad Commission to construct spur tracks in the cities of San Francisco, El Centro and Oakland.

Pacific Electric Railway, Los Angeles, Cal., has applied to the commission for authority to reconstruct the grade crossing of its track between Twenty-seventh Street and a point easterly of Nineteenth Street in the city of Newport Beach.

Manchester Street Railway, Manchester, N. H., during 1923 rebuilt 1 mile of city track.

United Railways, St. Louis, built 3.17 miles of city track paved with granite in 1923 and rebuilt 21.72 miles.

Power Houses, Shops and Buildings

Columbus Railway, Power & Light Company, Columbus, Ohio, is planning to erect a new 150,000-kw. station laid out for five 30,000-kw. turbine-generator sets, two of which have been ordered from the General Electric Company.

Pittsburg County Railway, McAlester, Okla., will build a new power station at McAlester to cost $450,000. The power station will be built by the Choctaw Power & Light Company and the Pittsburg County Railway jointly, as both are owned by the same parent company. A new terminal station and office building are also to be built during the year by the interurban company.

New York, New Haven & Hartford Railroad has awarded the contract to the Anchor Construction Company for the erection of a new steel building, 24 ft. x 26 ft. on Spring Street, New Haven.

Trade Notes

Ingot Iron Railway Products Company, Chicago, has been organized for the development and promotion of sales of Armco corrugated metal culverts in the railway field. The central office is located at 1318 Peoples Gas Building, Chicago.

Stevens & Wood, Inc., New York, N. Y., announces that John W. F. Bennett, recently chief construction engineer of the American Sugar Refining Company, has become associated with them, in their work of engineering, financing, construction and management, as vice-president and contract manager effective Feb. 1.

Okonite Company, Passaic, N. J., has recently opened a branch office at Pittsburgh, Pa. It is located at 1111 First National Bank Building. It will be in charge of Edward A. Damrau, district manager.

Western Electric Company, New York, N. Y., has moved its supply department office in Minneapolis to 413-417 South Fourth Street.

Scott-Jaqua Company, Inc., Indianapolis, has opened offices in the Roosevelt Building as electric sales representative and engineer. The purpose is to better serve the electric field in construction and illuminating material and equipment from Indianapolis as the distributing center. The principals in the company are John F. Scott and Charles A. Jaqua, both of whom have been identified with the electrical industry in India in various capacities for several years. In addition to the merchandising activities of the business the company offers a high grade engineering service to its clientele to assist in proper and economical application of the equipment and construction material. The manufacturers of which the company is a direct representative include the American Steel & Wire Company, the Frank Adam Electric Company, the Kuhlman Electric Company and other prominent manufacturers.

Ohio Brass Company, Mansfield, Ohio, has purchased about 5 acres of land with buildings just across the Pennsylvania Railroad tracks from its present Mansfield, Ohio, plant. The tract is bounded by three trunk-line railroads—the Pennsylvania, Erie and Baltimore & Ohio. The purchase was made from the Aultman-Taylor Machinery Company.

American Bosch Magneto Corporation Springfield, Mass., has obtained a final injunction from the state and federal courts against the Bosch Ignition Corporation, Chicago, permanently restraining it from using the name "Bosch." According to the announcement of the Springfield company the sale by agents of the Bosch Ignition Corporation of transformers which they may have in stock is in direct violation of the injunction orders.

C. Garness, formerly with the American Car & Foundry Company, has been appointed supervising engineer of railway car inspection by the Robert W. Hunt Company. Mr. Garness was graduated as a mechanical engineer in the Technical School of Bergen, Norway, and after being associated with the Westinghouse Electric & Manufacturing Company and the Carnegie Steel Company entered the engineering department of the Standard Steel Car Company, at Butler, Pa., where he remained four years. For the past twelve years Mr. Garness has been associated with the American Car & Foundry Company, first in its general office at St. Louis and also at its Detroit shops, during 1917 and 1918. Since that time he has been engaged as mechanical engineer of the American Car & Foundry Company shops at Chicago.

The Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has tentative plans under advisement for extensions of its plant at Sharon, Pa., used for the production of transformers. It is said that the present output of distribution transformers will be doubled.

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New York, February 16, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 63
Number 7

Chuck, Chuckety, Chuckety, Chuck—or Clank, Clinkety, Clackety, Clank

THE sounds made by cars passing over special trackwork tell much as to the kind of maintenance that is being done on the cars. Cars in proper condition pass over rail intersections with a "chuck, chuck" that imparts to the mechanically tuned ear an evidence of tightness of parts and good solid body and truck mechanism—a noise that is not especially unpleasant to hear. On the contrary, poorly maintained equipment clatters and clanks and rattles over the special work and joints and produces noises that are exceedingly annoying and wearing on the nerves. The trackwork may also contribute to the clattering noises if it is in bad condition with loose inserts and bent switch tongues. And such trackwork certainly shakes the equipment to pieces so it will rattle worse.

Sleeping in a hotel recently in a city where the latter kind of maintenance is manifestly practiced, the thought came to the writer that such rattling, clanking noises certainly make one think of the junk yard and perhaps contribute more than we realize to the impression part of the public has that the street car is obsolete.

Moral: Tighten up. There is no necessity for such noises. The rattles can be taken out by proper attention to maintenance.

Preheating and Slow Cooling Assist in Welding Large Castings

THERE is a broad application for the welding of cast iron in electric railway repair work if we learn how welds can be made successfully. The difficulties that have been experienced come from the fact that cast iron is naturally brittle and weak, and the application of welding heat at one point while the surrounding metal remains cold creates forces and strains that are likely to make the weld unsound. Even if the weld holds, cracks in other portions of the casting may occur. It thus becomes apparent that means must be employed to avoid this irregular heating and cooling.

That this is practicable and successful is shown by the practice used in the shops of the New York & Harlem Railroad for welding large conduit yokes, given elsewhere in this issue. It consists of heating the casting by gas flames beforehand and while the weld is being made and cooling the casting slowly and uniformly.

Results so far indicate that the method is very successful. Special equipment is used in this case. The welding stand has gas burners incorporated for the preheating, and two annealing ovens have been constructed and equipped with adequate facilities for handling the castings into and out of the ovens.

Some railways have reported satisfactory results in welding large iron castings by temporarily surrounding the castings with brick and then applying heat by gas torches or a charcoal fire. The weld is then made rapidly and the casting is allowed to cool slowly before the bricks are removed. This rough method, of course, increases considerably the cost of the welding over that where special equipment is used, but special equipment may not be justified if only an occasional weld on a large piece is to be made. Methods may vary with different conditions, but preheating, rapid welding and slow cooling are essential to assured success.

The composition of the welding rods used is another factor in obtaining satisfactory results. Manufacturers of welding materials recommend the use of rods having not less than 3 per cent of silicon for welding iron castings. Silicon in sufficient quantity keeps cast iron soft and so the strains from cooling are reduced.

Merchant Has Vital Interest in Good Transportation

THERE have been so many cases in large and medium sized cities of the temporary stoppage of the trolley service through strikes or hostile political action that it is now possible with fair accuracy to predict what will happen. It was not so easy to do so in 1919, when the cars were withdrawn in Toledo and kept out of service for twenty-eight days. Then the possibilities—and limitations—of the jitney, the bus and the private automobile for conducting the local transportation of the city were not so fully known. Since the historic Toledo case, there have been a number of other instances of extended shut-downs, notably in Bridgeport, Des Moines, Saginaw and on the Public Service Railway in New Jersey. Now has come Akron.

In all of these instances it is found that the first members in the community to suffer material financial loss from the stoppage of the trolley cars are the large retail merchants. Of course the rest of the community also is greatly inconvenienced, but those who have to travel can make shift for some time without a great deal of discomfort, if the weather continues good, by using various nondescript public and private conveyances. In the meantime, those who do not actually have to travel stay at home. But the retail business in the center of the city is entirely dependent for its prosperity on good local transportation facilities between the center of the town and the residential districts. Most of the customers of these stores are women, and if they cannot reach the down-town store comfortably, a great many of them will buy their necessities from a neighboring store or mail order house and will postpone the rest of their purchases. Some may telephone their orders, but if the average department store had to depend for its business on its telephone sales, it would soon be obliged to close its doors.

Hence, it is significant that the retail merchants in Akron have already raised a strong protest against the

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stupidity of the Mayor, which brought about the present unfortunate situation. The trolley cars in Akron are now being seen in their true light, i.e., as the means by which the commercial life of the city is kept going. Ultimately, of course, the cars will have to come back. Akron is too large a city to be able to get along with buses only. But when the cars resume service it will have to be under much more favorable conditions than existed before the present trouble.

Electrification at the A. I. E. E. Meeting

THE low availability for service of the steam locomotive was stressed as one of the principal problems of steam operation at the transportation meeting of the American Institute of Electrical Engineers, held at Philadelphia, Feb. 5. Figures presented showed that the availability factor of the steam locomotive is somewhere between 25 and 45 per cent on various roads, while for the electric locomotive the factor is, from Norfolk & Western service records, 85 per cent.

The time required for turning the engine at the end of the line, for the electric, is little more than that needed for uncoupling it from one train and coupling it onto another. The steam engine, on the contrary, has to be taken to the roundhouse, have its fire dumped, the water drawn off, the boiler washed out and minor repairs made. Then it must have its boiler filled and a new fire built before it can go out on the road again. While great steps have been made in recent years toward increasing the length of engine divisions, particularly by the use of oil-burning engines, and so reducing the frequency with which this turning operation has to be performed, still it takes a not inconsiderable portion of the total time, and so reduces the availability.

Another factor that was brought out at the meeting is that when the greatest demand comes on the system the electric locomotive is especially effective. The case of the New Haven Railroad, which has extreme peaks to handle in connection with football games in New Haven, was cited. Then each year every electric locomotive owned is in service and is kept running just as long as it is needed to handle the traffic. Such continuous service is not practical with the steam locomotive, and hence more steam locomotives are required to handle a heavy peak than electric. Similarly, the annual heavy traffic season can be handled under electric operation with comparatively less investment in locomotives than with steam, because the electric moves the trains faster and is tied up for repairs and inspection for a so much smaller part of the time. In other words, the extra investment required to handle peaks, both seasonal and special, is substantially less for electric.

There seems to be a feeling on the part of some steam railroad men that the electric locomotive still is an untried machine, and that it is necessary to electrify an entire main line division before any really conclusive evidence can be obtained for or against it, as practically all accounting is by divisions only, with no segregation of the electric from the steam where both are used on a division. The figures that were cited as to what electrics already have done do not bear out this contention. On the Norfolk & Western, for instance, the electric locomotives have done more than the most modern steam operation ever was able to do. They have moved a greater tonnage per train and per day, have done it with less delays and failures on the road, and at a lower cost. Furthermore, the electrified section, which under steam operation was the limiting point of the system, now has ceased to determine the capacity of the road. On the Chicago, Milwaukee & St. Paul installation many of the limitations due to heavy grades, tunnels and bad coal have been eliminated, so that the capacity of that road is materially greater than before electrification, particularly in winter.

If the attitude of the steam men is to be that the case for or against electrification cannot be proved until an entire division is electrified, it would seem that there will be no real progress until some railroad has the foresight and the courage to go ahead and make such an installation. Are railroad men going to leave it to Henry Ford to show the way on the D. T. & I.? There are numerous divisions where electrical engineers estimate that large savings can be made. One was cited at the meeting where, after figuring charges of every sort, a profit of 15 to 20 per cent could be shown on the investment. Certainly with such a margin the risk cannot be very great.

Nor is it necessary to wait until a perfect locomotive is developed for electric service. The only way to learn to swim is to jump into the water. Experience covering nearly thirty years has developed a number of types of electric locomotives good enough so that they have given more than satisfactory service under nearly all conditions of traffic. High-voltage, low-voltage, alternating-current, direct-current locomotives can all be used.

Altogether, it seems that the engineers have been prone to hold the penny so close to the eye that the sun is obscured. Small details and cost figures pertaining to the electrified division only seem to have kept them from seeing what has been pointed out, namely, that the main value of electrification is the increased use of the entire railroad plant and the higher earning power of the system as a whole which it makes possible.

It Pays to Lay Out Maintenance Work in Advance

IT STANDS to reason that much more can be accomplished by a given expenditure of time and effort when the work is carefully laid out in advance and is conducted along a logical plan of procedure. Sad to relate, this practice is not followed on all electric railway properties. As one maintenance engineer remarked to the writer, "Why worry and waste effort before you know that anything is wrong?"

One large Eastern property followed this haphazard practice for years, and not until it had passed through a receivership and a reorganization was the fallacy of the procedure recognized. Nevertheless, that much can be accomplished along these lines is well shown in the article by Frank B. Walker elsewhere in this issue.

Much of the gain is not from the improved equipment alone, but from the careful planning of the season's work well ahead of time, so that each machine could be in use for the longest period possible, and the men could be kept working steadily. This meant that a smaller amount of equipment had to be purchased and a smaller force hired. With the smaller number of men to train, of course they attained expertness and were able to do more and better work. The gain to the company has been very considerable, not only in cost but in performance, and through that, in improved public esteem.

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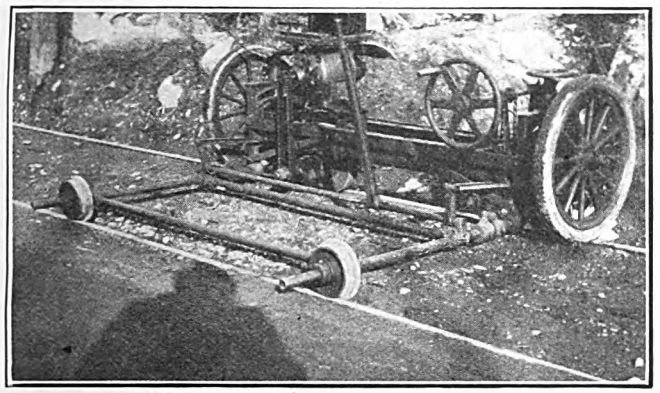
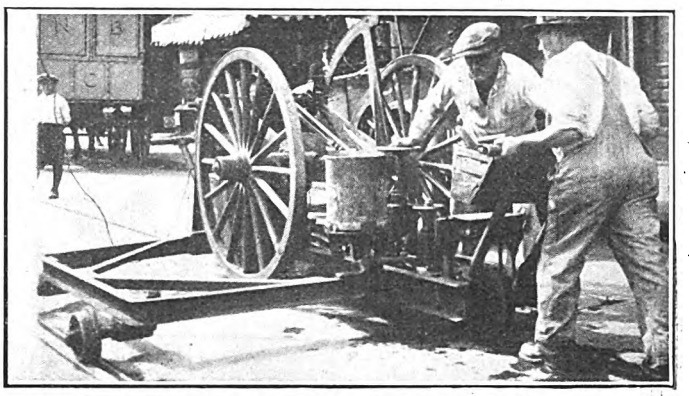




Universal Rotary Grinder and Reciprocating Grinder at Work on Eastern Massachusetts Street Railway

Applying Quantity Production Methods to Maintenance of Way

Construction Forces Organized According to Manufacturing Practice to Obtain Intensive Use of Track Machinery on Eastern Massachusetts Street Railway — Selection of Proper Equipment for Diversified Jobs Is Important—School for Training Men to Do More and Better Work Found Helpful to Economical Maintenance

By Frank B. Walker

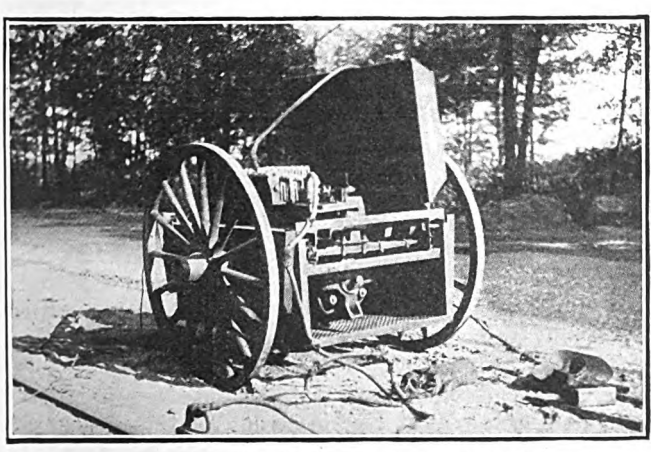
Chief Engineer Maintenance of Way, Eastern Massachusetts Street Railway

IN THE rehabilitation and maintenance of its 680 miles of track, the Eastern Massachusetts Street Railway has recently adopted machinery and methods which have greatly expedited the handling of the work. Substantial savings in labor and material have been accomplished.

When the public trustees took over the property in 1919 the track and roadbed were in poor condition as a result of long-deferred maintenance during the war and during the period when the company was in receivership. A comprehensive plan of way betterment was started late in the summer of 1919. The carrying out of the program has involved the organization of the work on a divisional basis, the acquisition of various types of track equipment, and the thorough training of the departmental personnel in the use of improved equipment for track repairing. Close attention to enlarging the force in the spring and summer and reducing it again in the fall, as shown on an accompanying chart, has greatly increased the efficiency of the work.

In order to keep machinery going all the time, several things are necessary. First, the amount of work to be done must be known in advance. The Eastern Massachusetts Street Railway works on a budget system. From the general budget the track department calculates its various jobs and details the items of work to be done. The number of men to be employed and the amount of material to be purchased must be determined, and a definite schedule is necessary in order to assign machinery to the several divisions and to prepare a working program for this equipment. After this has been done, the various jobs are formally and systematically authorized. Charts are prepared showing the progress expected during the season of different items of work, such as seam welding, joint grinding and surface welding.

A close study is made of the progress of each division, and when one division has failed to keep up to the anticipated rate, inquiries are immediately started to determine the difficulty. It is found occasionally that



The Company Used Two Types of Welders, the Dynamotor Type, at Left, and the Resistance Type, at Right

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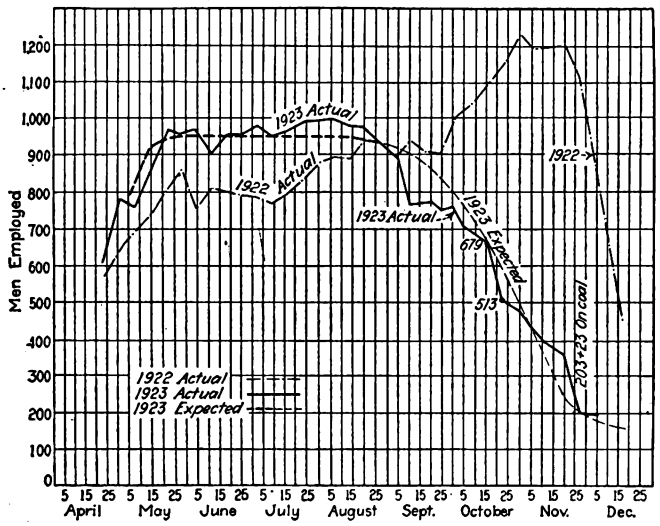
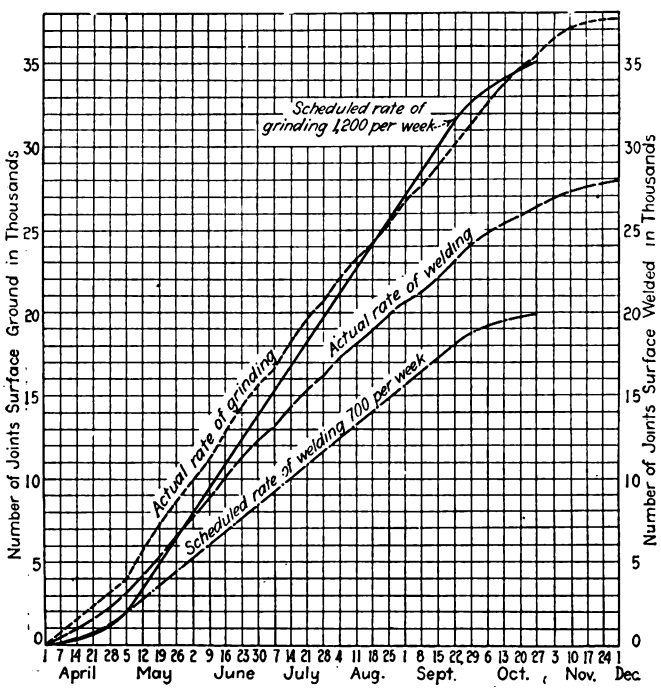


Labor Chart for 1922 and 1923

work has not been opened up in sufficient time to keep up the anticipated rate; sometimes material has not been ordered or delivered in time, machinery may have broken down, or production may have fallen off for some other reason. However, the department accepts no alibis for failure of production. Even labor conditions or machinery failures are not always considered adequate excuses.

The rate of production is set high, but certain allowances are made for unexpected contingencies. It has been found in general that if the men directly in charge of the work correctly anticipate their wants so far as ordinary material is concerned, production can be kept at high speed. Ratings are given by the engineering department to several types of machines. For example, in seam welding of T-rail with 24-in. joints, a rate of ten joints per welding handle per nine-hour shift is expected. With 30-in. joints the rate is nine, and with 36-in. joints it is eight. On girder rail, the rate of welding per handle per shift is seven joints when they are 24 in. long, six joints when they are 30 in. long, or five joints when they are 36 in. long. In grinding, the schedule calls for eighteen surface welded joints or thirty-six other joints per grinder for each nine-hour day.



Scheduled and Actual Joint Grinding and Welding, 1923

Unless a definite daily quantity of work is assigned, the desired production for the season cannot be obtained, nor can it be determined whether or not gangs are working efficiently. The question has sometimes been asked, why were only a few items selected for this quantity production? The answer is that in repairing, overhauling or reconstructing a track, the last thing done is the joint work. Those items, such as joints, which are selected as standards for measuring production, represent a finished product. It is necessary for the forces to put in ballast, do the lining and surfacing, ditching, tie renewals and all other miscellaneous work, except paving, before the joints are finally finished.

Complete reports are prepared by each division for the general offices twice a week during the construction season, detailing the work done and also showing the amount per half week and the total to the date of the report. Where slowness appears in a particular job after an analysis, special attention is given by sending out instructors, or in some cases engineers, to inspect the work closely. In other cases of more important problems, the chief engineer gives his personal attention to bringing up the quantity of work.

Progress charts are kept, showing for any given date the number of joints welded up to that time and the number ground. On these charts are shown also curves for the estimated rates of progress, so that it can be seen at a glance whether or not the work is proceeding according to schedule. This close supervision is necessary in order to accomplish such a large amount of maintenance work over scattered divisions.

IMPORTANCE OF HAVING THE RIGHT MACHINERY

To keep the track maintenance equipment continuously in use during the entire season has been the aim of the railway. It is the policy to purchase all machinery necessary to do the work properly and efficiently, provided such equipment can be used throughout the entire working season. Machinery, even though of proper design, is of little value if it can be used only a small portion of the time.

Equipment used by the track department must be portable, rugged and simple, not only in its operation but in its maintenance. It must also be well protected against the weather and should have parts which can be readily detached, covered, or fastened on so securely that they cannot be stolen, as the machinery must be left along the roadside in many instances. There is room for still further development of portable track machinery. Manufacturers should not attempt to adapt shop equipment for use of the track department without being sure that such machinery can stand the extra heavy service brought upon it by use under all conditions of weather, sand and dust storms, and being operated by men who are not mechanics.

Due to the wide separation of jobs on the system, which covers both city and country areas north and south of Boston, the company did not purchase the larger pieces of track maintenance equipment available on the market. Such purchases would have resulted either in excessive investment or in too much idle time and difficulties in meeting local demands for the service of particular large units.

The gradual purchase and installation of track maintenance machinery followed recommendations by the engineering department after more or less extended research and experiment, working out the machine use

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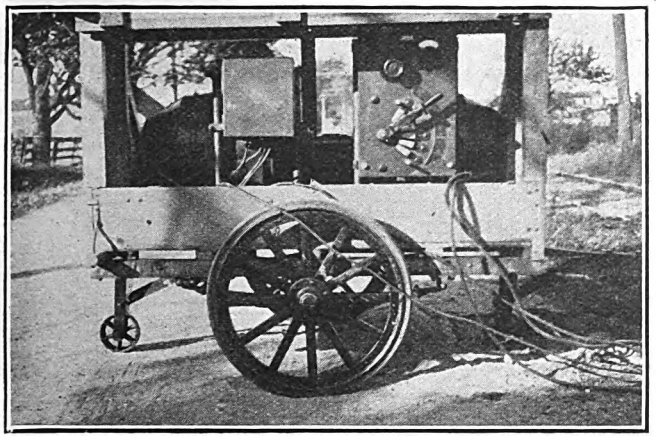
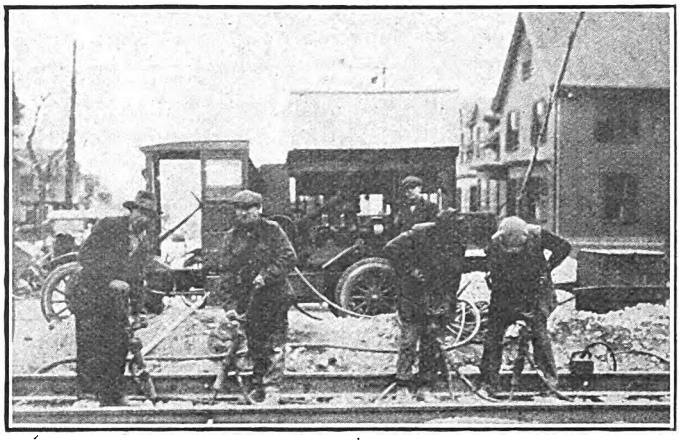


Shop Welder on Wheels for Outside Use. Tool Box on Roof



Track Air Compressor Mounted on a Ford Truck

through a system of reports, and including sending out instructors and conducting a winter track school.

The equipment finally purchased and in use on the Eastern Massachusetts Street Railway includes twenty-four rail joint seam welders, of which twelve are of the Rail Welding & Bonding Company Type WW, six are the same company's Type B, five are General Electric shop welders mounted on trailers, and one is a Westinghouse shop welder also mounted on a trailer.

All these machines with the exception of the Type WW are limited by their capacity to the use of one welding handle. The capacity of the latter is sufficiently great to permit two welding handles, so that there are thirty-six welding handles with twenty-four machines. All of these seam welders are of the so-called "dynamotor" or "motor-generator" type, permitting reversal of the polarity of the arc. The surface welders used by the company are all resistance machines of the direct polarity type and consist of ten Indianapolis welders, five Erico welders and nine Ajax welders. For grinding the joints there are twenty-four Universal joint grinders and six Seymour "Midget" grinders, as well as ten reciprocating grinders for grinding corrugated rails.

Vertical rail benders are used to a considerable extent, forty-seven having been made by the company.

Eighteen electric tie tampers of the Jackson type, having 4 tamper units each, are used. Compressed air is provided by two Ingersoll-Rand portable compressors, each mounted on a Ford chassis. These are used for tie tamping and operating concrete breakers.

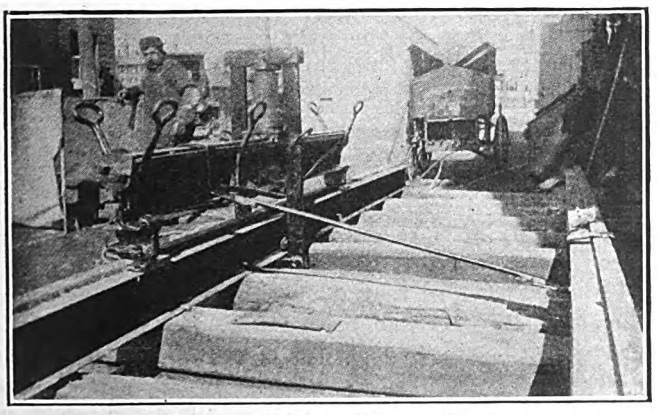
Other equipment used includes a Racine electric rail saw, a "Nut cracker" clamp designed by the company for holding plates in place while welding, an electric brush for cleaning rail joints, and an electric hammer for cleaning rail joints. These two latter machines were used for experimental purposes.

The company also has twenty-four acetylene cutting torches, forty track drills and various other small units of the usual type.

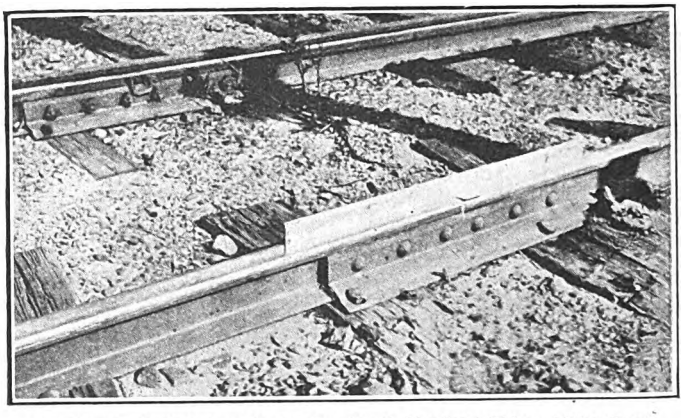
The theory upon which the engineering department works is that poor trackwork is just as likely to be the fault of the supervisory forces as it is to be the result of incompetence or unwillingness on the part of the workmen. Old methods of doing trackwork were apparently satisfactory up to a few years ago, there having been few changes for a number of years. More recently, however, maintenance methods have been much modified by the development of certain types of machinery such as welders, grinders, rail benders, mechanical tampers, etc.

It is hardly to be expected that foremen and trackmen should be familiar with the newer methods and be able to get the desired results without special instruction. On the Eastern Massachusetts the training of these men has been combined with the instructions of the supervisory forces, including managers, superintendents, engineers and roadmasters, as well as foremen, sub-foremen, welders, grinders, bonders, trackmen and laborers. Instruction was started at the top, working downward through the various grades to the men with picks and shovels.

A most successful school for track forces was conducted under the direction of the chief engineer during the winter of 1921-1922. Subjects were classified under the headings of bonding and joint welding, surface welding and grinding, special work drainage in open track, tie renewals and joint repair work, construction of city tracks, and reports. The classroom was equipped to accommodate about twenty-five students, with facili-



Vertical Rail Bender Used by the Eastern Massachusetts Street Railway



Testing Rail Joints with 36-In. Steel Straight Edge. The Card Indicates a Cup of 0.005 In.

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TABLE I—MACHINERY UNITS AVAILABLE SEPT. 20, 1923, AND WORK COMPLETED DURING YEAR TO DATE

THE UPPER FIGURES SHOW THE WORK DONE DURING THE PREVIOUS WEEK AND THE LOWER FIGURES ARE FOR THE YEAR TO DATE

The enlargement of the track force in spring and summer is a feature of quantity production methods on the Eastern Massachusetts Street Railway

	Force	Jobs Working	Auth. Open and Working	Welders Working Seam	Welders Working Surface	Joints Welded Seam	Joints Welded Surface	Grinders Working U.	Grinders Working R.	Grinding Completed Joints	Grinding Completed Feet of Rail	Electric Tampers Working	Ties Tamped Hand	Ties Tamped Mach'y
Chelsea	64	5	1 working	2	1	29	54	1	0	112	0	0	0	0
			3 open			1,231	1,341			2,267	12,847		472	10,057
Melrose-Woburn	79	4	2 working	1	2	12	59	2	1	54	144	0	147	0
			4 open			389	2,480			2,462	17,458		2,843	459
Lynn	78	11	8 working	3	1	47	26	1	1	26	319	2	0	210
			36 open			1,062	1,447			2,578	35,026		758	9,699
Salem	52	6	4 working	2	2	0	60	2	1	78	193	1	167	120
			14 open			1,659	2,141			4,219	11,118		5,021	7,083
Lowell	98	4	7 working	2	3	38	93	2	0	93	0	2	29	212
			13 open			3,003	3,438			3,607	5,270		2,883	12,735
Lawrence	48	5	3 working	1	1	16	4	1	1	12	525	1	30	240
			4 open			1,104	1,000			1,489	20,375		2,440	4,690
Haverhill	14	2	1 working	1	1	0	11	1	0	11	0	0	8	0
			4 open			329	813			971	0		6,152	1,750
Milton	2	1	0 working	0	0	0	0	0	0	0	0	0	0	0
			0 open			0	0			0	0		1,070	0
Norwood	8	0	0 working	0	0	0	0	0	0	0	0	0	10	0
			1 open			6	6			414	0		1,089	0
Hingham	0	0	0 working	0	0	0	0	0	0	0	0	0	0	0
			0 open			0	0			0	0		399	1,206
Weymouth	20	2	1 working	1	0	8	0	0	0	0	0	0	28	0
			2 open			43	116			18	0		748	330
Quincy	48	8	6 working	0	0	0	0	0	1	0	335	1	125	250
			8 open			413	621			644	16,540		3,455	3,897
Brockton	137	9	6 working	4	3	60	120	3	1	121	510	3	130	151
			16 open			413	6,294			6,645	13,357		7,418	8,294
Taunton	27	2	2 working	0	1	0	50	1	0	45	0	0	0	0
			3 open			1,078	204			447	0		2,000	5,158
Fall River	107	5	5 working	2	2	31	51	2	1	85	280	1	275	300
			18 open			1,272	1,874			2,461	12,827		10,279	11,805
Total	782	64	46 working	19	17	241	528	16	7	637	2,306	11	949	1,483
			126 open			13,490	21,775			28,222	144,818		47,037	77,163

ties for showing lantern slides. The school was in session five days a week, beginning late in December and running to the latter part of February. Sessions lasted five hours each day, half of the time being assigned to illustrated lectures by the engineering staff or occasionally by manufacturers' representatives.

The afternoon sessions were devoted to the actual demonstration of track maintenance machinery, which was set up in the shop for instruction purposes. The shop contained sections of both sand-ballasted and rock-ballasted track so that seam welding, surface welding, grinding, tamping and other operations could be carried out on full-sized track sections. About 125 men went through the school. Classes were divided according to occupations, and attendance for not more than one day per week was required of any one individual. Many valuable suggestions bearing upon working methods in the field were received from those attending the school. The sessions were repeated during the winter of 1922-1923 and will be resumed again this year.

The railway has kept records of the amount of work of various kinds done for several years. The tremendous volume of such work may be judged from the fact that 137 miles of paved track or 47 per cent of the total paved track mileage have been welded. In unpaved territory 211 miles or 66 per cent of the total unpaved trackage have been welded. For the system as a whole 348 miles or 53.5 per cent of the total of 650 miles have been welded.

TABLE II—SUMMARY OF TRACK MAINTENANCE WORK DONE BY EASTERN MASSACHUSETTS STREET RAILWAY

	1921	1922	1923	Total
Joints welded	34,822	37,415	17,841	90,078
Surface welding	19,591	26,654	27,713	73,958
Joints ground	26,182	59,559	37,688	123,429
Linear feet of corrugated rail ground	.....	175,426	165,899	341,325
Ties tamped with electric tampers	.....	.....	92,000	92,000

	1920	1921	1922	1923	Total
Miles of track rebuilt	29.4	16.9	33.5	22.6	102.4
Miles of track overhauled	89.5	51.1	69.9	33.8	244.3
Ties installed	103,996	69,252	115,259	100,159	388,666
Pieces of special work installed	479	257	374	510	1,620

An analysis of the welded joint failures may be of interest. By the end of 1922 there were 77,128 seam-welded joints, of which, in the years 1921 and 1922, there were 265 broken joint plates or 0.34 per cent, 195 broken rails or 0.25 per cent and 120 broken welds or 0.15 per cent, a total of 580 failures or 0.74 per cent in the two years. By the end of 1923 there were 89,969 seam-welded joints, of which, in the years 1921, 1922 and 1923, there were 523 broken joint plates of 0.58 per cent, 320 broken rails or 0.35 per cent, and 131 broken welds or 0.15 per cent, a total of 974 failures or 1.08 per cent in the three years. For this work the organization of the engineering department has included a chief engineer, a return circuit engineer in charge of welding, bonding and machinery, three division engineers in charge of construction and maintenance, one assistant engineer and three men doing instrument work, two welding and grinding instructors, one chief clerk and one stenographer.

In spite of the vigorous attempts which have been made to accomplish a large volume of work, efforts have not been spared to produce at the same time a good quality of work. It has constantly been impressed upon the men by teaching in the school, by the criticism of the instructors that quality must not be sacrificed for quantity. It has been found on the whole that where men failed to produce quantity they usually failed also to produce quality. Where they work, however, they do good work. The workmen have been encouraged more than they have been criticised. It has

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been the theory that the men want to do good work and failed in doing it only through lack of proper instruction on the part of their superior officers. This theory in the main has proved to be correct. In the few cases where men were found unwilling to work the company adopted the policy of quickly dispensing with their services.

When the very poor condition of the track existing in 1919 is considered, the tremendous volume of work done can be realized. As a result, riding has become more comfortable, noise has been eliminated, the expense of car maintenance has been reduced, as well as that of track maintenance, and derailments, particularly those due to the defective track, have become infrequent. This has not been accomplished without the expenditure of a great deal of effort on the part of the executives, but it is felt that the results have more than justified the efforts.

Welding Large Iron Castings with the Oxyacetylene Torch

The New York & Harlem Railroad Is Successfully Welding Conduit Yokes—The Castings Are Heated with Gas While They Are Being Welded and Afterward Cooled Slowly in Annealing Ovens—Cost of a Reclaimed Yoke One-sixth the Price of a New One

A DEPENDABLE autogenous weld on a large iron casting is extremely difficult to make, due to the fact that the metals in the casting adjacent to the weld are melted by the local heating. When this source of heat is removed, the molten iron solidifies quickly, owing to the large body of cold material in the casting around the portion melted. Naturally, that portion of the metal which has been liquefied and then cooled quickly is very hard, and uncombined carbon is brought to the surface. This carbon has a deteriorating effect on the weld, acting as a separator between the casting and the deposited metal. The volume of the metal at the weld decreases considerably as the weld cools, the linear contraction of cast iron while cooling from its melting point to ordinary room temperature being approximately 1 per cent. This means that each foot of length contracts approximately ⅛ in. It is evident that severe stresses are set up by this contraction of the welded metal, and as a result either the casting soon breaks again or the weld is pulled apart.

A process to obviate this difficulty in the welding of cast iron has been developed by the New York & Harlem Railroad in connection with the reclamation of the large yokes which are used in the underground conduit construction in New York City. These frequently break after a number of years of service, and in the past have been thrown away and replaced. The development of the welding process has made it possible to reclaim practically all of them and restore them for further use. The description of the method of reclamation indicates how this has been accomplished.

Clamps Hold Yokes in Position

As these castings are very large, weighing from 500 to 525 lb., it has been found desirable to provide for economical handling during their removal from the street and while being worked on in the shop. Accordingly, a variety of clamps has been prepared, the proper ones being placed on a broken casting before it is removed from its position in the street. This clamps the broken parts securely together. A top plate with a U-shaped projection is bolted to the top of the yoke, so that a chain and tackle can be hooked in for handling. An accompanying illustration shows one of these large yokes with a clamp attached to hold the broken parts together, and also the plate with a chain attached for lifting. A number of other clamps which are used in this work are also shown in the illustration. After the broken yokes have been clamped together, they are transported on cars or trucks to the shop where the welding work is done. Clamping the various parts together before they are removed from the street reduces the labor in handling, and there is no danger of any part becoming lost. Where castings have several breaks in half the yoke, it is cut in two by the carbon arc and the good half is then welded to another similar good half from another yoke.

Preheating and Annealing Are Essentials of the Method

In order to make a successful repair on a cast-iron piece of such large section, the company has found it necessary to provide for heating the casting preparatory to the welding operation, and to arrange for slow cooling so as to anneal the entire casting. To facilitate handling and prevent cooling of the metal between the welding process and the annealing a welding room has been provided immediately in front of the annealing ovens with three sides inclosed. The welding stand is constructed of 1-in. pipe, with its top about 30 in. from the floor. This stand is provided with three special gas burners. Each burner has a 1-in. supply pipe, bent to a circular form, to which short uprights of ¾-in. pipe are welded. Each of these upright pipes is beveled slightly, and has small holes in the top to permit the correct amount of gas to flow. When the yoke is in position one of the three burners is underneath the center and one under each end. With this arrangement the yoke can be heated by the gas flame, no matter where the breaks may be, and without the necessity of changing the position of the yoke on the welding stand after it has once been placed. One of the illustrations shows a yoke in position on the stand with the operator cutting out a V-shaped groove in the break preparatory to welding.

Oxyacetylene is used for cutting and is also used for the entire welding process. Provision, however, is made for electric welding and also for cutting by the carbon arc if desired.

In carrying on the work the burners underneath the yoke usually are lighted at the time that the cutting

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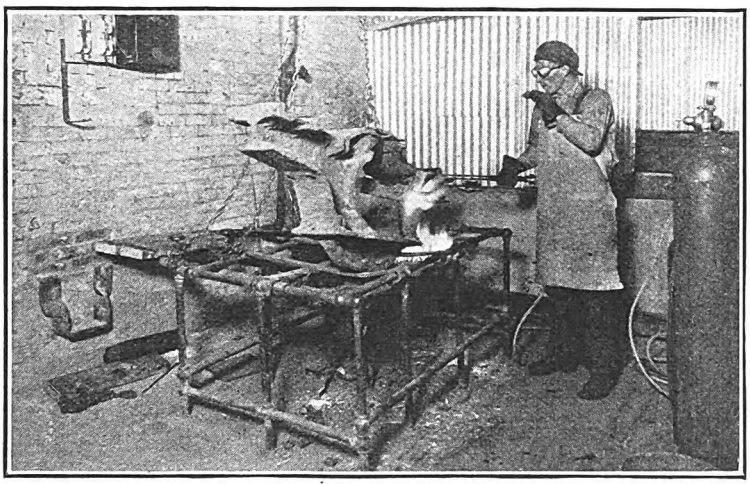
commences, and by the time that the cutting and welding are finished the yokes are heated. The flame can then be reduced to a size just sufficient to keep the casting hot, should the welding extend over a considerable period.

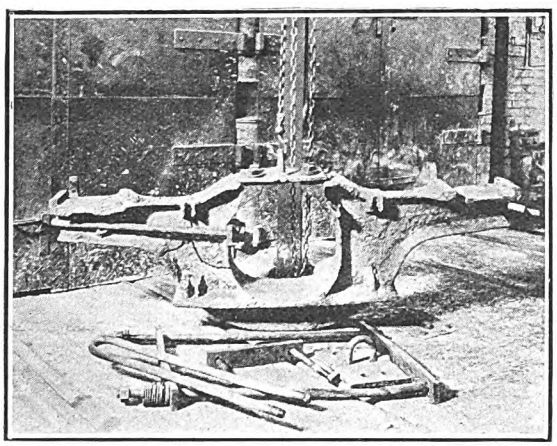
Two ovens of brick have been constructed, each of which is 6 ft. 3 in. wide, 10 ft. 4 in. long and 6 ft. high, providing sufficient room for four yokes. Four gas burners are provided at the bottom of each oven. These burners consist of 1-in. pipe running the length of the oven and perforated with small holes to permit the flow of gas. The same blower that serves the welding stand also supplies air for the burners in the ovens, and galvanized-iron pipes conduct it to the regulating valve. Two sheet-iron doors are provided for each oven. Each door has five 1-in. holes as a safety precaution in case the gas pressure should be reduced so that the flame would go out.

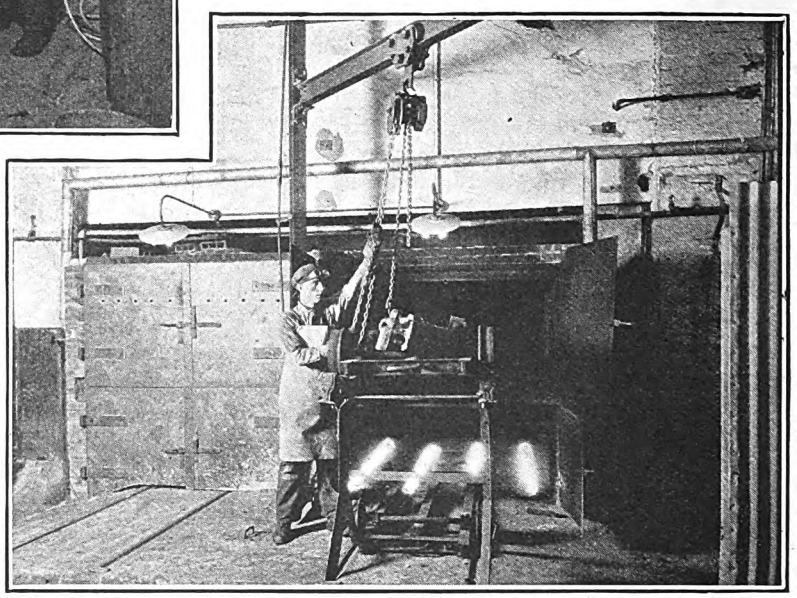
The burners in the oven are lighted a sufficient time in advance so that the oven is hot when the castings are ready to be inserted. After castings are placed in the oven the gas is turned off and the oven is then allowed to cool slowly. The oven will stay hot for approximately sixteen hours. In practice, however, castings are cooled in a minimum of six hours.

A jib crane has been installed in front of the cooling oven to facilitate handling. This serves the welding stand and the oven, and it also is used to unload or load the yokes on or off the cars and trucks, which can be run alongside. The yokes are handled by the jib crane from the cars to a storage space provided at the side of the oven front platform. From there they are picked up and placed in position on the welding stand by the crane as required. The upright column for the crane is made of old T-rail with an I-beam for a jib. On this jib a 1-ton Yale block travels. The upright is trussed with a tension member at the back. An accompanying illustration shows this jib crane.

Each oven has two tracks, one above the other, so that the castings can be loaded on a small car and rolled into and out of the ovens. The bottom track extends outside on a platform in front of the ovens. Extensions are provided for the upper tracks by a movable framework and rails. An I-beam extends across the center of the oven, providing support for one end of each of the rail extensions, while an angle-iron stand is provided to support the other ends. Two short lengths of rails are used, dowels being provided so that the rails are placed in exact position and are firmly held when once installed. With the extensions in place the car can be rolled outside so that castings can be handled onto or off the car directly by the use of the jib crane.







Top, left, cutting out grooves in a yoke preparatory to welding, with yoke in position on welding stand.

Below, at left, broken yoke held together by clamps. Other clamps used are shown in the foreground.

Below, right, placing a yoke on a car for insertion in the cooling oven.

Air pressure for the burners of the welding stand and also for the burners in the oven is provided by means of a blower installed on a platform attached to the wall above. Air is conveyed from the blower to the burners by 4-in. galvanized pipes. The admission of gas and of air from the blower is regulated by valves placed at the welding stand, convenient to the operator. The switches, fuses and starting box for the blower motor are installed on the wall adjacent to the welding stand.

Since this welding equipment has been installed the average cost for welding a yoke has been $6.25, and this is less than one-sixth the cost of a new yoke.

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Public Service Testing Buses

Detailed Specifications Have Been Adopted for Trial Runs by Fifteen Different Types of Buses

AS A PRELIMINARY to determine the extent to which it will engage in the bus business as supplementary to its electric railway service and the type of buses to use, the Public Service Railway of New Jersey is conducting an extensive system of tests on buses. Fifteen buses have been selected for these tests, some of which have been completed. The list of buses and scheduled dates for the tests follow:

Chicago single-deck (Yellow Coach)	Jan. 14
Chicago double-deck (Yellow Coach)	Jan. 16
Fifth Avenue single-deck	Jan. 18
Fifth Avenue double-deck	Jan. 21
International Harvester	Jan. 22
Fageol (street car type)	Jan. 25
Reo	Jan. 28
Garford	Feb. 1
Federal	Feb. 4
Philadelphia double-deck, Mitten-Traylor	Feb. 6
White	Feb. 10
Mason (Durant)	Feb. 13
Pierce-Arrow	Feb. 15
Day Elder	Feb. 18
Mack	Feb. 20

In addition to the performance tests outlined below, some of these buses are being tried out in regular passenger service at Plainfield and Camden. Those at Plainfield are two Fageol, three Fifth Avenue type J and four Reo type F. Those at Camden are twenty-one White, models 50 and 50A.

The performance tests are being conducted over a test loop, 11.2 miles in length, in Newark, Orange, West Orange and East Orange, combining opportunities for level running and hill climbing. The paving includes rough cobble, smooth cobble, brick and asphalt. In addition, a short straight level section of road with asphalt paving in Newark will be used to determine the maximum rate of acceleration for each bus. An outline of the specifications for the performance tests, which are being conducted under the name of the Public Service Transportation Company, follows:

Outline of Performance Tests of Motor Buses

Object. The object of the tests is to determine (1) the ability of each make or type of motor bus to perform under a wide range of both normal and maximum service conditions; (2) the relative abilities of motor buses in a given service; and (3) the character of work for which each make or type of motor bus is best suited.

Conditions. Agents will be requested to submit for test, upon a prearranged schedule, one or more gasoline motor driven buses of the so-called street car type provided with one front or rear entrance-exit door and cross and longitudinal seats carrying from 17 to 67 seated passengers. The equipment submitted shall be standard in all respects, fitted with stock parts, and motored and geared as best suits the agents.

Agents are requested to participate in the tests of their own buses and to offer such suggestions as to the conduct of tests as will assist in developing and demonstrating the performance and characteristics of buses; but such changes in or additions to the tests specified herein as may be adopted shall apply equally to the tests of all buses submitted. Agents will not be permitted to participate in the tests of competitive buses, nor will they have access to the results thereof.

Each agent is requested to familiarize himself with the tests and routes outlined herein and to have his equipment in the best possible normal operating condition prior to the tests. Ample opportunity will be given for this purpose. No changes or adjustments of equipment will be permitted during the series of four tests outlined herein. Changes made necessary by the failure or abnormal performance of equipment may be considered cause for the running of a new series of tests.

All tests of an individual bus will be made during one week day, between the hours of 8 a.m. and 6 p.m., if possible. Decision to start or stop buses shall rest with representatives of the Transportation Company.

Agents shall furnish signed statements giving information relative to each bus prior to the tests, as follows:

(1) Diagram showing engine torque and horsepower curves, (2) cylinder bore and stroke, (3) cylinder volume, (4) normal revolutions, (5) maximum safe revolutions per minute, (6) transmission gear ratios, (7) differential or rear axle gear ratios.

Agents shall equip each bus submitted for test with a calibrated and certified speedometer. This may be installed either temporarily or permanently.

Agents shall make provision for the insertion of a thermocouple in the top radiator connection to the engine by drilling a $\frac{5}{16}$ in. hole in the top radiator connection below the minimum water level and tapping with a $\frac{3}{8}$ in. S.A.E. thread. The hole so made shall be closed with a screw plug, pending the insertion of the thermocouple by representatives of the Transportation Company.

Agents shall provide means for easily and rapidly draining the main gasoline storage tank, vacuum tank and all connecting piping up to the carburetor.

1. Schedule and Economy Test

Each bus submitted for test will be operated for at least four trips over an established test loop about 11 miles in length, upon which will be found nearly all conditions of traffic, grades, street surfaces and other elements common to city and suburban bus operation. Description of the route and map is attached.

Stops will be made at established points averaging about eight per mile, and the time of each stop will be 7 seconds unless traffic conditions require other periods.

Time will be recorded at each start and stop, that is, at the beginning and end of each of the eight individual runs per mile.

Speed will be recorded and will be limited to a maximum of 30 miles per hour.

Gears used during each run will be recorded.

Temperature of the engine cooling water will be recorded during the progress of the test.

Weight of the bus and its load will be measured during the progress of the test. The passenger load, including observers, but excluding driver, will be about 60 per cent of the normal rated seating capacity. Other loads may be used on later tests.

Tire pressures will be measured at the beginning and end of the test and adjusted to the tire manufacturer's recommended values for the sizes of tire used and the weights carried.

Gasoline consumption will be measured. The fuel system will be drained at the beginning of the test and a measured quantity of "Standard" gas, of known gravity, will be supplied by the Transportation Company at the expense of the agent. The quantity remaining at the end of the test will be measured.

Riding quality, vibration, side sway and other elements affecting the comfort of passengers and driver will be observed and recorded.

Weather conditions and condition of pavements will be recorded.

Traffic conditions will be recorded.

Driver shall be furnished by the agent for two of the four trips, while one competent driver in the employ of the Transportation Company will operate each bus for the two remaining trips.

Observers will be furnished by the Transportation Company. Each observer will perform the same duty during the tests of all buses, in order that errors due to the human element may be kept as constant as possible.

2. Hill Climbing Test

Each bus submitted for test will be operated in a hill climbing test two or more times up and down Mt. Pleasant Avenue, West Orange, for a distance of about 6,000 ft. on a grade averaging 7.35 per cent and having a maximum of 11.02 per cent. Two groups of tests will be made: A. From dead stop at beginning of the grade. B. With 25 miles per hour running start at the beginning of the grade.

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Time will be recorded at the beginning and end of each run and at such intermediate points as may be determined by gear shifts.

Speed will be recorded at established points along the grade and at points where gear shifts are made, using the same devices as in the schedule tests.

Gears used during each run will be recorded.

Brakes, both service and emergency, will be tested singly on the runs down grade to determine their ability to hold the loaded bus.

Temperature of the cooling water will be recorded during the progress of the test, using the same devices as in the schedule tests.

Weight of the bus and its load will be practically the same as in the schedule tests. Maximum loads may be used on later tests.

Tire pressures will be the same as in the schedule tests.

Gasoline consumption will not be measured, but gasoline of the same kind and quality as used in the schedule tests will be used and the carburetor will have the same setting as in the schedule test.

Weather, pavement and traffic conditions will be recorded.

Driver shall be furnished by the agent.

Observers will be furnished by the Transportation Company.

3. Acceleration Test

Each bus submitted for test will be operated in an acceleration test over a section of Lake Street, Newark, adjacent to Branch Brook Park and north of Bloomfield Avenue. This section is straight and level, is unimpeded by traffic and has a smooth asphalt surface. Each bus will be operated from a dead stop to free running speed in the shortest possible time consistent with good operation. Several runs will be made to secure a fair average.

Time will be recorded at the beginning and end of each run and at intermediate points.

Speed will be recorded at established points on the run and where gear shifts are made, using the same devices as in the schedule tests.

Weight of the bus and its load will be practically the same as in the schedule tests. Maximum and light loads may be used on later tests.

Gasoline consumption will not be measured, but gasoline of the same kind and quality as used in the schedule test will be used and the carburetor shall have the same setting as in the schedule tests.

Driver shall be furnished by the agent.

Observers will be furnished by the Transportation Company.

4. Braking Test

Each bus submitted for test will be operated in a braking test over the Lake Street course used for acceleration tests. Each bus will be braked from a previously sustained speed of 25 miles per hour to dead stop, using the service brake and the emergency brake independently, in the shortest possible time without slipping the wheels. Several runs will be made to secure fair averages.

Time will be recorded at the beginning and end of each run.

Speed will be recorded at the beginning of each run and at intermediate points.

Weight of the bus and its load will be practically the same as in the schedule tests. Maximum and light loads may be used on later tests.

Tire pressures will be the same as in the schedule test.

Drivers shall be furnished by the agent and by the Transportation Company and they shall be used in turn.

Observers will be furnished by the Transportation Company.

Large Shop for Brooklyn

PLANS are being prepared for large repair shops for the Brooklyn-Manhattan Transit Company. They will be located between the Sea Beach right of way on the west, Shell Road on the east, Avenue X on the north and Coney Island Creek on the south. This tract comprises about 60 acres. It is said that the total investment in these shops when completed will be about $10,000,000 and that they will be the largest electric railway shops in the country.

Boston Elevated Occupies New Shops

DURING January the Boston Elevated Railway paint department was moved to the new paint shop, forming part of the new elevated shops in course of erection near the Everett terminal, and during February it is expected that the new woodworking shop in the same shops will be completed and its machinery installed. As yet the company has not begun construction on the buildings to house its machine shop, equipment shop, wheel and axle shop and blacksmith shop. In other words, about half of the shops, shown in plan on page 240 of the ELECTRIC RAILWAY JOURNAL for Feb. 10, 1923, or that portion to the south, has been completed. The portion to the north still remains to be done.

The present extensions to the company's repair facilities obtained through the erection of these shops will be a great help in the maintenance of equipment. It will enable the company to shut down its Bartlett Street shops. The Albany Street shops will necessarily be kept in service until the completion at Everett of the machine shop. Below will be found a list of the new tools ordered for the paint shop, brass shop and mill at Everett. Most of these tools are now in position.

LIST OF NEW AND REMODELED TOOLS AT EVERETT SHOPS

Mill

New Tools

Kind	Size	Make
Molder	No. 600	Fay & Egan
Sander, 42 in.	No. 393	Fay & Egan
Double surfacer	No. 140-A	Fay & Egan
Ripping and jointing machine	No. 386	Fay & Egan
Hand planer and jointer	No. 506	Fay & Egan
Band saw	No. 50	Fay & Egan
Double-head sash and door tenoner	No. 505	Fay & Egan
Hollow chisel mortiser	No. 510-A	Fay & Egan
Double spindle shaper, type F	No. 452	Fay & Egan
Doweling and rod machine	No. 7	Fay & Egan
Corner and rounding machine	No. 294	Fay & Egan
Band saw filing and setting machine	No. 3	Fay & Egan
Circular saw filing machine	No. 5	Fay & Egan
Patternmaker's lathe	No. 411	Fay & Egan
Double-disk sander	No. 466	Fay & Egan
Cabinet surfacer	No. 156	Fay & Egan
Knife grinder	No. 101	
Heavy bevel and miter saw	No. 22	Pettingill
Single spindle borer	No. 356	Greenlee
Railway cutoff saw	No. 6	American
Universal saw bench	No. 30	American
Hand block sander	No. 16	American
Grindstone	36 in.	American

Old tools equipped with new individual motor drive

Buzz planer	16 in.	Rogers American
Inside molder	13 in.	Rogers
Large mortiser	Car mortiser	Greenlee
Small tenoner	No. 2	Houston
Band saw, 2 in.	42 in.	Fay
One universal boring machine	No. 8	Fairhaven
One arbor saw	Tilting arbor	American
Circular saw		Fairbanks

Brass Worker's Tools

Belt polisher		Blount
Double emery wheel	12 in. x 2 in.	U. S. Elec. Tool Co.
Two buffing wheels	12 x 1½ in.	U. S. Elec. Tool Co.

Sheet Metal Tools

Circular shears	No. 208	Niagara
Squaring shears	No. 8 96 in. ¼ in. metal	Niagara
One power punch	No. 36	Niagara
Hand brake	8 ft.	Dreis & Krump Mfg. Co.
Hand brake	4 ft.	Dreis & Krump Mfg. Co.
Hand shears	No. 14	Niagara
Hand punch	No. 14	Niagara
Bar folder	36 in.	Peck Stow & Wilcox
Nazel hammer	No. 2	Nazel Eng. Works

Paint Mixing Machinery

Three heavy duty mixers	200 gal.	J. H. Day Co.
White lead mixer	50 gal.	J. H. Day Co.
Three change can mixers	50 gal.	J. H. Day Co.
Ten enamel paint mixers	10 gal.	J. H. Day Co.
Three stone color grinders	15 in.	J. H. Day Co.
One pebble mixer and grinder	No. 7 Abbe	J. H. Day Co.
One putty mixer	48 in.	J. H. Day Co.

Ovens

Electric oven... 6 ft. x 6 ft. 4 in. x 3 ft. deep	Oven Equip. & Eng. Co.
Electric oven... 7 ft. 6 in. x 6 ft. 9 in. x 6 ft. deep	Oven Equip. & Eng. Co.
Electric oven... 3 ft. 6 in. x 5 ft. 6 in. x 3 ft. 6 in. deep	Oven Equip. & Eng. Co.

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New Features of St. Louis Automatics

Five Substations Installed by United Railways Have Forced Ventilation and Duplicate Power Lines—Units Chosen for Full Load Operation with Provision for Exchanging Equipment to Obtain Future Increased Capacity

SUCCESSFUL operation of the fifth automatic substation installed during the past year marks the completion of the present program of the United Railways of St. Louis for the application of this type of station to its power system. Careful study of the requirements for applying automatics to the network on a heavy city distribution system have resulted in a number of interesting features which have been incorporated in the new stations and which were developed to insure maximum capacity and reliability.

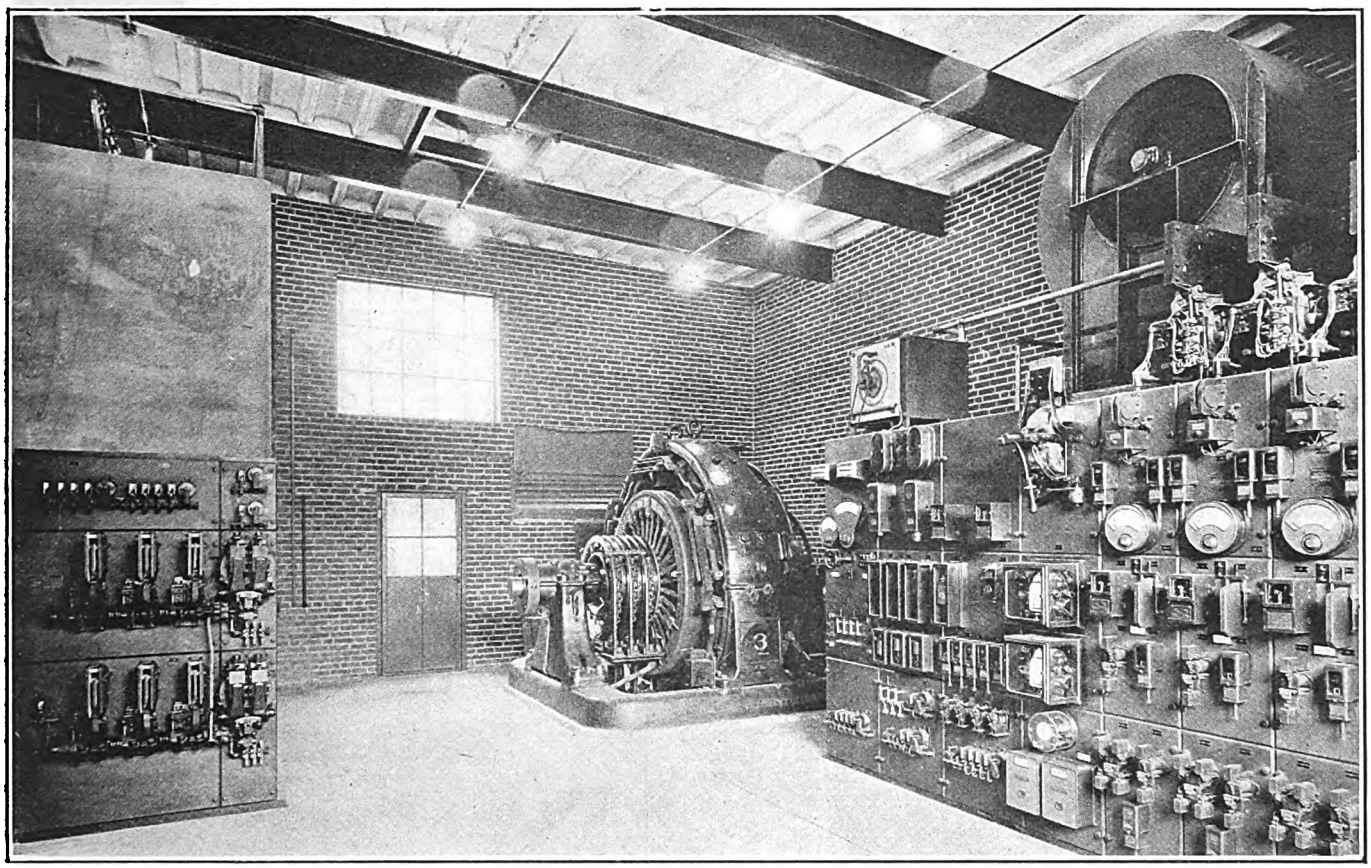
These features comprise a number of departures from established automatic substation practice. Natural ventilation was found inadequate during the hottest period of the year, so that forced ventilation is used at such times to obtain the full rating of the machines. The duplicate power lines have an automatic switching arrangement so that in case of failure of one the other will take its place without delay. The stations are designed as complete units, with no space for additional machinery, but with provision for replacing the converters and transformers with others of larger size in case increased capacity becomes necessary.

These stations were designed by the railway company's engineers under the direct supervision of W. E. Bryan, superintendent of power. The work of construction and equipment was carried out completely by the railway, utilizing General Electric Company apparatus.

Two automatic substations, each of 300-kw. rating, have been in service on some of the outlying lines of this property since the early part of 1921, and experience with these stations showed them to be satisfactory for this class of work. Increased car service within the city during recent years resulted in overloading some of the existing manual stations and made necessary an addition to the capacity of the d.c. system.

Some of these manual stations were large enough to allow the installation of additional converter capacity, and previous practice would have dictated such installations. The advent of the automatic station, however, made it possible to effect a material reduction in distribution copper and distribution losses by applying these units as nearly as possible at the points of maximum power requirement. As a result, it has not only been possible to locate the new substations so that the trolley voltage regulation has been materially improved, but at the same time it is estimated that the use of the new stations will allow the removal of approximately 125,000 lb. of copper now in the distribution system.

Two of the five stations put into service since



The Franklin Avenue Substation Has a 2,000-Kw. Unit. A Portion of the 2,000-Amp. Multiple D.C. Reclosing Feeders Are Shown Above the Switchboard to the Right

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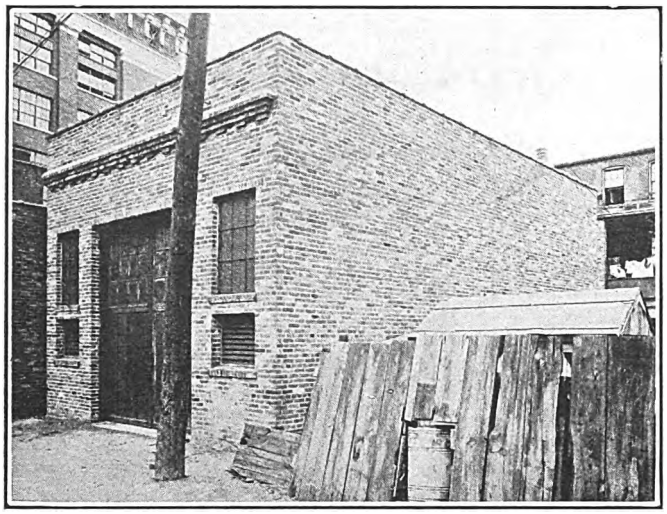


A Simple Building Is Used Where the Surroundings Permit

January, 1921, are single units of 1,000 kw. capacity, each, with oil-cooled transformers. These stations are Maple and Arsenal and their equipment is entirely new.

Clark and Franklin stations have each a single 2,000-kw. unit. The rotary and transformer equipment was used for about nine years in manual stations, but was suitable for use with the automatic apparatus which was purchased. In these two stations the transformers, of the forced air-cooled type, are mounted in a separate transformer room. In the other three stations the oil-cooled transformers are mounted in the same room with the other apparatus.

Each station as installed is loaded to its full rating with the existing load. No space is allowed in the buildings for additional units, but the design is such that the present machines can be replaced with the next larger commercial size to take care of future requirements. Such a change requires only the replacement of the rotary and the transformer. The buildings are made small and compact, but the arrangement is such as to allow for changes of this kind.

Under the plan adopted, the existing stations can be expanded in gradual steps so that they are always loaded up to capacity. A considerable saving is made in the cost of buildings over the practice of making the structure large enough to take one or more additional machines. Furthermore, it was considered that the addition of a second machine to an existing station would mean an increase in capacity of 100 per cent, which probably would be in excess of the requirements for some time after the addition was made.

In manually controlled stations the problem of ventilation is not serious. The stations are usually made of liberal size and plenty of door and window space can be allowed because of the presence of attendants. These conditions do not hold with automatics. It was considered desirable to make the buildings as compact as possible and to keep them closed, particularly as some of them were located in congested districts where minimum size and maximum security were important.

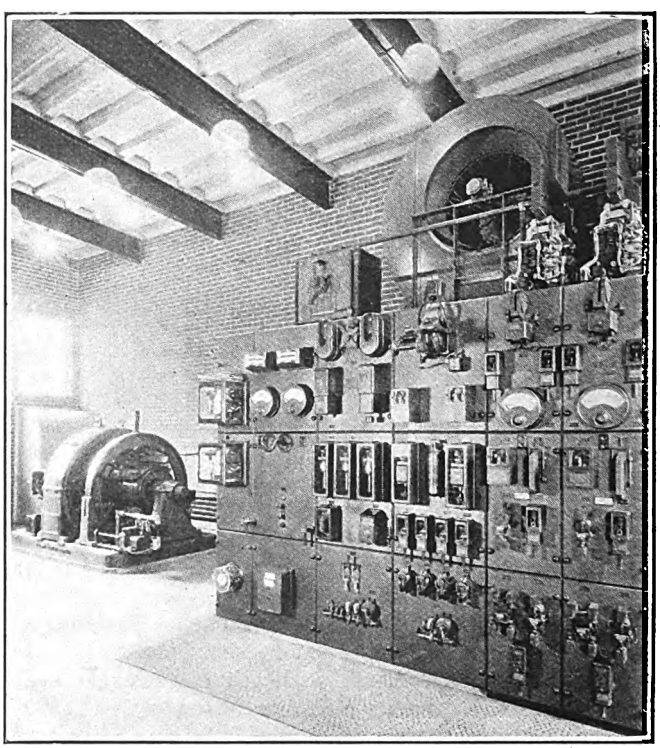
Natural ventilation, depending upon louvers in the side walls and some form of roof ventilator to maintain a circulation of air through the station, was not considered entirely satisfactory. With natural ventilation, the amount of air circulated varies with the temperature of the air and the direction and velocity of the wind. It was found that the full rated capacity of the station could not be obtained in hot weather because of inadequate ventilation. A forced draft ventilation system was designed by the railway to remove this limitation. It consists primarily of a fan mounted on a concrete balcony above and behind the switchboard and arranged so as to draw air out of the station and exhaust it at a point near the roof. The fan used is the Buffalo Forge Company "Turbo-Conoidal" type No. 7½, with a capacity of 11,500 cu.ft. per minute. It is driven by a 5-hp. motor. The fan is automatically started and stopped by thermostats on the converter and on the station resistance grids.

Although the stations are provided with a number of wall louvers near the floor line, all but two of these are closed when the fan is operated, which is necessary only in hot weather, as the natural ventilators take care of the requirements at other times. When forced ventilation is being used, the incoming air is drawn directly around the rotary converter and transformer and is blown through the series resistance grids before being exhausted.

A sheet metal duct is installed at one of the wall louvers and leads the incoming air down to a duct in the concrete foundation under the converter, from which it passes directly up through the machine. A second and similar duct leads the air coming in through the second wall louver to a passage in the foundation under the oil transformer and it then passes up through openings around the base so as to create a draft of cool air on all sides. In those stations where forced air-cooled transformers are used, they are provided with a separate blower independent of the ventilation system.

Variable conditions surrounding the different stations affect the height of the louvers in the wall. It is the practice to set these as close to the floor line as possible, but where the location of the station exposes it to considerable dust, the louvers are raised 4 or 5 ft. above the floor line so as to keep the dust from entering the station.

The resistance grids are inclosed in a housing made



A Single 1,000-Kw. Unit Is Installed in the Arsenal Street Station. The Ventilating Blower Is Mounted Above and Behind the Switchboard

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of 1-in. transite board mounted on a steel frame. This housing is directly connected to the discharge side of the station fan. The entire front of the resistance housing is made up of a series of swinging shutters, so that it can be opened to the rest of the station when the fan is not operated and the ventilation is by natural means.

The system is designed so that the station can, if necessary, be operated at 50 per cent overload with a rise in the temperature of the air of not more than 25 deg. F. A comparison of costs shows that the total cost of the fan and motor is about equal to the cost of the additional roof ventilators that would have had to be installed for natural ventilation.

Substantial construction consistent with minimum cost was the object of the building design. In each case the structure has been made to fit into its surroundings. Where the station is located so as to face the street in either a residential or business neighborhood, terra cotta trim is applied to improve the appearance. Some of the stations are located on alleys in congested districts, and under these conditions the entire structure is made of common brick. One station of this type is shown in an accompanying illustration.

Clark, Franklin and Evans stations are located in heavy traffic districts, where uninterrupted operation is of paramount importance. By utilizing existing high-tension power lines, these stations are arranged so that each has two incoming 13,200-volt, three-phase, 25-cycle supply cables, practically all power being purchased. Each of these cables is of sufficient capacity to carry the entire station load.

Maple and Arsenal stations are less vital to the maintenance of continuous service, and they are, therefore, equipped with only one incoming line to the automatic apparatus. In the case of Maple station, however, a second incoming cable is available and the station can be thrown over to it by the operation of a manual switch.

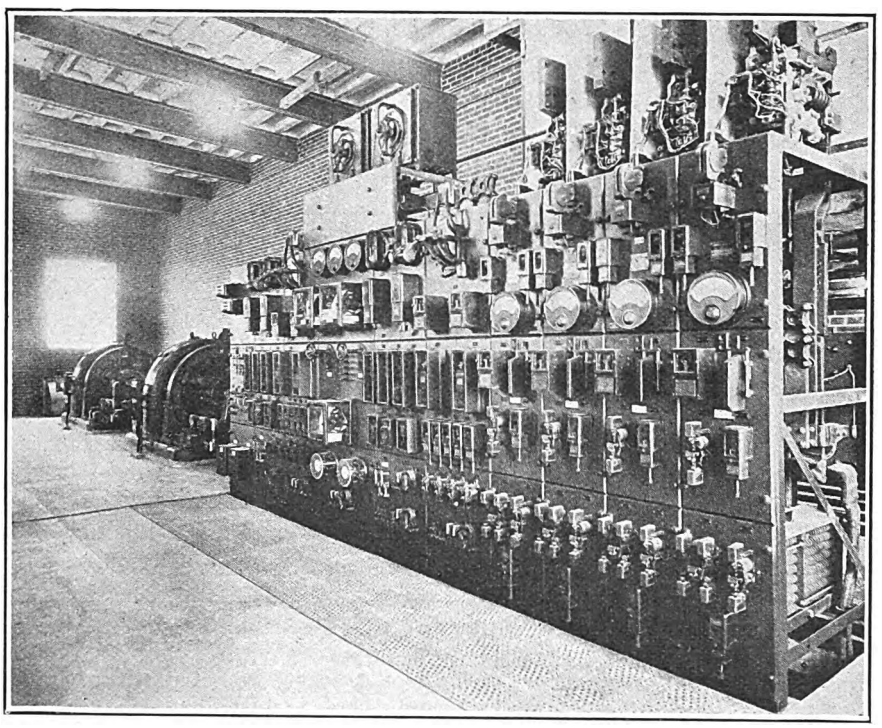
Automatic switching between the two incoming cables is provided in Clark, Franklin and Evans stations. One of the lines is designated as the "preferred" line and under normal conditions carries the entire load at all times when the station is in operation. If the preferred line fails for any reason, the second line is immediately and automatically substituted. This is accomplished through the tripping relay, which when tripped completes the circuit, causing the second line to pick up the load. When the trouble on the preferred line is removed and the repair man closes the disconnects out on the line the load immediately shifts back to the preferred cable.

Evans station is a two-unit installation. Each of the 1,000-kw. rotaries is provided with its own oil-cooled transformer, and the station is also one of the three having duplicate power lines. In this case the load of both machines is carried on one of the lines, and in case of trouble the second is switched in automatically as in the case of the single-unit stations.

Either machine may be made the first to pick up the load by throwing a manual switch in the station. The two machines operate in parallel when both are on the line, but only one is required to carry the load except in the peak period. When it is needed, the second machine is brought on automatically, and it also shuts down automatically when the load drops to the capacity of the first rotary. If No. 1 machine is set to pick up the load first when the station goes into service, and for any reason it fails to do so, No. 2 machine will automatically take its place.

In this station a single exhaust fan provides the ventilation for both sets of rotaries and transformers. The ducts in the concrete below the rotaries are divided so as to insure equal distribution of air to both machines and also to avoid diverting the air through one of them, if it is not running.

All the stations are completely equipped with high-speed circuit breakers on outgoing feeders. These are provided with automatic "feel out" reclosing apparatus arranged to test the circuit at predetermined intervals through an auxiliary contactor and current-limiting resistance. An adjustment on these breakers, which was made by the railway's engineers, allows the first test contact to be made after a very short interval. This contact is then repeated periodically at any predetermined time setting.



The Evans Avenue Substation Has Two 1,000-Kw. Units. The Two Converters and Complete Switchboard are Shown with Reclosing Breakers Above

The high-speed breakers are designed to differentiate between a legitimate load and one caused by a defect on the circuit. An inductive shunt on the breaker allows it to carry a 4,000 or 5,000-amp. normal load, but to trip out on less than 2,000 amp. in the event of a ground or short.

In Clark and Franklin stations, which are located in the downtown heavy traffic section of the city, the rotary converters are shunt wound. In this district the feeder network between the automatics and the adjacent manual stations is of very low resistance. The object of the shunt winding on the rotaries of the automatic stations is to prevent them from taking more than their proper share of the load, without at the

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same time causing objectionable fluctuations in voltage. This would occur if the load-limiting resistance of the automatic station cut in, because this resistance is a large proportion of the entire feeder resistance in this section.

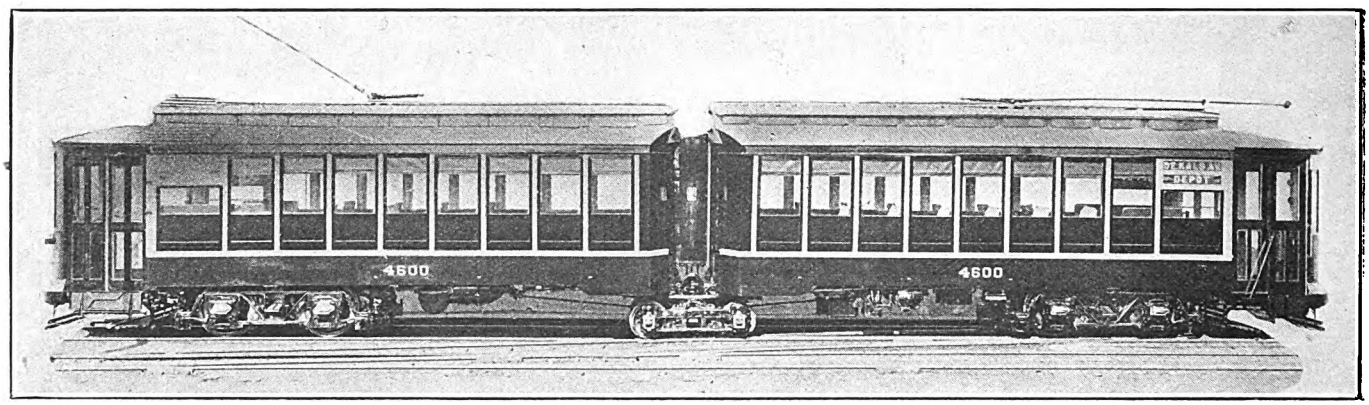
The shunt winding drops the voltage of the automatic station gradually as the load increases, and thus prevents it from carrying an excessive proportion. Cars operating in this section move slowly, either on resistance notches or with motors in series a large portion of the time, so the reduced trolley voltage due to shunt winding of the rotaries is not considered objectionable. In the outlying sections the feeder resistance is relatively higher and compound-wound rotaries are used. The load regulation is handled by the station series resistance, as under these conditions cutting in of the resistance does not produce as great a voltage fluctuation as would occur in the congested district.

As is customary, thermostats on the load-carrying apparatus are arranged to shut down the station if the temperature becomes excessive on any part. The bearings are similarly protected.

On the air-cooled transformers the blower motor is tied directly to the low-tension side of the transformer. A speed-regulating switch on the blower end will trip out the station if the fan is not up to speed for any reason. When the station shuts down due to a defect in its apparatus, a telltale signal is illuminated in an adjacent manually operated substation so that the load dispatcher can be immediately notified.

Brooklyn's "Duplex Car" Placed in Service

A Two-Unit, Three-Truck Car, 63 Ft. 10 In. Over All, Has Novel Center Construction with Weather Tight Drum to Permit Free Passage Between the Two Sections



The New "Duplex Car" with Three Trucks Constructed by the Brooklyn-Manhattan Transit Corporation

A NEW type of duplex car with three trucks was placed in service by the Brooklyn-Manhattan Transit Corporation Feb. 6 on its DeKalb Avenue surface line in Brooklyn, N. Y. This car is built in two units and has an over-all length of 63 ft. 10 in. with seats for seventy-one passengers. The standing room provided will accommodate approximately 100 additional during rush hours. The weight of the experimental car as constructed is about 36 tons, but this weight can be reduced somewhat when parts are designed for quantity production.

In building this duplex car the company used two of its 4,500 type cars, which as orginally constructed were 42 ft. 6 in. long over all. These cars were cut off at one end just outside of the bolster, which was then used as a support for the new swivel castings. The truck used for supporting the center portions of the two units is a Brill type 62 EF, such as that used by the company under its center-entrance trail cars. This truck has a wheelbase of 4 ft. 4 in., with 22-in. diameter wheels. The truck was used without changes except those necessary to provide for attaching the truck swivel casting and side bearing plates for the body.

The construction of the center section of the duplex car is of particular interest. A drum type vestibule connects the two sections, being carried directly on the center truck by strap connections to the truck bolster. This drum is 4 ft. in diameter. Two circular sections of $\frac{3}{32}$-in. steel inclose the two opposite quadrants, being supported by a $\frac{1}{4}$-in. bottom plate, the open quadrants forming the passageway through the center section. The inside of the drum is lined with a fibrous material and rubber matting covers the floor. This connecting vestibule between the two units is used by standing passengers during peak-load periods. There is sufficient space inside the drum for eight standees. Two grab handles extend around the circumference on either side. These are located at a height of about 43 in. above the floor level.

The center ends of the two-car units are shaped so as to come into relatively close contact with the center drum, and as they rotate about a common center only a small clearance is needed. Rubber rollers mounted on the bodies provide for a weathertight connection between the car ends and the drum. Each roller is supported at the top and bottom by bearings in a plunger with springs to press it firmly against the surface of the drum.

The top of the center vestibule drum extends only to the bottom of the clerestories of the two units. In order to keep water from dripping down inside, and to secure satisfactory drainage, the top of the drum is provided with three angles bent to circular arcs at the edges adjacent to the car ends. The top of the drum

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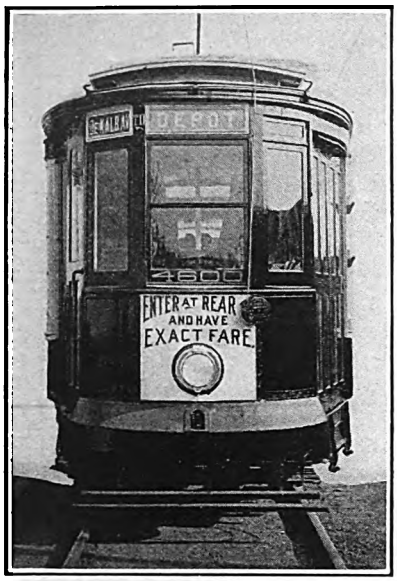
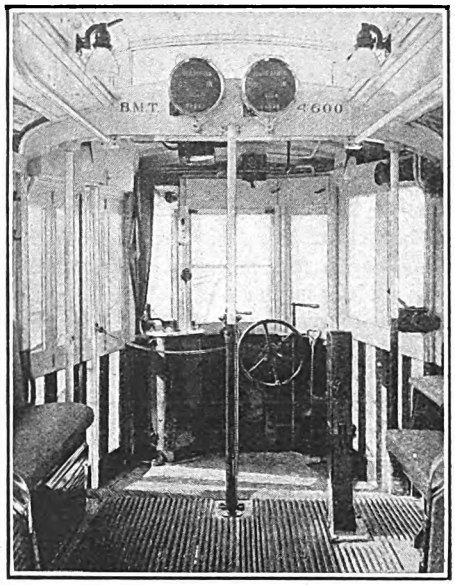


Conspicuous Signs Give Passengers Necessary Information as the Car Approaches

Unrestricted Passage Between the Two Units Is Provided by the Center Vestibule Drum

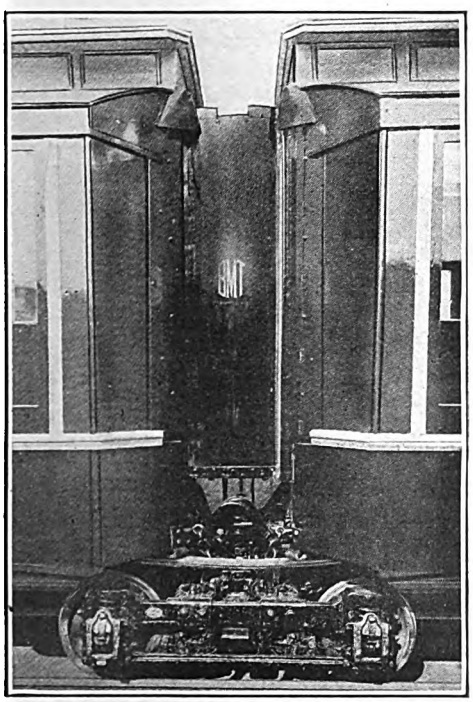


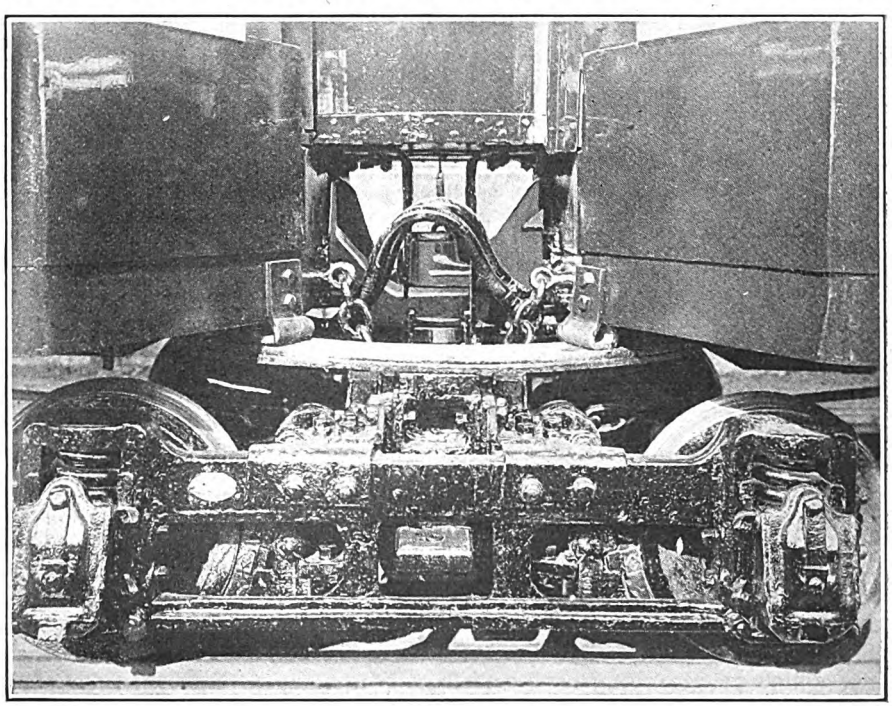
Porcelain Enameled Bars and Stanchions Provide Substantial and Sanitary Supports for Standing

is also shaped so that the lowest portions are at the sides, and the top of the drum adjacent to the two units passes underneath the clerestory. Thus any drippings from this will fall inside the angles. If any water should splash over the top of the first angle, the other ones are provided as a barrier to conduct the water to the edges for draining.

The construction of the underframing and swiveling castings at the inside ends of the two units is of particular interest. Three swiveling castings are provided. The upper and center ones are attached to the underframes of the two bodies, while the bottom casting is attached to the truck bolster. The king pin fastens through these three castings and through the truck bolster bearing, as shown in an accompanying drawing. Channels of 4-in. section are used for the outside members and the diagonal braces, and two 6-in. channels run directly from the swiveling casting to the cross-members of the underframe. The construction is substantial, the entire weight of the inside end of each unit being borne by its swivel casting and transmitted through the spherical bearings to the truck bolster. Circular side bearings are provided, but these serve only to prevent excessive side motion and do not support the weight of the body. Circular steel plates on the trucks attached to the center bolster and similar plates riveted to the ends of the car bodies form these side bearings.

The air and electrical flexible connections between the two units are carried over the top of the center truck. The air hose passes on one side and the electrical connections on the opposite side of the swivel joint. In order to provide for taking the two units apart, as may be necesssary for maintenance repairs, a special type of junction box is provided for the electric wires. It consists of two facing terminal boards, the leads from the car body ending in a set of socket terminals





At Left, the Center Vestibule Drum Effectively Closes the Space Between the Two Units and Is Supported by Straps to the Truck. At Right, Support for the Inside End of the Two Units Is Provided by Swivel Castings. A Standard Trail Truck Is Used

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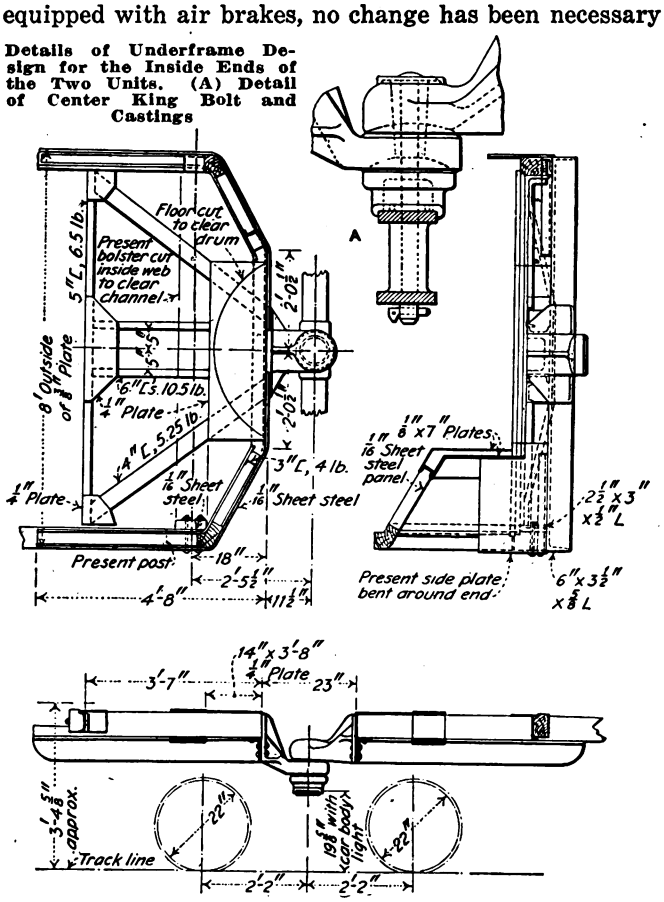
in one, while the flexible leads which extend between the two units terminate in a set of four-prong plugs in the other part. Angles riveted to the outside portions provide for bolting these two parts permanently together. The leads do not need to be disconnected from their terminals in order to separate the two units. All that is necessary is to loosen the bolts and to spread the two parts of the junction box by turning a special screw at the center of the terminal, which gives sufficient pressure to separate the plug and socket connections. The junction box is made of $\frac{1}{16}$-in. sheet steel lined with $\frac{1}{4}$-in. transite. The terminal boards are made of hard maple, painted with insulating compound and otherwise protected.

The operating equipment of the original cars consisted of four Westinghouse No. 101 motors. The outer end trucks are retained in the duplex car, so that the complete unit is operated by four of these motors. The center truck has no motors. The control equipment, which has also been retained, consists of K28-L controllers. A line switch for opening and closing the circuit underneath the car is operated from contacts on the controller drum. As the cars originally were equipped with air brakes, no change has been necessary

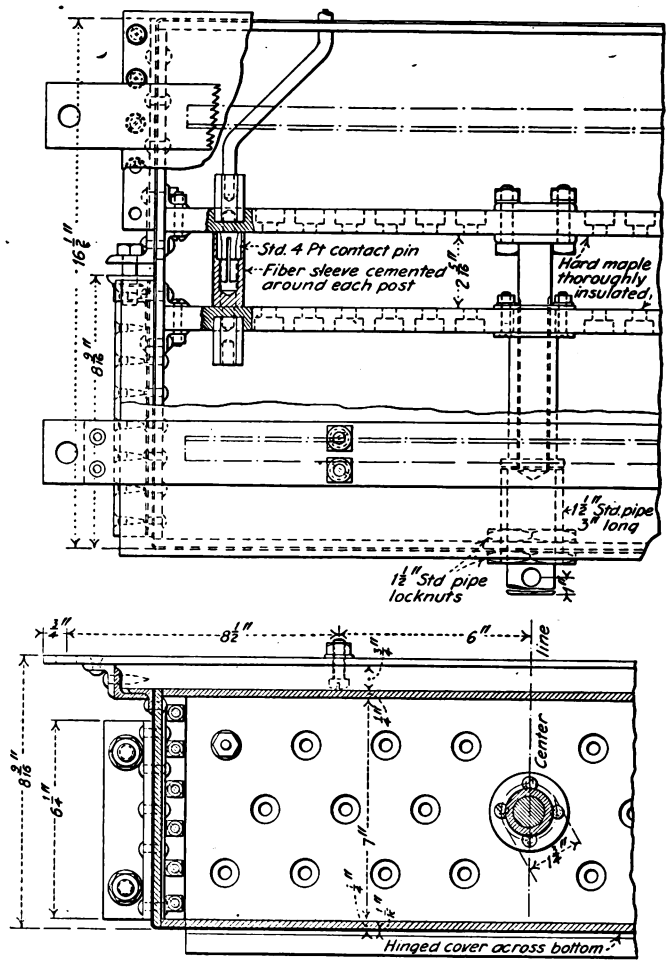


Details of Underframe Design for the Inside Ends of the Two Units. (A) Detail of Center King Bolt and Castings

in this equipment other than to provide an emergency valve for each unit. Connection to the operating emergency valve is made by an emergency cord, running the length of the two units.

The cars before reconstruction had semi-inclosed vestibules with gates and permanent steps. In the reconstruction the bulkhead was removed between the platform and the body of the car and the platform was lengthened 8 in., so that it has a length of 6 ft. $2\frac{3}{8}$ in. from the bulkhead over the bumpers. Two folding doors and a folding step were added to the left-hand entrance side and a sliding door to the right-hand exit side, on diagonally opposite corners. The folding doors are operated by Consolidated Car Heating Company's pneumatic door engines, which are installed over the doors. These are pneumatically controlled from a station at the opposite side of the platform, just where the bulkhead was previously. The sliding door is manually controlled from a control lever at the front and right of the motorman's operating position. Special control features provide for the interlocking of the door control circuit, so that the doors cannot be opened until the car stops.

Electric coin boxes are used for collecting fares.



Junction Box Used for Main Power Circuit So That Units Can Be Separated Without Disturbing Connection Leads

The depositing of a nickel in the slot of these boxes rings the fare register, which is located just inside the body.

Enameled stanchions were added to the platform, and a chain directs the flow of passengers on the front end. This chain runs from a central vertical stanchion, and hooks to a stanchion at the left-hand door entrance. The inside end of this chain runs over a sheave, so that by unhooking the end the chain drops into the upright stanchion out of the way.

Cross seats are used except at the entrance and exit ends, where short longitudinal seats are installed on either side. The hand straps which were in the original cars were removed, and porcelain enameled rods have been substituted. These are substantial and sanitary and have a better appearance than the hand straps. The new lighting arrangement has thirty-two lamps of 23-watt size arranged in two rows over the aisle ends of the seats. These have globes supported by Schroeder spring-type lamp fixtures.

The regular entrance is at the rear, but there are exit facilities at both ends. Signs are provided within

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the car at the center end of each unit on either side of the drum vestibule, and also over the center vestibule, directing passengers to leave by the front door. Attention is called to the fact that this should reduce the average length of stop and that passengers alighting have an opportunity to cross the street before vehicular traffic proceeds.

Special attention has been given to providing exterior signs which will direct passengers as the car approaches. Routing and destination signs are conspicuously displayed. A large sign below the window on the front and rear of the car reads: "Enter at Rear and Have Exact Fare." In the center above the window is a curtain type destination sign, and on either side of this are two route signs. Route and destination signs are also displayed at sides at the end windows.

The present painting of the car corresponds to the standard red and yellow painting scheme used in Brooklyn. The interior is painted a light color to assist in providing ample illumination.

Rail Corrugation Experience

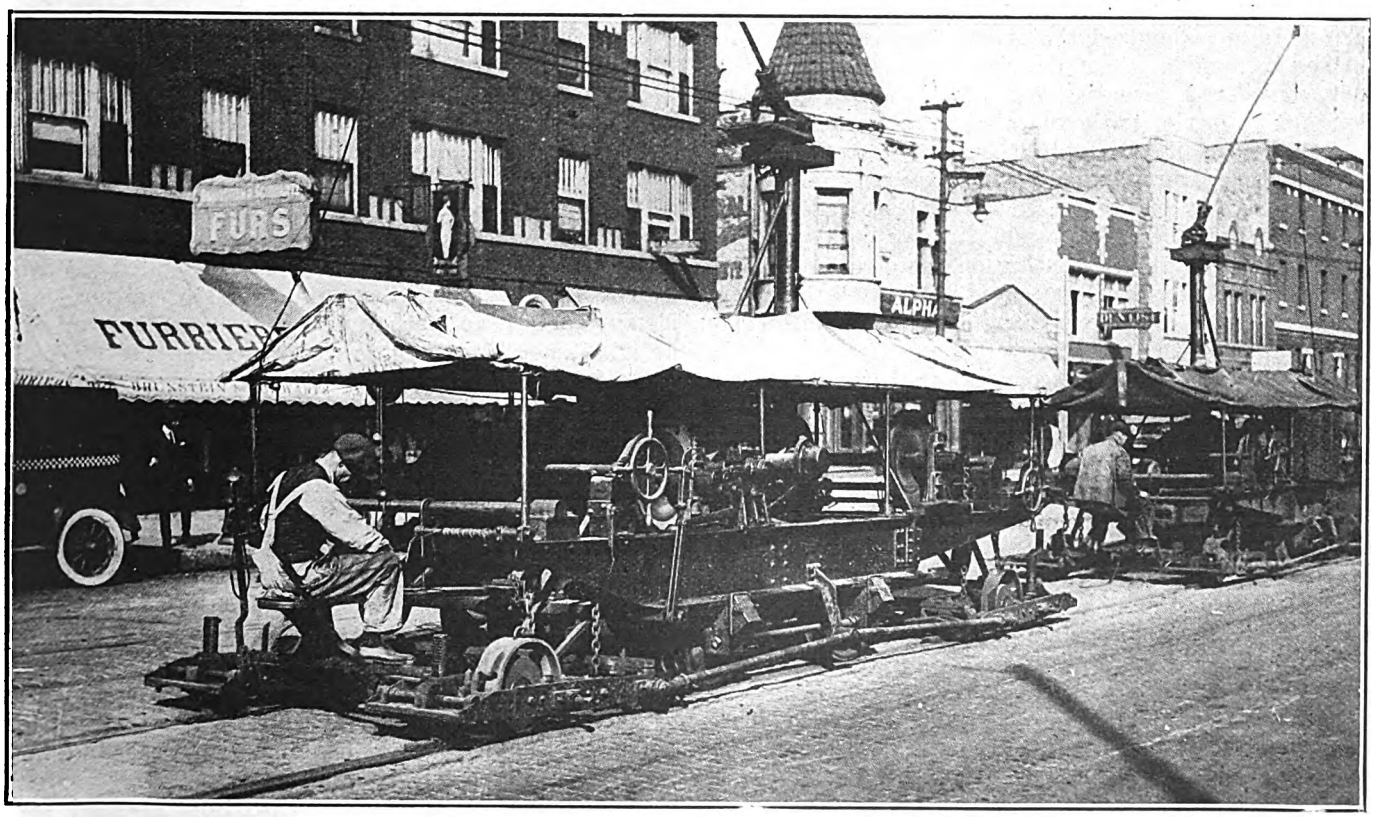
Survey of Railways in Various Parts of the Country Brings Out Interesting New Data as to Extent of This Trouble; Practices Followed in Removing and the Cost, and Comments as to Causes of Corrugation

RAIL corrugation, the cause of which is still as baffling as ever, is a problem of considerable magnitude to the men responsible for expenditures for track maintenance. This is clearly brought out in the summaries of present-day experience by the track engineers of a number of electric railways throughout the country, as presented by cities in what follows:

There is no uniformity of experience as to the type of construction or type of rail on which corrugation is most likely to occur. The length of the waves is reported to vary all the way from 1½ in. up to 8 in., and this appears to vary with the kind of equipment operated, i.e., single car, multiple-unit train, electric locomotive, etc. All reports agree that no definite relation can be found between length of wave and wheel diameter, and there is similar agreement as to any direct relation between number of wheel passes and the start of corrugation. But there seems to be some consensus of opinion that after corrugation starts the rate of development is then in proportion to the number of wheel passes. Joints, in general, are not considered a source of corrugation origin. Other ideas about corrugation and the best method of preventing and removing it differ considerably on the individual properties.

The Chicago Surface Lines during 1923, we learn from H. B. Fleming, chief engineer, found it necessary to grind out corrugation on 42 miles of single track. Corrugation in this city is found under many different combinations of construction and traffic. It is found on practically all types of track used in Chicago with the exception of high T-rail. Many attempts here to determine the effect of different types of construction have given no consistent results from which conclusions could be drawn. Neither has comparison of the results obtained with rigid concrete foundation track and track with crushed stone ballast.

Three years ago a change was made in rail laid from Lorain section 129 to section 130. Some of the latter,



The Special Double-End Grinder Used in Pairs on the Chicago Surface Lines to Remove Corrugation

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laid on the old foundation on Wabash Avenue, where traffic is extremely heavy, has shown very little corrugation after three years of service, whereas the 129-lb. section previously had corrugated badly after less than a year in service. In this case the new rail was laid on the old foundation and no other change in the construction made.

Corrugations in Chicago are of various lengths and depths and develop under various combinations of wheel sizes. No definite relation has been established between the rate of corrugation development and the number of wheel passes. In some cases sections of track under heavy traffic will be free from corrugation, while other sections of the same track under the same traffic and sometimes in an adjacent block will corrugate badly. After corrugation starts, it, of course, develops more rapidly under heavy than under light traffic. In some cases standard construction track has started to corrugate in spots almost immediately after being laid.

Several types of grinding apparatus are used for the removal of corrugation in Chicago track. Atlas grinders are used for small work, and also Chicago Pneumatic Tool hand grinders for cleaning up small spots. Kerwin grinders are used for cleaning up long sections. The Surface Lines developed a double end machine some time ago, which is particularly suited for the large amount of such work required on this largest of surface line systems. These machines were described in ELECTRIC RAILWAY JOURNAL Sept. 23, 1922, page 452. They are frequently operated in pairs, as shown in an accompanying picture. The ordinary Kerwin grinder was equipped with four grinding wheels instead of two, which permits the work to be done twice as fast with the same crew of two men. The front pair of wheels takes the initial cut and the rear wheels do the finishing. Strand grinders are also used for some classes of work in Chicago. Reciprocating machines have not been found satisfactory for this work and are not used, the primary objection to them being that they are too slow. It is recognized that the reciprocating grinder makes it possible to get a very fine finish, but this is not considered essential for practical purposes and hence not superior to the more rapid rotary grinder.

Grinding is done at night on heavy traffic streets or sometimes throughout the full twenty-four hours. The practice is to use crossovers and single-track the cars past a section 200 to 500 ft. long at a time, depending on conditions existing on the street on which the corrugation is being removed. The Atlas grinders are used under conditions where it is desirable to take the grinder off the track between cars.

No allowable depth of corrugation before grinding is determined. It is the practice to remove it as rapidly as it develops and this is carried out as far as the equipment available and the personnel will permit. If a section of rail becomes too badly worn to permit of grinding economically the rail is removed.

The experience in Chicago is that corrugation tends to destroy the entire track structure, as well as to cause rapid destruction of equipment and discomfort to passengers. After grinding, there is apparently no definite cycle of recurrence, although careless workmanship will cause corrugation to develop again because it was not entirely removed. There is no evidence that it develops on properly ground rail any more or less rapidly than on new rail. The grinding, of course, affects the life of the rail in proportion to the amount of metal which must be removed. Maximum economy in rail life is believed to be obtained by grinding as soon as any evidence of corrugation is found.

As said before, very little trouble has been experienced in Chicago with T-rail. Installations of 7-in. 91-lb. Lorain section in 1908, laid with beveled tie plates which tilted the head of the rail inward slightly, have shown very little corrugation.

CLEVELAND CORRUGATION OF SMALL EXTENT

The experience of the Chicago company with tilted T-rail is corroborated by that of the Cleveland Railway. Charles H. Clark, engineer maintenance of way, reports that the Cleveland Railway has no corrugation to speak of on straight track. There has developed once in a while a soft spot in the track with slight corrugation, but little notice has been taken of it. For a number of years the company has tilted its rails 1 in 25. It has been Mr. Clark's opinion that corrugation starts at the gage line of the rail where the gage line of the wheel produces very heavy pressure and causes the steel to cold roll and flow ahead of the wheel in waves. By tilting the rails the pressure of the wheel has been transferred to the middle third of the wheel tread, and as to the result, Mr. Clark says, "The answer is that we have no corrugation on straight track," except as noted above in small degree where soft spots develop. Some severe corrugation, however, has been experienced on long radius curves in paved streets where the cars make 25 m.p.h.

PITTSBURGH FINDS TIGHT TRACK ONE CAUSE

After a several months study of rail corrugation on the Pittsburgh Railways, I. E. Church, special engineer, reached these general conclusions:

"After a thorough inspection of our track we came to the conclusion that all track corrugates more or less. In other words, that the rail in wearing down wears unevenly. The main difference is in the closeness of the unevenness. When the high and low spots are greater in length than about 6 in. the car will roll over the track smoothly, but when they are closer together the car begins to bounce and the corrugations become noticeable. With the aid of a few strokes of a reciprocating grinder, I could find these hills and hollows on any rail.

"Now, then, the question is what conditions contribute to shortening up these depressions to bring the rail to the condition popularly known as 'corrugated.' With our track I found that the one universal condition that always applied, no matter what other conditions might or might not be present, was tight track. If we had from $\frac{3}{8}$ in. to $\frac{1}{2}$ in. between wheel and track gage the corrugations were far enough apart to cause no trouble and hence could be classed as 'uncorrugated.' Our standard difference between wheel and track gage is $\frac{1}{4}$ in., but during 1920 a slight mistake was made in the track gages so that all rail laid during that year was laid too tight and it is all corrugated. We, of course, have track corrugated that was laid to our standard, but in the majority of cases there are spots or sections where the rail was pulled closer or has distorted enough to make it a little under gage.

"We also have corrugated track that is a little wide of gage, but this is mostly at points where the subsoil has sunk, leaving the ties hanging to the rail and the whole supported by the pavement.

"With our type of track construction, I would say

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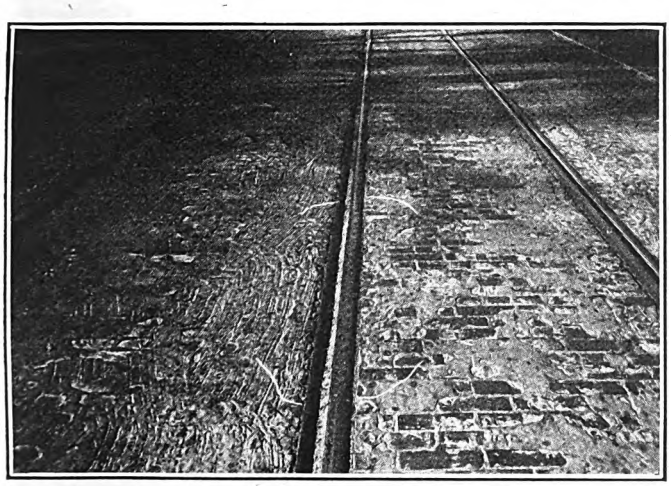
that if we would allow from ⅜ in. to ½ in. difference between the wheel and track gage and always have the ties resting on a good foundation we would never be bothered with corrugations on straight track. As to curves, if the radius is such as to allow a car speed greater than 7 m.p.h. the track will corrugate no matter what other conditions apply."

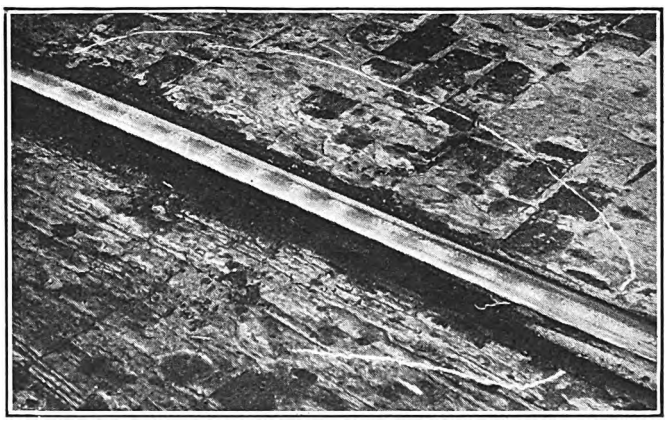
COLUMBUS, OHIO

E. O. Ackerman, engineer of way Columbus Railway, Power & Light Company, Columbus, Ohio, writes that corrugation occurs on almost every track on the Columbus system, requiring periodical removal by grinding. The extent of the corrugation can be judged by the fact that the cost of its removal is approximately $10,000 per year. The corrugation develops more quickly on rail wherein the wheel bearing is close to the gage line. The lengths of corrugations are about 3 in., this being almost uniform throughout the system. Mr. Ackerman says that he has never discovered any relation between wheel diameter and the length of rail corrugation. Similarly, the number of wheel passes bears no definite relation to the rate of corrugation, except that for each individual case an increased number of cars increases the corrugation, which is of course to be expected. The rate of corrugation development differs so much on different lines and different rails that no definite method of determining the rate, except observation, has been employed.

The method followed in Columbus to remove corrugation is to use a reciprocating grinding machine until the corrugation is entirely removed. The rapidity with which this can be done depends upon the depth to which the corrugation has been allowed to develop. It is endeavored to remove it as soon as it is plainly visible. By so doing, the damage to the rail is reduced to a minimum. On the other hand, if corrugation is not removed, it tends to shatter the foundation and pavement and loosen the entire structure, as well as damage the car equipment. Removing corrugation by grinding does seriously affect the life of the rail. The damage caused by corrugation on the Columbus railway system is placed at not less than $25,000 per year. After grinding, corrugation will reappear, the rapidity of this depending on the position of the wheel bearing on the rail.



Both These Tracks on Main Street, Columbus, Ohio, Were Built at the Same Time. Corrugation Developed on the Left Track Where the Wheel Bearing Was Close to the Gage Line. No Corrugation Has Developed on the Right Track, Where the Bearing Was Considerably Away from the Gage Line



Appearance of Corrugated Rail in Columbus, Ohio, After It Has Been Rubbed with Reciprocating Grinder Sufficiently to Brighten the High Portions

The reciprocating machine manufactured by the Railway Trackwork Company, Philadelphia, is used by the Columbus company for removing corrugation. A photograph reproduced herewith plainly shows corrugation on the rails of one track laid to bring the wheel bearing close to the gage line, while on the rail of the other track built at the same time, but laid to bring the wheel bearing considerably away from the gage line, there is no corrugation. Both tracks have been subjected to equal traffic.

The organization for grinding work consists of two crews of three men each, who operate two grinders.

PHILADELPHIA, PA.

In Philadelphia, W. K. Myers, vice-president Philadelphia Rapid Transit Company, advises, the amount of corrugation is comparatively small. This is attributed to the fact that corrugation is never allowed to get much of a start. As soon as evidence of it occurs the grinding machines are put to work.

Corrugation occurs most generally on track which is noticeably loose, and also on track with concrete stringers under the rail. The corrugations vary from 2 in. to 6 in. in length.

Some years ago the P. R. T. developed a machine for measuring the lateral vibration of rail heads under load. The action of this machine was described in an article by J. H. M. Andrews in the ELECTRIC RAILWAY JOURNAL in September, 1910. In recent years no investigation work has been done, and Mr. Myers comments that instead of attempting to solve the theoretical problem, effort has been directed toward giving prompt attention to incipient corrugation and preventing its development.

The method employed for removing corrugation is to use a reciprocating grinder with a crew of three men. This outfit can do about 125 ft. per day under the normal conditions of traffic. If the corrugation is well developed, it is necessary to remove the crest of the waves with a Universal rotary grinder, after which the reciprocating grinder is used to finish. The cost of grinding corrugation under average conditions is about 8 cents per foot of track.

Commenting on the destructive effect of corrugation, Mr. Myers said:

"Corrugation destroys paving and track structure. Whether loose track causes corrugation or corrugation causes loose track has never been definitely settled in our opinion. There is no doubt that should corrugation

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occur on track which is not loose it would rapidly become loose.

"It is our experience that corrugation is apt to recur. If thoroughly removed, however, and the track reconstructed and well tamped, the probability is that it will not return. We do not believe that the removal of corrugation by grinding seriously affects the life of the rail."

Los Angeles, Cal.

B. H. Eaton, engineer way and structures Los Angeles Railway, states that this company has not had serious trouble with corrugation to date. What has occurred has been almost exclusively in solid concrete construction, except occasionally on curves. An interesting observation is that it has been found on curves with certain radii, namely, anything around 65 ft. or 300 ft.

The length of corrugations varies from 1½ in. to approximately 8 in. Corrugation seems to develop more or less in proportion to the number of wheel passes. However, a few exceptions have been noted where it has occurred quite extensively under very few wheel passes.

For removing corrugation the company makes use of a specially built car equipped with two 25-hp. motors. Grinding blocks are suspended from the body of the car on either side between the wheels. These blocks are of carborundum, 2 in. x 2 in. x 8 in., and are forced down on the rail by a system of levers and springs which produce between 400 and 500 lb. pressure. Both rails are ground simultaneously. The car is operated back and forth over the track after regular service has been discontinued. It will grind about 2,000 ft. in three nights work. This car is said to operate very satisfactorily and is the cheapest method the company knows of for removing corrugation. Two men operate this car at a labor expense of $10.60 per night.

Corrugations are never permitted to get more than ⅛ in. deep. If corrugation is allowed to develop unhindered, it will soon destroy the entire structure, usually cutting into the ties, loosening the rail and destroying the pavement by a vertical movement. As to recurrence, the Los Angeles company has a number of locations where there has been no recurrence after grinding. However, the more common experience is that corrugation does reappear. This is particularly true in solid concrete construction.

San Francisco, Cal.

B. P. Legaré, engineer maintenance of way and construction Market Street Railway, San Francisco, reports that this company has had a great deal of corrugation on its lines; in fact, nearly every line has developed corrugation to some extent. It has occurred most commonly in rigid concrete construction. The length of corrugation varies. It begins in short waves, a small fraction of an inch long, and if allowed to run for a long time will become 6 or 8 in. long.

The method and equipment employed for removing corrugation in San Francisco are very much the same as that just described for the Los Angeles Railway. No attempt has been made to figure the cost of removing corrugation. It is considered work that has to be done regardless of the cost. The experience is that corrugation returns after it has been removed. Certain track in San Francisco has been ground five or six times in the last ten years. This grinding seriously affects the life of the rail, as the head is being ground off instead of worn off by wheels.

Experience from Other Cities

The extent of corrugation in Little Rock, Ark., according to John Card, Arkansas Central Power Company, is 1,300 ft. of track out of 50 miles. All corrugation has occurred in track in pavement, and the corrugation varies from 5 to 7 in. in length. A reciprocating track grinder is used for its removal, which can be done at the rate of 5 ft. per hour at a cost of about 20 cents per foot. Corrugations are permitted to get from ⅛ to ⅜ in. deep before grinding. The grinding not only wears out the rail faster, but it has a tendency to harden it. And corrugation returns more rapidly than it first developed.

F. B. Walker, chief engineer Eastern Massachusetts Street Railway, Boston, reports that this company has 175,000 ft. of rail corrugations per year, mostly in 9-in. girder rail in paved track. Ten reciprocating grinders work continuously during the entire track season, each machine having three men, on a program of removing corrugation as soon as it appears. These machines will each grind from 150 ft. to 300 ft. per day at a cost of 9 or 10 cents per foot of rail. Corrugation does recur in some cases, particularly if the rail is loose on the ties.

Approximately 25 miles of corrugated track out of a total mileage of 484.5 is estimated as the amount existing on the Boston Elevated Railway by H. M. Steward, superintendent of maintenance. It is common to all types of track construction employed in paved streets. The lengths of corrugation vary up to 4 in. Rotary and reciprocating grinders are used for removing corrugation and the speed of grinding with varying depths of corrugation averages about 20 to 25 ft. of rail per hour. This is done at a cost of 23 cents per foot of rail.

Effort is made to remove corrugation soon after it appears. Preference is given to track over which service is heavy and frequent. If allowed to remain, the corrugation will cause rapid deterioration of the track structure on adjacent paving. Corrugation does recur after grinding. Its removal by grinding does not seriously affect the life of the rail.

An interesting special case of corrugation is reported from Bangor, Me. E. W. Jennison, engineer maintenance of way Bangor Railway & Electric Company, states that on one of the two tracks at a sharp change in grade corrugation has occurred, but not on the other track. The track where the movement is down grade and onto the level there is no corrugation. The corrugation has occurred on the track for traffic changing from level to the up grade. Another case of corrugation in Bangor has occurred on the rail through special trackwork. The paving in both cases cited is wood block on a concrete base. The corrugations are approximately 3 in. long and have occurred only in girder rail.

The only place where corrugation has developed in the track of the Key System Transit Company, Oakland, Cal., has been on very rigid construction, mostly on 141-lb. girder rail laid in concrete. But the amount is small, according to H. O. Demeritt, engineer maintenance of way and structures, and only a few nights each year are devoted to grinding off corrugations.

George N. Cole, engineer Second Avenue Railroad, New York City, attributes the fact that this company

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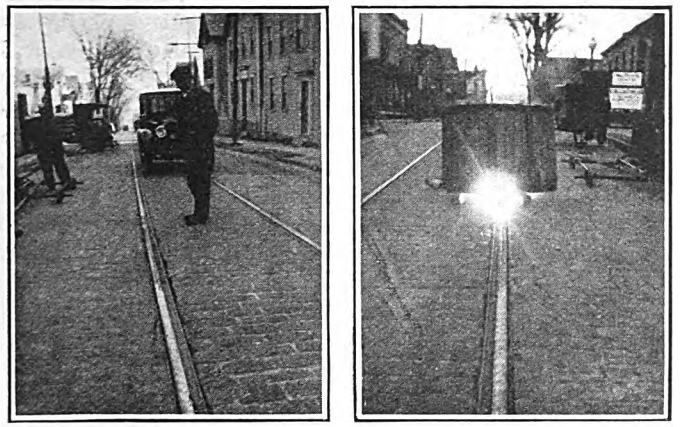
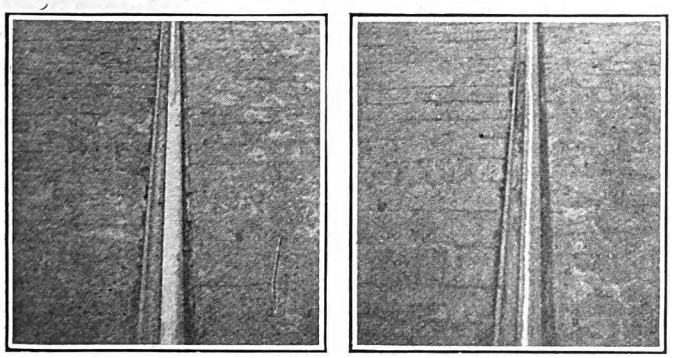
has no corrugation on its tracks to the use of cast iron wheels instead of steel wheels.

R. N. Wade, engineer maintenance of way Chicago Rapid Transit Company, writes as follows in regard to corrugation on the elevated lines:

"As you know, all track on the elevated railroad is open track, and we have no trouble with rail corrugation except on the curves. This, I believe, is due to the combined motion of the wheels slipping and the trucks slewing; that is, moving backward and forward in the throatway between the restraining and the running rail. This is also due to a certain extent to the application of power on the curves.



Corrugation in New Bedford Is Removed by Welding on New Metal



At Left, the Welded Strip Is Ground Down Smooth, but the Metal of the Original Rail Is Not Touched.. At Right, the New Metal Is Laid ¼ In. Back from the Gage Line

"Most of our curves wear out due to corrugation, but we do not grind them, as we have found it is cheaper to renew the rail. When the rail becomes so badly corrugated that it is noisy and the trains ride over it uncomfortably we take it out."

Building Up Corrugated Rails by Welding

A most interesting treatment of the problem of removing rail corrugation is that recently brought to light by the visit of a JOURNAL editor to the New Bedford Mass., property. T. W. Williams, engineer maintenance of way Union Street Railway, makes a practice of building up badly corrugated rail by welding, thus giving it a new tread. This is done with an Indianapolis welder.

Three seams of metal are welded to the tread parallel to the length of the rail, the nearest being ½ in. from the gage line. The rail must be clean when the welding is done and care must be taken to keep away from the gage line. If the latter is not done, the welding material is likely to spatter and spoil smoothness of the gage edge. After the head of the rail has been built up by welding on these three strips the surface is partly ground down again. The grinding, however, is not carried to a point where the original metal of the rail is affected.

After having been treated in this way, the rail surface is good for one and a half to two years service before new corrugation develops. Hard steel electrodes are used and it has been found more advantageous to do the work in hot weather because of the unequal contraction which afterward occurs if the welding is done during cool weather. The corrugation with which the New Bedford company has to deal is principally at points where the cars are braked for a stop.

Nearly every one has his own theory of the cause of corrugation, but the method of avoiding corrugation employed by J. M. Mudie, chief engineer Detroit United Lines, seems to be as dependable as any. He says: "I am frank to admit that none of my theories regarding the cause of corrugation stand up under all conditions, and I am inclined to believe that keeping one's fingers crossed is about as good a method as any of avoiding this trouble."

Experience of a Track Consultant

Drawing upon the experience of H. P. Hevenor, consulting engineer, New York, who has had an extensive consulting and contracting experience in connection with electric railway track, we get a somewhat broader view of the subject. His experience with respect to corrugation covers rapid transit lines where multiple-unit trains are operated; railroad tracks where the service involved multiple-unit trains, electric locomotives, and steam locomotives, and surface street railways both in paved and open track. His observations follow:

"It has been my experience that corrugation occurs most on surface lines of girder rail and wood tie construction with concrete paving base between the ties and a block form of pavement. On girder rail I have seen lengths of corrugation vary from 2 in. to 8 or 10 in. On T-rail I have never seen corrugation run less than 3 in., with an average of about 4 in. Under multiple-unit operation corrugation very seldom runs less than 6 to 8 in.

"I have never found any direct relation between wheel diameter and length of corrugations other than the difference in lengths of corrugations under trolley use and multiple-unit operation. There is a definite relation between corrugation and the number of wheel passes. When corrugation once starts it is only a question of the number of wheel passes before it becomes pronounced and eventually destroys the rail and the entire track assembly, including the paving adjacent to the rails.

"Development of corrugation has usually been brought to my attention by the depreciation of the track structure or the adjacent paving. But complaints from adjacent residents have also been a source of information as to the condition. In one instance, where a multiple-unit operation was used in an open cut, the jarring of the cars operating over track damaged by corrugations shook an entire house and broke glassware in the house.

"There is only one real method for properly removing corrugation and that is by means of what is known as a reciprocating grinder which gives a true planing

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action on the top of the rail. I believe that removal of corrugation by means of a grinding wheel may remove the heavy corrugation, but it leaves a great number of microscopic cups, which in due time, under a sufficient number of wheel passes, will cause corrugation to recur. The reciprocating grinder is slower than the rotary grinder, and of course the time required for removing is dependent upon the depth of the corrugations.

"The cost of grinding will vary considerably with the chemical analysis of the rail, whether girder or T-rail, the width of the head or rail tread and the depth of the corrugations. The cost of removing corrugations by means of a reciprocating grinder usually is greater than by means of a grinding wheel, but there is no comparison in the value of the work after it is completed.

"Corrugation should be removed as soon as it can be visibly detected or identified, or before it has had an opportunity to loosen or harm the track assembly or the adjacent paving. It will absolutely destroy the track structure and the adjacent paving long before normal depreciation. I might also add that corrugated track is very hard on rolling stock, and the noise caused by corrugation is very annoying to passengers as well as the people living in the vicinity.

"If corrugation is properly removed in its early stages it oftentimes will not recur in the life of the rail; but if it is allowed to get to any depth, say to 1/8 to 1/4 in. in paved track, by removing the corrugations it will save the paving and track assembly for a few years, when it will most likely need to be gone over and the corrugation again removed. The cost of removing corrugation is so trivial compared to the cost of replacing the structure that the work is well warranted. However, in open track structure, it is my belief that when corrugation reaches this stage the rails should be replaced because of the harm done to the track assembly, thereby increasing the maintenance and the risk of derailment.

"Unquestionably, all metal removed from the top of the rail, in addition to that of normal wear, will have a tendency to decrease the life of the rail, but if this rail has corrugations on it, it will naturally add to the life of the rail to remove the corrugations. On the old deduction that the life of the joint is the life of the rail, the small amount of metal required to be removed to eliminate the corrugation in its early stages is not likely to have any effect on its future life.

Some Observations from Heavy Traction Experience

"I have found that corrugation is oftentimes introduced at and adjacent to station stops due to the heavy braking and the quick acceleration of trains. The electric locomotive does the least harm to the rail in this respect, the steam locomotive the most harm at the point of acceleration due to slipping of the wheels, while multiple-unit trains are a source of complaint from the entire territory in which they are operated.

"The causes of corrugation have been the source of considerable controversy, but I feel that most authorities will agree that it unquestionably comes from narrow track gage in most instances. It has been my personal observation that the single-truck safety cars are also the means, at times, of starting corrugations. Whether this is from the rigid wheelbase of the single truck I am unable to say, but I feel that this source should be watched by different men throughout the country. In another instance I found that corrugation started very quickly on one type of T-rail. A micrometer was used on an unused rail of this type and slight variations were found in the top of the head of the rail, after machining the base to a true plane. This may have been an exceptional case or it may exist in a number of instances.

"Corrugation in street railway construction has often been looked on as being more prevalent in the rigid type of track construction than in the flexible type of track construction, both in paving. I believe, from my own experience, that the rigid track construction will have less corrugation than the flexible.

"If corrugations are permitted to become of any excessive depth before they are removed, and are then planed to a level surface, the early recurrence of corrugation in this rail is due to the difference in the density of the metal as the steel is more compacted at the hollows than at the high spots. It might be an interesting research to find out the amount of compacting received by the rail at different depths of corrugation."

British Conclusions

In bringing together some discussion of the corrugation situation as it exists today, it may be well to include the conclusions of the Municipal Tramways Association of Great Britain. The final report of the sub-committee on rail corrugation dated April 29, 1921, confirmed the conclusions reached by the same committee in 1914, after extended additional study. These conclusions comprised experiments with rail supported in various ways to reduce the vibration. The conclusions follow:

1. Corrugation takes place on all rails under observation, varying only in degree and pitch.
2. On most rails corrugation is accompanied by pitting or crumbling, varying from a slight to a marked degree. This pitting appears most where corrugation ceases to develop cumulatively and in regular ridge and hollow form.
3. The pitting or crumbling appears to relieve the superficial molecular stresses induced by the causes of corrugation, and thereby eradicates, limits or modifies corrugation.
4. Corrugation occurs in ordinary grooved rail and on bull head rail and on rail with or without specially secured lateral stiffness and rigidity.
5. Differences in freedom of the rail for lateral vibration are not accompanied by any corresponding differences in either the occurrence or the severity of corrugation.
6. The corrugation of the Zell-treated rails did not differ appreciably from that of other rails.
7. Persistent corrugation occurs on straight lines where the slippage is least and where it is therefore least likely to be a contributory cause of corrugation.
8. Corrugation is removed at or near stopping places by magnetic brakes as fast as the cause of its origin tends to its production.
9. The corrugation of the tracks considered by the committee appeared in definite form on railways, such as the Metropolitan District, whereon the rails are of different form and differently fixed.

A further finding of the committee in its final report was that "corrugation of steel rails is inseparable from the action of the heavily loaded wheels rolling along the surface of the tread of rails, and this rolling originates the corrugation by giving rise to superficial stresses in the material of the rail tread, which are in excess of the elastic limit and of the toughness of that material."

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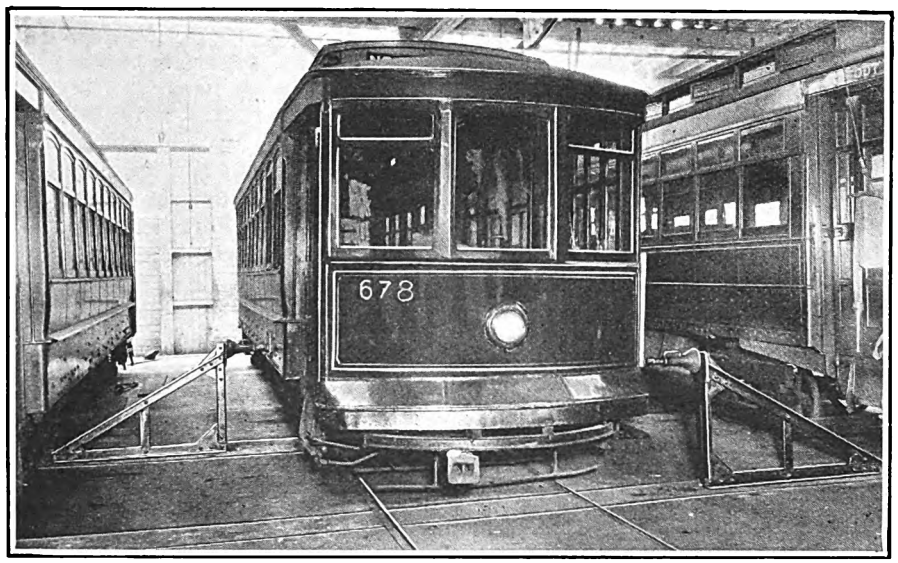
Equipment Maintenance Notes

Car Straightening Device

WITH the increased use of steel side sheets and steel underframing for electric railway cars has come a demand for convenient equipment to assist in straightening bent sides and ends. These become twisted, warped or crushed out of shape from collisions with trucks or other cars, and if the bending is not too extensive it is most convenient to straighten out the bent portions without cutting out the steel sheets or understructure. A few railways have provided special straightening construction and equipment for taking care of this work, but the majority have no special facilities. On many roads it is quite common to bring the car in between two brick walls or between two iron columns and then apply jacks for straightening out excessively bent portions, while other parts are hammered out, if possible.

A special construction used by the Northern Ohio Traction & Light Company was described in the ELECTRIC RAILWAY JOURNAL for Feb. 2. The accompanying illustrations show a very simple, strong and portable equipment which is used in the shops of the Capital Traction Company, Washington, D. C. This construction makes use of anchorage beams installed in the floor of the shop. Jack braces are provided which can be placed in position by hooking the foot lugs at the bottom of these braces into slots in the concrete anchorage beams. The straightening of the bent part of the car is then carried out by means of screw jacks which are placed between the jack braces and car body.



Straightening a Car Body in the Shops of the Capital Traction Company

In the shop of the Capital Traction Company four anchorage beams are provided. These are of concrete 1 ft. 4 in. wide and 2 ft. 6 in. deep. The concrete is reinforced by ¾-in. and 1-in. round iron rods which have hooked ends. Iron plates are also provided to receive the hooked portions of the jack braces. An accompanying illustration shows the construction of the anchorage beam and also details of the jack brace construction.

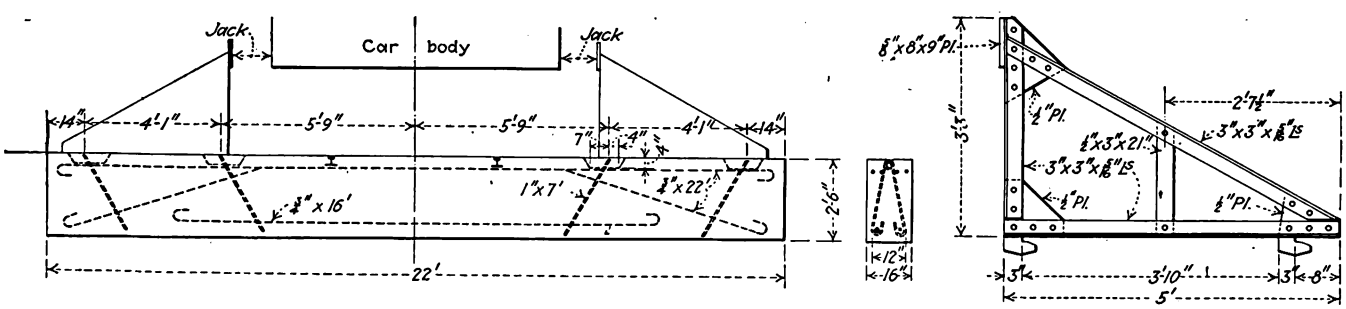
The jack brace is made of 3-in. x 3-in. x ⅝-in. steel angles riveted together and having gusset plates at the corners and a crossbrace between the top and bottom members. Each brace is provided with two hooks at the bottom to fit into the plate of the anchorage beam and hold the brace firmly in position, when pressure is applied.

The method of applying pressure and straightening a car is illustrated by the accompanying photograph. A particular advantage of this construction is that the jack braces can be placed in position and removed very easily, so that the entire floor area is available for other work when the straightening work is not being carried out.

Plug-Cutting Bit for Finishing Screw Holes

AN ATTEMPT is being made at the Throop Street shops of the Chicago Rapid Transit Company to eliminate from the interior trim of the car all screwheads by counterboring the head and placing a wooden plug of the same material as the trim on top of the screwhead. Thus on the side posts, wood panels and end panels of the car no indication of the screws which hold the wood to the steel framing mar the finish of the trim.

To obtain the necessary plug from



Details of Anchorage Beam and Jack Brace for Car Straightening

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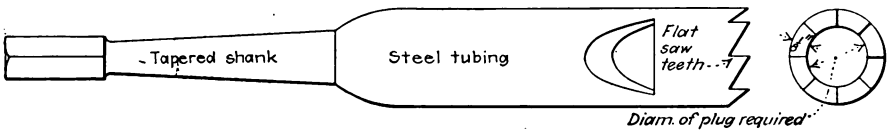
a piece of material of the same character and grain it was necessary to devise a plug-cutting tool which would turn these plugs out at a rapid rate and at the same time have them accurate as to size. In the construction of this tool, or bit, a piece of steel tubing whose inside diameter corresponds to the required diameter of the plug is securely fastened to a taper shank which will fit conveniently into the drill press or horizontal wood drill. The other end of the steel tubing is serrated by hand into a number of flat teeth. A notch is made in the steel tubing about ½ in. from the saw tooth end in order that a small drift may be used to force the plugs out of the tool should they become lodged in there during the process of cutting. It has been found advisable to make these bits out of ⅛-in. stock and to have three or four sizes on hand which will cut plugs for the majority of screwheads. Forty plugs per minute may be cut by one man operating one of these tools, and it is the practice to make up a couple of hundred plugs at a time in order that the woodworkers will have an ample supply for a period ahead.



Details of Plug-Cutting Bit for Finishing Screw Holes

Notes on Modern Armature Repair Practice*

A Number of Methods Are Discussed that Make for Good Repair Work on Windings, Brushes and Bearings—High-Voltage Testing of Windings Desirable

BY JOHN S. DEAN
Westinghouse Electric & Manufacturing Company

THE armature winder should be provided with proper tools, including a rawhide mallet, steel and fiber drifts, screw driver and scissors. Improper tools in the hands of the average winder may result in a poor winding job. Best results can only be obtained by using armature coils made from a good quality of copper, insulated with high-grade fibrous material or a combination of fibrous material and mica wound to correct shape, with insulation reinforced at cross-overs and corners, and thoroughly treated by dipping and baking in a high-grade insulating varnish.

All sharp corners and roughness in the slots that might damage the windings must be removed by filing or by grinding with a small portable emery wheel. The insulating material placed on the coil support should be evenly spaced to avoid any thin spots. The coils should have a snug fit in the slots and should be laid in so that their tops extend about 1/32 in. above the band grooves. This is important to get a good banding job. In winding the coils they should not be twisted, bent or otherwise abused. Insulating or protecting pieces should be placed at all points where coils cross and where there is danger of short circuiting.

In soldering the leads to the commutator the iron should preferably be held on the side of the commutator rather than on the top, and the pinion end of the armature raised 6 or 8 in. This procedure tends to prevent solder running back of the neck and short circuiting adjacent bars. If the armature coil leads are well tinned, experience has shown that it is not necessary to tin the commutator necks. An acid flux will tend to weaken the fibrous insulating material on the windings and should not be used. The best practice in soldering is to use a high percentage tin base solder for wire-wound armatures and pure strip tin for those that are strap wound.

DIPPING AND BAKING

On many roads, armatures are partly banded and then heated twelve to twenty-four hours, depending upon the size, and dipped, pinion end down, in a good grade of black insulating varnish. After draining they are baked at a temperature of from 95 deg. to 105 deg. C. for forty-eight to seventy-two hours depending upon the size. This treatment fills the crevices in the armature and acts as an effective bond to prevent vibration.

Best results in banding armatures are obtained by drawing the windings down in place by temporary bands after they have been heated. For the final bands a good grade of tinned steel banding wire, ranging in size from No. 14 to No. 17 B. & S. gage, with tensions from 100 to 350 lb., is best. Phosphor bronze wire is used for bands by some operators, but the following comparative test results show plainly the superiority of the steel for this purpose:

	Ultimate Strength, Lb.	Elongation, Per Cent
High grade steel	267,000	36
Phosphor bronze	157,000	15

Strips of tin placed under the core bands tend to strengthen and make them less liable to work loose in service. Bands should be soldered with pure tin as it has a higher melting point than the half-and-half solder.

TESTING ARMATURE WINDINGS

On a number of properties repaired armatures are given an insulation test of 600 volts, through a bank of lamps connected to the trolley circuit. This test is not severe enough to weed out the defects in the winding due to poor material and inferior workmanship. A railway shop should be equipped with a high-voltage testing box. All newly wound armatures should be tested at 2,000 volts to ground and repaired armatures at 1,000 volts.

FIELDS AND BRUSHES

To insure the proper speed of the motor, the field coils must have the correct number of turns. The wound coils should be carefully insulated and thoroughly impregnated with a high melting point asphaltum gum. This treatment produces a coil that will best resist heat and moisture. Revamping old field coils by burning off the old insulation and reinsulating should only be done under careful supervision, as there is danger of damaging the copper. A 30 per cent increase in the resistance of a revamped coil was reported by one master mechanic, which in his estimation was due to burning the copper when the coil was heated to remove the old insulation.

It is considered best practice in connection with modern motors, and is also recommended for old motors, to use cables coming out from the body of the coil instead of the heavy brass terminals, which are more

*From a paper read at the meeting of the Midwest Electric Railway Association, Springfield, Mo., Jan. 17, 1924.

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likely to break off, due to vibration, or to develop loose connections and burn off the leads. Another objection is the difficulty of properly insulating the terminals after the connections are made. Field coils mounted in the frame should be spring-supported, to keep them tight on the poles and prevent vibration and chafing. As a precaution it is advisable to test the polarity of the coils after they are assembled in the frame.

To improve the operation of brush holders, keep the porcelains clean, the shunts in good repair, the mechanism working freely and spring tension approximately from 6 to 9 lb., depending upon service conditions. Brush holders with a single carbon per box are more likely to give trouble than those using split carbons, due to reduced spring pressure, by having the circuit broken at the brushes, with resultant tendency to flash. Brush holders should be properly aligned on the neutral position, usually at the center line of poles, adjusted about $\frac{1}{8}$ in. from the surface of the commutator, and spaced around commutator one-quarter of the number of commutator bars on a four-pole machine. The general feeling is that brush holders that need repairs or adjustment should be replaced by others in good condition and the defective ones sent to the shops.

The use of high-grade carbons more than pays in the form of increased life of brushes and commutator and improved operation of the motor. Carbons should have a snug sliding fit in the boxes. They should not be copper plated as the plating is liable to peel off and jam the carbon. Shunts on carbons are not necessary as the modern brush holders have the shunt as a part of the brush holder pressure finger. The average life of carbon on non-ventilated motors is from 40,000 to 50,000 miles, while from 8,000 to 10,000 miles is a good average on ventilated motors. This comparative short life of carbons on the ventilated motors is due to rapid side wear of the carbon, caused largely by the action of the dust and dirt drawn through these motors. A number of operators are using a single carbon per holder instead of the split or double carbon and reports indicate that they show less side wear on ventilated motors and give a higher mileage. This scheme shows a decrease in the cost of carbons per holder of about 15 per cent; further, they are more easily renewed, hence are favored by the carhouse men. On the other hand, the single carbon tends to wear uneven on the end and is more likely to jump off the face of the commutator and cause flashing of the motor.

BEARINGS

The tendency of present-day practitce is to use bronze armature bearings lined with babbitt and plain unlined bronze axle bearings. In the manufacture of bearings a high grade of bronze alloy should be used and great care and attention should be paid to the details of the various manufacturing operations. Armature bearing shells should be carefully tinned and lined with a high-grade tin base bearing metal. They should be given from 0.008 in. to 0.010 in. initial clearance and be pro-

Dick Prescott Goes to Work

and Gets a Chilly Reception

WHEN Dick reported for work the next morning after having been so abruptly hired by Thomas Mullaney, the general foreman, he wore clothing that he thought would be suitable for the rough work as a carpenter's helper which he agreed to take when he was told that the shops of the Consolidated Railway & Light Company did not have an engineering department. In addition, he carried under his arm a small roll containing a suit of overalls.

After punching his time-clock number he followed the instructions given by the timekeeper and started out to find Steve White, the carpenter foreman.

When he entered the door of the little office, built into the corner of the carpenter shop, the round-shouldered, slightly built man who sat before a small battered desk was busy sketching on a pad of paper.

"Are you Mr. White?" asked Dick as the man at the desk looked up.

"Yes. What can I do for you?"

"The timekeeper told me to report to you," said Dick.

"Oh, you're the new helper the boss hired yesterday. Say, just sit down over there for a few minutes until I get this sketch finished and I'll be right with you."

Dick sat down on the makeshift chair indicated, and waited for several minutes in respectful silence. A boy perched in front of a small window opening into the shop was busily handing out job tickets to a number of heavily clad men who stared curiously at Dick as they called out their numbers.

"George," said the man at the desk, suddenly tearing off the sheet on which he had been working from the rest of the pad, "take this sketch right over to old man Johnson in the mill and tell him to make up six pieces like that right away. Tell him we've got to get that car out tomorrow afternoon."

As the boy departed, White turned to Dick.

"Now, young fellow, got any tools?"

"No, I haven't," said Dick, "I thought it would be better to get your advice on what I would need."

"Well I guess you can get along today all right."

Just then the carpenter foreman caught sight of the small bundle under Dick's arm.

"For the love of Pete! That's not all the clothes you brought?"

"Why-y, yes; I have a pair of overalls here and I thought that would be all I would need."

"Overalls! Say, young fellow, what you need here is some overshoes! You can't work in this shop in that outfit—you'll freeze to death. You need some good heavy clothes to wear under your jumper, and some heavy gloves. This shop's as cold as an ice house."

"I'm mighty sorry, Mr. White, but I'll have everything I need in the morning. I thought my overalls would be plenty warm enough for work inside."

"That's the way it ought to be, but I haven't had any luck convincing the old man. I lost several good men this week because we couldn't get more heat. We'd save money by enlarging the heating plant 'cause a man can't do good work all bundled up. But just the same we've got to make the best of it and you'll have to bring down some heavier clothes tomorrow. You can give George a hand in the office today and help him get his time records up to date."

In the meantime, George, the clerk, had found old man Johnson in the mill and handed him the hurriedly made sketch.

"Steve wants to get them made up right away. Says they gotta get that car out tomorrow."

"Yeh? Det ban same story ever' time; hurry, hurry, hurry. Den nutt'n come right. How many pieces he want?"

"Why, I guess he said four pieces."

Still muttering under his breath, and not stopping to question the boy further to investigate the accuracy of his statement, old man Johnson started toward the lumber pile.

(To be continued next month)

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vided with ample oil grooves, properly located. At least one of these grooves should extend to the radius at the bearing flange to supply oil to the rubbing surface between the bearing flange and the wiper ring. These bearings should have approximately 3 to 5 tons press fit in the housings and in addition should be held by a key. Axle bearings should be given from 0.012 to 0.016-in. initial clearance. It has been found by experience that oil grooves are not essential. The bearings should be a tight clamping fit in the bearing seat and in addition should be provided with dowels or keys. Two end dowels in the bearing flange and one body dowel have proved very effective and are used in connection with some of the more modern motors.

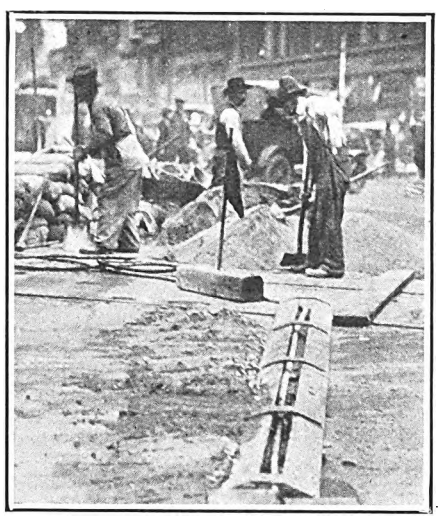
The shells should be cleaned thoroughly before babbitting. Bronze shells that are to be lined with babbitt should be well tinned. Malleable iron shells can be tinned by first pickling the shell in a weak solution of sulphuric acid. A good tin base metal is preferred for babbitt lining, although a lead base metal has been used successfully. The latter requires extra care and attention to get good results. The bearing shell and mandrel should be heated before babbitting. The metal should be poured at a temperature of from 460 to 480 deg. C. This is best accomplished by equipping the babbitt pots with an automatic temperature control to keep the temperature of the metal within the specified limits.

Heat-treated axle steel and alloy steel shafts used in modern railway motors have given good results in service, and these materials are recommended for use on the older motors now using plain axle steel. Tests show that axle steel heat-treated is 44 per cent stronger than untreated axle steel, while the alloy steel is 77 per cent stronger. In addition, either material is more uniform in strength than untreated steel, is tough and fatigue-resisting, and will increase the shaft's operating factor of safety. Fillets must be provided at all changes in diameter. At the end of the pinion taper a large fillet is now commonly used in connecting with a shortened pinion key-seat. It is the practice on armatures using a spider to leave the key off and to depend on the press fit of the shaft in the spider. By thus omitting the key-seat in the shaft increased strength is obtained.

A number of operators believe that loose laminations on cores are largely responsible for broken armature leads. The older railway motor cores were built up with laminations that had a loose fit on the shaft or spider, and in the case of the spider construction were held in place by a ring key. The laminations on modern motors are now made a tight driving fit on the spider or shaft, depending upon the construction, and are forced down in place by means of a special air-operated cylindrical plunger type hammer. The ring key has been replaced by a ring nut to hold the laminations together as this design is more reliable.

Effective Hose Bridge

STREET car companies have difficulty in laying hose across streets because of objections due to traffic blockades and frequent damaging of valuable lengths of hose. The Market Street Railway, San Francisco, is



An All-Metal Hose Protector for Track Gangs

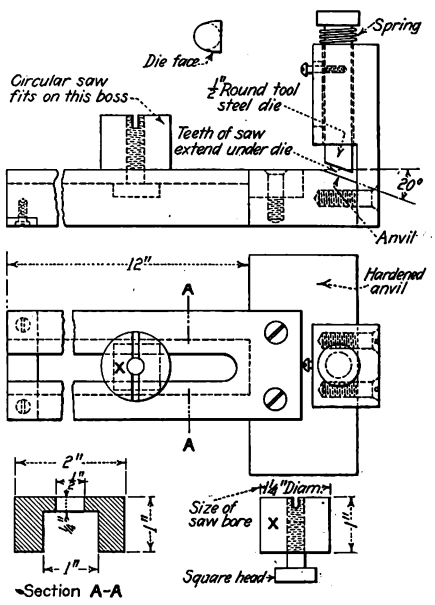
now using a bridge which is built of two wrought metal strips, tied together with iron straps that are also made of drawn material. The straps are curved to bring the long metal strips into an arch. Vehicles can run over the protector with little jarring and without injuring the hose.

Special Tool for Setting Circular Saws

AN INGENIOUS device has been made and is used in the Throop Street shops of the Chicago Rapid Transit Company for rapidly and accurately setting the teeth on heavy circular saws. By employing a blow instead of a leverage pull to deflect the tooth the desired amount, it is claimed that a more accurate setting is obtained in a shorter time than was the case with the ordinary hand saw set. Fundamentally, the device now used consists of a center to hold the saw, an anvil beveled to the proper angle and a die of the proper design arranged to strike the beveled portion of the anvil when actuated by a blow from a hand hammer.

The construction of the device is of mild steel with the exception of the anvil and die, which are hardened tool steel. The anvil portion is 1 in. thick, of rectangular shape, and measuring 2 in. x 4 in. Attached to one side is the guide for holding the boss or center upon which the saw revolves. The other long edge of the anvil is beveled 20 deg., forming the portion of the anvil on which the saws are set. An upright die holder or guide is fastened to the vertical face of the anvil piece by means of countersunk machine screws. The die is of tool steel and is cylindrical up to within ¼ in. of its face, which is semi-circular. This design gives a wide face to the die near the ends of the teeth, thus aiding in bringing them down to shape. A set screw in the die slides in a slot and prevents the rotating of the die, while a small compression spring located between the head and die support returns the die to its position after being depressed by the hammer blow.

An adjustable feature has been introduced in the manner of fastening the boss or center. A slotted



Assembly and Some Details of Special Saw Set

undercut guide accommodates a square-headed bolt, while the boss is threaded and acts as a nut in holding the bolt in any desired position. This boss for the particular saws used measures 1¼ in. in diam-

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eter and was made 1 in. long in order to prevent the saw from jumping off when struck during the setting operation.

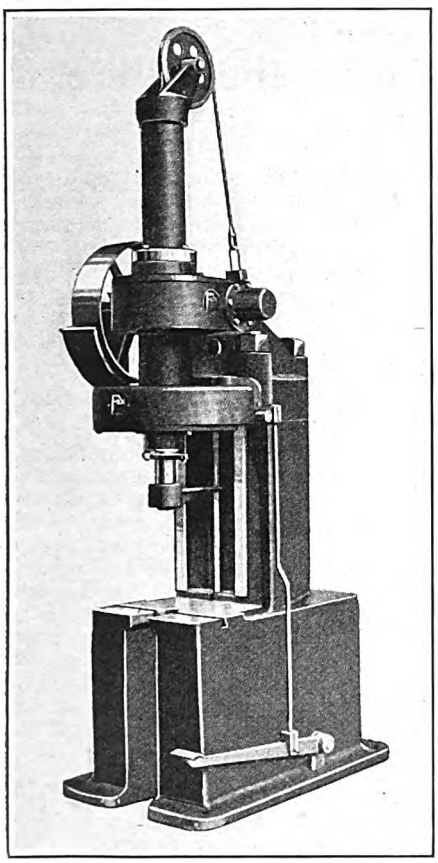
In practice, a saw is placed on the spindle and adjustments made so that the teeth will extend over the beveled anvil. Often the die support is used as a guide, bringing the ends of the teeth up to the support, but experience is the only guide for placing the saw. Alternate teeth are brought under the die and a blow is delivered by a hand hammer. Here again experience will dictate the number and intensity of the blows. After every other tooth has been set in one direction, the saw is inverted and the remaining teeth set.

In setting a No. 12 gage, 18-in. circular saw this device required the services of one man for about three hours, as compared with several days time for the old method. The accompanying illustration indicates the general dimensions and construction of the device, which may be used for saws having diameters up to 22 in.

New Equipment Available

New Screw Type Power Press

TO MEET the demand for a flexible power press, so that varying pressures can be applied and regulated without difficulty, the Fox Machine Company, Jackson, Mich., is placing a new line of power presses on the market. These are built in



Flexible Power Press

four sizes, with capacities up to 5, 10, 20 and 30 tons, respectively.

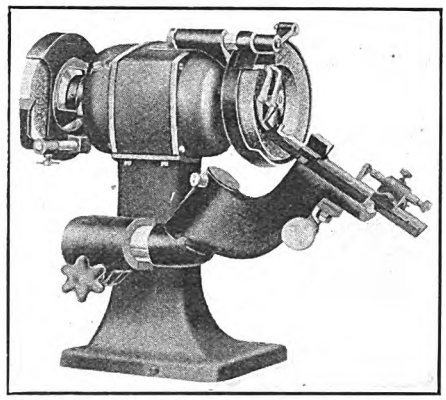
A power press in an electric railway shop is a very convenient tool, as in addition to the work of pressing in bearings and bushings a press finds ready use for straightening shafts and bent bars, pressing mandrels into work that must be turned in a lathe, broaching babbitted bearings, and assembling various parts where pressure is required. With these new machines the work is placed on a table and the depressing of a pedal causes the ram to travel down at a rapid rate until it comes in contact with the work, after which the pressure applied can be regulated by the pressure on the pedal. When the pressure on the pedal is released, the ram returns to its initial position.

The base of the machine is of heavy construction, with a slot down the front of the base under the center of the ram. This permits flanged shafts, etc., to be placed on the work table. The ram is made of high manganese chrome alloy steel, having a tensile strength of 135,000 lb. The ram has a quadruple thread of coarse pitch and two opposed splined keyways for drive in rotation. The nose of the ram has a hardened steel thrust cap, and also a special nose piece is provided so that a variety of different tools can be used at the end of the ram.

Pressure is regulated from the pedal through connection to a raybestos-lined band brake. Pressure on the pedal brings friction to bear on the band brake drum, thus arresting the rotation of the drum. When the ram comes in contact with the work, the pressure on the band brake regulates the slippage of the drum and thus governs the pressure of the ram against the piece placed on the bedplate.

Direct Connected Twist Drill Grinder

A BENCH type twist drill grinder made in three sizes is being marketed by the Gallmeyer & Livingston Company, Grand Rapids, Mich. The smallest size is suitable for drills from No. 60 to $\frac{3}{8}$ in., the second size for drills from No. 52 to $\frac{3}{4}$ in. and the third size from $\frac{1}{8}$ to $1\frac{1}{2}$ in.



Bench Type Twist Drill Grinder

The small machine is equipped with a $\frac{1}{4}$-hp. motor and the larger ones with $\frac{1}{2}$-hp. motors. The grinders carry $8\frac{1}{2}$-in. diameter grinding wheels, which run at 1,750 r.p.m.

The spindle of the grinder runs in high-grade ball bearings and is made of 60 to 80-point carbon, hammered crucible steel. The swivel stud is $2\frac{1}{4}$ in. in diameter, with the bearing the full width of the column. The drill holder is designed so that either straight shank or taper shank drills of standard type can be ground, and drills with enlarged shanks or drills mounted in quick-change sockets can also be ground with equal facility and without any changes or extra adjustment. The holder swivel bearing is $1\frac{1}{2}$ in. in diameter and $4\frac{1}{4}$ in. long.

The lip-rest of the grinder can be put on so as to use either edge for the drill support, and it can be reversed top or bottom, or to give four distinct settings. There is also an adjustment to provide for wear.

A diamond truing device is furnished as a part of the standard equipment. This truing device has a stop in the form of a track on a movable section of the wheel hood. As the diamond is advanced into the grinding wheel, this movable section of the wheel hood with its track is advanced an equal amount, so as to remain a fixed distance from the face of the grinding wheel. A circular stop on the front of the drill holder abuts against the track and rocks on it when swiveling the holder.

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Association News & Discussions

New Englanders Discuss Welding, Economics and Public Relations

MARKED by noteworthy addresses upon public relations, engineering and economics topics, the program of the New England Street Railway Club's meeting at Boston, Feb. 7, attracted a large attendance and the close attention of representative traction men from all over the Northeast. President R. D. Hood occupied the chair. At the afternoon session R. L. Brown, New England manager Metal & Thermit Corporation, Boston, spoke on "Track Welding," J. B. Crawford, superintendent Concord Electric Railways, Concord, N. H., read a paper on "The Vanishing Railways" and C. Q. Richmond, general manager Berkshire Street Railway, Pittsfield, Mass., and Fred A. Cummings, assistant to the trustees Eastern Massachusetts Street Railway, Boston, spoke of pending legislative activities in Massachusetts. C. W. Kellogg, Stone & Webster, Inc., Boston, spoke on the A.E.R.A. regional committee.

Following the usual dinner at the Copley Plaza Hotel, addresses were made by F. E. Webster, vice-president and treasurer Massachusetts Northeastern Street Railway, Haverhill, Mass., on "Street Railway Accounting"; by Hon. Henry G. Wells, Massachusetts Department of Public Utilities, on "The Public and the Railways"; and by Rev. Dr. McIlyar H. Lichliter, Newtonville, Mass., on "The Spirit of 1924." The date of the annual banquet of the club was set for March 27 at Boston.

WELDING BY THERMIT DESCRIBED

Mr. Brown described the principles and application of Thermit welding and showed a large number of lantern slides from the Brooklyn Rapid Transit Company system illustrating the equipment and practice of this branch of maintenance activity. He pointed out that while the welding of locomotive frames is at present the largest application of the Thermit process, its use in track welding is extending so rapidly that in the future it is expected this will surpass the railroad shop development in magnitude. Recent improvements in the equipment include better facilities for preheating joints through the vaporization of kerosene. Ordinarily it requires from twenty to twenty-five minutes to heat the joint properly with a 7-in. rail. In the past two years the manufacturer has greatly simplified the operation of his equipment, reduced the amount of Thermit required per joint, and generally has speeded up production. Improved crucible designs have been put in service, and the No. 3 crucible now lasts for forty or fifty reactions before relining is necessary. It can be tapped from the bottom, which is a great convenience. Thus far the Thermit process has been applied mostly to paved track, but some degree of success has also been attained in its use on exposed track.

L. E. Moore, Boston, pointed out the desirability of educating the public as to the real cost of operating private automobiles in and out of town. Omitting depreciation and other overhead charges, it costs at least 5 cents per mile to go and come from a point 8 miles out of town daily, or 80 cents per diem by automobile, often with a 50-cent garage charge added. For 30 cents round trip a commuter can go and come by rail. It was also brought out that by going into bus operation where conditions warrant it, the electric railway company can apply existing legislative rights of operation to advantage. It was pointed out that a bill in the Massachusetts Legislature compels licensed motor buses to carry school children at half fare, and that this should be opposed by street railways operating buses.

REGULATION OF JITNEYS ON EQUAL PLANE WITH RAILWAYS

F. A. Cummings, Boston, and C. Q. Richmond, Pittsfield, urged that licensed motor buses be placed under the same regulative restrictions as electric railways, and that no jitney license should become effective until the department of public utilities had found that public convenience and necessity demand its use. At present jitney licenses from local authorities do not have to be approved by the commission. About twenty-six states now have legislation regulating jitneys through the state public service commissions.

President Hood urged the inclusion of track-mileage data in cost comparison information sent out by the association. He thought the admission of motor bus owners to the association would be helpful to members.

Getting a New Deal from the Public*

BY HENRY G. WELLS
Commissioner Massachusetts Department of Public Utilities

IT IS common knowledge that the public was antagonistic to street railway companies before the war. Of late years, however, the public has cooperated very largely in order that the companies might give reasonable service and receive a fair return therefor. What is the reason for that change of attitude?

In the first place, it would seem that there was very little attempt to cultivate public opinion when everything was running smoothly with the companies. Then came the war. Labor costs and costs of material increased tremendously. The public, with the old instinctive distrust, opposed any increases in rates. The regulatory bodies, because of that popular distrust, were very slow to act until the companies, particularly in this state, were rapidly approaching bankruptcy. Two of the largest roads in Massachusetts were in such condition that radical action had to be taken. Although every one assumed that private ownership of property, with public regulation, was better than governmental control and operation, yet the management of these two roads was placed under public trustees appointed by the Governor. As a result, the public woke up to the necessity of such institutions as street railway companies. They realized that their cost of operation went up as well as everything else, and that service at a higher rate is better than no service at all. During this period more than 400 miles of street railway tracks in Massachusetts were abandoned, and those people who were left without any service realized the mistake of their attitude in the past.

PROBLEM IS TO MAINTAIN PUBLIC CO-OPERATION

Today the public is more sympathetic to the street railway companies than ever before. Your problem is to maintain that sympathetic co-operation. To do that it is necessary for you to analyze your own condition, to analyze the state of mind of the public with which you deal, to respond to their requests if possible, and, if not, by means of proper publicity to show them why such requests must be denied. Today is a day of readjustment and a critical period in the history of street railway lines. With the present state of the public mind there is no reason why the street railway companies cannot continue to function, give reasonable service and receive a fair return.

Too much must not be taken for granted because of the present condition of the public mind, however, for the peak of high prices has gone by and with every step taken in other lines of activity to reduce prices the public of necessity looks for a reduction in all

*Abstract of a paper presented at a meeting of the New England Street Railway Club, Boston, Mass., Feb. 7, 1924.

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things. It must be clearly indicated that street car fares have only increased 45 per cent since before the war, and on a comparative basis there is still a margin between that and other costs. It should be clearly pointed out that the street railway companies have secured their increased fares at a much later date than any one else; and that, therefore, it will be necessary to be slow in readjusting or lowering such fares.

Diversified Service Needed

The street railway used to be considered a monopoly, but that is not true today. The automobile has cut down the revenue of practically every company in the state. No doubt that is why many of the lines have been abandoned, although possibly some of them ought never to have been built. There must be more variety in method of transportation. We have congested centers today where we need subways and tunnels, with trains of six to eight cars, and we have sparsely settled territory where bus lines as a supplement to street railway lines are necessary. So today the service is not all of one kind, and just so far as you men study these conditions and meet these varying changes in conditions, just so much easier it will be to maintain the public mind in a proper attitude.

The use of the one-man car has aided street railway companies in reducing operating costs. There would seem to be room for further use thereof by such companies as are in financial difficulties. Some opposition has been voiced to this type of car. Reliable statistics, not only in our department but gathered all over the country, indicate that these cars are operated, as a rule, more safely than the other types. With that fact established, it would seem that the only question left is whether or not some communities are to have service at all. In other words, there are many lines where the cost is such that one-man cars must be operated or none at all. With the public confronted with the alternative of the one-man car or no car, there would seem to be but one answer.

Bus Can Be Used to Supplement Cars

There are thinly settled territories where even a one-man car does not pay but where a bus, running at reasonable intervals, would serve and would act as a feeder to the rail lines. Jitney competition with street railway companies has not caused as much trouble in Massachusetts as elsewhere and therein, too, the public's attitude has been helpful. All the more reason for street railway companies to study their territory carefully, with a view to utilizing such modes of transportation as are best suited to the territories.

At the other extreme, we have seen recently where a railroad line (the Shawmut Branch of the New York, New Haven & Hartford Railroad) is to be utilized for service by the Boston Elevated Railway. It is possible there are other thickly settled communities where there has been duplicate service by railroad and railway, neither one paying, and where the street railway company could take over the railroad right-of-way, electrify it and operate it in a manner financially satisfactory.

Old Methods Must Be Discarded

In order that the street railway continue with profit as an agency for the distribution of population in order to avoid congestion, and also serve many sparsely settled communities, old methods must be discarded. Just so well as you officials readjust yourselves to these conditions, just so well will you keep the public in a proper frame of mind. Do not assume that the present-day attitude is going to continue. Now is the time to hold it by a little special effort in your relations with the public. Do not assume they are always wrong. Doubtless you have formed the habit of turning down most requests. Even though you did not get the benefit of increased fares as soon as other prices went up, don't assume that anything and everything asked for means too much of a financial burden. Study it carefully from every angle before you decide, and then go over it thoroughly with the applicant, trying to make him understand it from your end.

It may be interesting to know that our principal complaints relate to service, heating (or rather lack of it), and cleanliness of cars. If the scheduled trips are satisfactory, the question of service is eliminated from the primary consideration of the executives. The rest is up to the employees. As to the cleanliness and heating, how much time do the executives spend with the employees on these questions?

Educate Employees and Public

We have spoken of educating the public. Do you educate your employees? No doubt you feel you do spend time enough on such matters with your employees, but you cannot spend too much. The public judges a company by those with whom it comes in contact. The managers may have the best intentions in the world, but that would be easily nullified by those under them. How easy it is for the wrong type of telephone girl to antagonize the party at the other end of the wire. Of course the one calling is more or less "peeved," as a rule, and a little good nature at one end often alleviates the grouch at the other end. Don't answer a written complaint by a mere form letter. Have some one study or investigate and deal with it personally, if possible. It creates better feeling.

Educate the public as well as employees. True, many distrust the paid advertisements of public service corporations. We have seen one company, however, that avoided that by stating that the advertisements were paid for out of the receipts from street car advertising. Tell them facts, not arguments; give them figures easily understandable as to your financial condition, not a mere accountant's report; tell them your difficulties. Do these things regularly, not spasmodically. Do it now, not when conditions change and you want something.

After all, as one official said long ago, real publicity is what you do, not what you say. If the public gets service it is willing to pay for it. If the public is satisfied, it is easier for regulatory bodies to deal fairly and justly with public service corporations. Street railway companies today need the co-operation of their employees and of the public. With that co-operation, regulatory bodies will be relieved of many of their troubles.

Track Bolt Committee Meeting

A MEETING of Sub-Committee No. 4 of the Sectional Committee of the American Engineering Standards Committee, which is dealing with the standardization of track bolts, was held in New York City on Feb. 5. A tentative design together with dimensions for standard track bolts was decided upon, and drawings and specifications will be prepared to be sent out to the various users for their criticisms.

Southwestern Utility Meeting

A JOINT meeting of the Southwestern Public Service Association and the Southwestern Division of the National Electric Light Association will be held in New Orleans April 22 to 25. The subjects will include development of public relations, interconnection of power lines, utility financing and engineering problems.

Utility Secretaries' Conference

ANNOUNCEMENT is made that a conference of secretaries of public utility associations will be held at the Hotel Sherman, Chicago, on March 25.

Illinois Utilities' Joint Meeting

THE annual joint convention of the Illinois State Electric, Gas and Railway Associations will be held March 26 and 27 at the Hotel Sherman, Chicago. A banquet will be given on the evening of March 26.

I.B.A. Public Service Committee

AMONG the committees appointed by President J. W. Prentiss of the Investment Bankers' Association of America is one on public utilities, with the following personnel:

Henry R. Hayes, Stone & Webster, Inc., New York, chairman; Eli T. Watson, Watson, Williams & Company, New Orleans, vice-chairman; James C. Willson, Louisville; Chester Corey, Chicago; Charles R. Blyth, San Francisco; Russell D. Bell, Montreal; C. J. Waddell, Philadelphia; John Esmond, Chicago; H. M. Addinsell, New York; Edgar C. Rust, Boston.

Day & Zimmermann Auditors Organize

AT A meeting in Philadelphia the auditors of the various properties managed by Day & Zimmermann, Inc., organized an association known as the Day & Zimmermann Auditors' Association. Officers elected were Melvin A. Miller, auditor Penn Central Light & Power Company, Altoona, Pa., president; W. C. Schoeppe, Alexandria, Va., vice-president, and L. W. Van Bibber, Springfield, Ohio, secretary and treasurer.

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The News of the Industry

Akron Growing Restive

Public Sentiment Is Strongly Against Avowed Nickel-or-Nothing Policy of Mayor Rybolt

Following an injunction issued by Judge C. H. Wood, on application of the Jitney Bus Owners' Association to prevent the operation of buses from outside points in Akron until they comply with the jitney ordinance, Mayor D. C. Rybolt announced that bus operation would not stop and that the court order would "make no difference in bus operation." The city, however, discharged practically all of its bus starters and they were later all hired by bus operators.

The Mayor announced on Feb. 14 that he would have a bus ordinance providing a straight 5-cent fare introduced at a special Council meeting held on Feb. 15 and that the Council would be asked to grant bus operators the right to run for a period of one or two years.

At a meeting of the City Council on Feb. 12 the Merchants' Association, the Chamber of Commerce, the Clearing House Association and various other organizations presented petitions to the Council asking the restoration of cars at a 6-cent fare for such period as was necessary to secure and submit to the people a permanent franchise for the operation of street cars and buses by the Northern Ohio Traction & Light Company.

Widespread Demand for Settlement

The City Hall was stormed with citizens who demanded that the cars be put back into service; several hundred persons were unable to get into the Council chamber. Resolutions presented at this meeting declared the existing conditions to be intolerable. The city claims to have 120 buses in operation, but checks which have been made by the railway and other interests show that the maximum number operated was sixty-nine. The service is practically no better than it was early in the month. Thousands of people are still walking to and from their work and in many instances workers are paying from 10 to 15 cents bus fare.

Edward S. Rose, Councilman from the Sixth Ward, has submitted an ordinance providing for a million dollar bond issue by the city for the purpose of having the municipality establish a bus system.

Merchants and other business men are still suffering from a decrease in business and advertising in the local newspapers has been cut 30 to 40 per cent.

Thousands of telephone calls are coming into the city and to the newspapers urging that the cars be put back into service, while all newspapers are carrying many letters dealing with the subject. Most of these letters insist that the car service and the bus service of the Northern Ohio Traction & Light Company be restored. Very few of the letters indorse the Mayor in his effort completely to motorize the city.

No modern buses are being operated. Buses are in Akron, however, from New Jersey, Michigan, various towns throughout Ohio, Indiana and some from Illinois.

Terrific pressure is still being brought upon the Council by the general public to recede from its "nickel-or-nothing" policy and grant the railway a 6-cent fare with transfers.

Arguments were heard on Feb. 15 on the injunction to prohibit the fifty outside buses from operating unless they comply with the law. Reports that day were to the effect that some of the eight members of the City Council who have been supporting the scheme for complete motorization are becoming dissatisfied with the Mayor's failure to make good his pledges to furnish Akron the finest bus transportation system in the world. The proposal now is to pass a blanket bus franchise to no particular persons, fixing a 5-cent fare, and try to get companies to operate under it.

Transit Report Under Way at Boston

The report of the Metropolitan Planning Division, at Boston, created by last year's Legislature, has been filed at the State House. The division, which is part of the Metropolitan District Commission, was authorized to make recommendations as to the general transportation service and facilities in Boston and vicinity.

The report deals with three features of the general proposition: Transportation on the highways, by street railway lines, and the relation between railroad facilities and the steamship systems centering in the port of Boston.

In the matter of street railways the opinion is expressed that the carrying capacity of the existing subways in Boston can be doubled by making changes in the construction of platforms and by making other changes in construction.

Further the report says that where existing railroad tracks cannot themselves be utilized by the Boston Elevated Railway because of the need of steam railroads, it is entirely possible that elevated service can be carried on surface tracks parallel to the steam tracks.

The board says that it hopes during the coming year to prepare a comprehensive report dealing with the present facilities of the Boston Elevated and needed enlargements and extensions.

Interstate Will Pay Pensions

Funds Are to Be Administered by Joint Board, Representing Both Company and Employees

Establishment of a service annuity plan for pensioning employees who have completed a certain period of service, was recently announced by the Interstate Public Service Company, Indianapolis. In general the retirement of men employees is at the age of sixty-five and of women employees at the age of sixty, but under certain conditions men employees may retire at the age of sixty and women employees at the age of fifty-five. All costs of the plan will be defrayed by the company. Administration will be by a board of five trustees, three of whom will be chosen annually by the board of directors from among the officers or employees of the company, and two elected annually by the employees from their own number.

Retirement on pension is obligatory for men employees at the age of sixty-five and women employees at the age of sixty, unless the board of directors, for special reasons continue the employee in active service without a service annuity. The rate in each case is 2 per cent of the average annual salary of the employee for the period of continuous service to the date of retirement, multiplied by the number of years of such service with the company, but the amount is not to exceed 50 per cent of the final annual salary or be more than $6,000 per annum. Employees now in the service of the company and over the retiring age are to have their annuities computed on the number of years of service and thereafter have the same standing as at the retiring age.

Plan Now in Effect

There is a provision by which the man employee who has reached the age of sixty while in service or a woman employee the age of fifty-five may be retired upon annuity upon his request or a request of his superior, if approved by the trustees, if he or she has been in the service of the company continuously for twenty years or more. In this case, the amount of annuity is determined by a sliding scale. Thus, the pension of a man at sixty years is 1.5 per cent of his average salary times the years of service, with a maximum of forty per cent of his final salary, and at sixty-four years the percentages are 1.9 and forty-eight respectively. Similar figures hold for women employees from fifty-five to fifty-nine years of age.

The pension plan was announced by special order dated Dec. 28, 1923. It was signed by Harry Reid, president, and went into effect Jan. 1, 1924, as noted previously in this paper.

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Arbitration Suggested

Traction Company and Street Railway Are Unable to Agree on Reorganization

Arbitration of the differences between the Cincinnati Traction Company and the Cincinnati Street Railway was suggested after representatives of the companies reported to the street railroad committee of the Council of Cincinnati on Feb. 11 that they were unable to agree on plans for a reorganization of the electric railway system of Cincinnati. City officials, as well as members of the Mayor's traction committee and representatives of the Cincinnati Street Railway, expressed opposition to the arbitration feature, which was suggested by W. Kesley Schoepf, president of the Cincinnati Traction Company, in a statement read to the committee by Walter Draper, vice-president.

Mayor George P. Carrel urged the committee to recommend to the City Council that the city solicitor be empowered to proceed immediately to protect the city and the public. The committee took the suggestions of Mayor Carrel and Mr. Schoepf, together with the statements of the companies, under advisement. It is possible that the committee will call the companies together for a final attempt to bring about an amicable settlement before making its report to City Council.

FUTURE ACTION UP TO COMMITTEE

What action the city will take in the matter depends entirely on the recommendations which the street railroad committee will make. The city solicitor, it was said, can bring suit asking for a receiver for the Cincinnati Traction Company or the city can institute legal proceedings against the traction and street railway companies to abrogate the service-at-cost franchise. Regarding the latter procedure, it was indicated that it would involve years of litigation and much expense to the public, as the Cincinnati Traction Company could take the matter into the United States courts because it has stockholders outside of Ohio.

While the street railway company is willing to offer $3,000,000 in its capital stock and other considerations for the return of the traction system, W. Kesley Schoepf, president of the traction company, said that the minimum his company would accept was $6,000,000 in stock, although he was willing to arbitrate the matter. Mr. Hinsch and Mr. Dupuis offered Mr. Schoepf $4,250,000 of the street railway's stock, which he also turned down.

Robert A. Taft, who, with Samuel Assur, represented the street railway at the meeting, informed the committee that there was nothing to arbitrate in view of the fact that his company in submitting its offer for return of the system based its conclusions on the earning power of the system. Mr. Taft further said the street railway company's offer involved the purchase of the leasehold interest of the Cincinnati Traction Company and the Ohio Traction Company in the street railway properties for $7,468,328. In addition, he said the railway company would give the traction company the buildings and ground now occupied by the Cincinnati Car Company and a reasonable amount of the ground now occupied by the Chester Park Amusement Company. The car plant and the ground occupied by the amusement company were leased, together with the traction system, by the street railway company to the traction company in 1901 for a period of forty-five years.

The street railway company, according to its offer, proposes to pay the $7,468,328 as follows: Assuming and paying as of Jan. 1, 1924, first mortgage bonds of the Ohio Traction Company of $1,570,000; $600,000 face amount of notes of the Ohio Traction Company due on Oct. 1, 1924, and $647,328 of additions and betterments not funded; assume and pay as they come due, $1,651,000 face amount of the car equipment notes of the Cincinnati Traction Company. The foregoing items represent debts of the Ohio Traction and the Cincinnati Traction companies. In addition the street railway company will bring the traction company $3,000,000 in par value, or 60,000 of its new shares of capital stock.

Committee Appointed to Study Subways for Pittsburgh

After a conference with Mayor William A. Magee of Pittsburgh, members of two planning bodies and representatives of the Philadelphia Company, the City Council of Pittsburgh voted on Feb. 1 to leave downtown subway and rapid transit matters for the present in the hands of a committee composed of Arthur W. Thompson, president of the Philadelphia Company and also head of the Pittsburgh Railways; Director Charles A. Finley of the city's Department of Public Works; Morris Knowles, chairman of the City Planning Commission; George S. Davison, member of the same commission, and Winters Haydock, chief engineer of the Citizens Committee on City Plan.

The committee of five was instructed to "study, investigate and report at an early date on the matter of a subway and all incidental matters pertaining thereto, and to report whether an expert engineer should be employed to study these matters."

Agreement on Bus Operation

The Eastern Massachusetts Street Railway has an agreement with the town of North Reading, Mass., by which the town will pay the company $1,100 for the year 1924 to cover the cost of operating a bus line from North Reading Junction to North Reading Center dating from Jan. 6. It is estimated that the traffic revenue will come within this sum of paying the cost of the service for a year. The company operated a railway line to North Reading up to Jan. 6, but the trustees did not feel that the traffic on the line warranted rebuilding it. The townspeople agreed to contribute to the cost of operating a bus line. The regular cash fare of 10 cents is charged.

Construction of 60,000 Kw. Power Plant at Detroit to Proceed

The city of Detroit will start immediately to build a 60,000-kw. power plant to furnish power for the Detroit Department of Street Railways. Together with transmission lines, substations and distribution appurtenances the estimated cost will be $11,611,000. The decision to proceed at once with the three-unit plant will result in the reduction from the originally planned four-unit plant with 80,000 kw. capacity at an estimated temporary saving of $2,000,000 in cost. This it is believed will enable the plant to be built within the $12,000,000 bond issue voted last April. It is expected that the plant will be ready to operate by Oct. 1, 1926.

It is the opinion of the officials that the existing interim contract with the Detroit Edison Company should be canceled and a new contract be drawn in accordance with the tentative proposal submitted to the acting Mayor under date of Jan. 28, 1924. The proposal as submitted is verbally revised to the extent that the Detroit Edison Company agrees to the original terms based on a minimum sale of 110,000,000 kw.-hr. a year, with the exception of the two tapering-off years. It is estimated the new Edison arrangement will save the Detroit street railways $1,250,000 between Jan. 1, 1924 and Oct. 1, 1926.

The city's present needs are placed at approximately 240,000,000 kw.-hr. a year. The estimated output of the proposed new three-unit plant is 300,000,000 kw.-hr., and a fourth turbo unit may be added at any time. The first year's construction program will be financed by the sale of $1,000,000 of public utility bonds. Steps will be taken at once to obtain the approval of the Public Utilities Commission for the proposed interim contract and to place the first $1,000,000 of bonds on the market.

Wages Increased Four Cents

An increase of 4 cents an hour has been granted the trainmen employed by the Middlesex & Boston Street Railway, Newtonville, Mass., according to the award handed down recently by the board of arbitration. The award is retroactive to July 1, 1923, and will continue in force until June 30 of this year. The men were receiving 51 cents an hour and the increase brings the maximum wage for them to 55 cents an hour.

The wage question was one of six disputed points referred to the board of arbitration and was the only one on which the board found for the men. The demands for increasing the existing differential rate for operators of one-man cars to more than 5 cents an hour were rejected, as were requests for increased compensation for snow work, overtime pay for the miscellaneous men, and a reduction in working hours for carhouse men and miscellaneous men employed by the railway from nine hours in ten consecutive hours to eight hours in nine.

The board also rejected a request for a change in hours for platform work.

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Work to Begin on $900,000 Improvement Program

Th Houston Electric Company, having won its fight against the use of jitneys, as noted in the ELECTRIC RAILWAY JOURNAL for Jan. 26, is preparing to carry out the conditions of the agreement reached by it with a committee of citizens.

On its part the railway company agreed:

To abandon its suit for an increased fare.
To route its lines in accordance with the Beeler plan.
To construct 4,200 ft. of single track, and 15,100 ft. of double track.
To speed up service.
To buy additional rolling stock and remodel present equipment.
To establish and maintain a bus line to the section south of McGowen Avenue and Crawford Street and extend it to Southmore as street pavements are completed.
To spend $900,000 in the next three years on additional improvements not outlined above, such as the extension of present car lines and the establishment of new street car and bus lines to serve every part of the city.
To pay the cost of paving between tracks without contest.

The city agrees to these conditions:

To abolish jitneys.
To hire a consulting engineer to check improvements and extensions.

Both the city and the company agree to drop the injunction suit in the federal court in which the company sought a higher fare.

Public Relations Department Will Sell Service in Dallas

"Merchandising Service" is the central idea of the work of the public relations department recently created by the Dallas Railway, with C. J. Crampton, formerly superintendent of the safety and efficiency department, in charge. The department of safety and efficiency has been abolished and the safety work heretofore carried on by Mr. Crampton has been turned back to the operating department. This is in line with the company's policy of making safety a part of the job of every employee of the company and not an activity to be carried on by a separate department.

In the conduct of the department of public relations Mr. Crampton will employ newspaper advertising, street car advertising, billboard and screen advertising, newspaper publicity and will co-operate with the various civic and other organizations in the city, such as luncheon clubs, the Dallas Safety Council, mothers' clubs in the public schools, etc., and "sell street railway service, street railway good will and street railway transportation wherever he can."

More than $2,000,000 for Detroit Improvements

A tentative program announced by the Department of Street Railways of the city of Detroit includes extensions, improvements and rehabilitation of street railway lines and equipment estimated to cost between $1,250,000 and $2,000,000. It is planned to commence the work in the spring and it is estimated that the extension program will take about two years to complete. It is planned by the commission to spend such amount of money as is made available out of the $5,000,000 bond issue voted by the electors of Detroit last April, and at the same time continue financing its rehabilitation program from the earnings of the system. As approximately $900,000 is available annually for rehabilitation purposes, the total to be spent during the next two years, including amounts from bond sales and earnings, will approximate $3,000,000.

Twelve new lines or extensions are proposed, the most of which will be extensions into new city territory not now served by the street railway lines. Plans for the track extensions have been completed and only the Mayor's and the commission's approval are needed.

Arbitration of Wage Increase Demanded in Atlanta

Local No. 732 of the Amalgamated Association has demanded arbitration of its request to the Georgia Railway & Power Company, Atlanta, for an increase of 25 per cent in the wages of trainmen in the employ of the company. The contract between the company and its men covering wages and working conditions expired on Dec. 31, 1923. When the request of the men was presented to the company it in turn submitted its financial statement to the union, showing that it was already losing money in operating its street cars and stated that it could not consider any increase in wages until additional income could be secured.

This made little or no impression upon the employees. They have insisted upon arbitration under the terms of the contract. C. Murphy Candler has been selected by the power company as its arbiter in the increased wage demand. The union has not yet selected its arbiter.

Articulated Car Goes to Detroit

The three-unit articulated car which is being built for the Detroit city lines at the Cincinnati Car Works will leave for Detroit Feb. 19 under its own power and will travel to Detroit over connecting interurban lines. It is scheduled to reach Dayton at noon and Lima at 5 p.m. on Tuesday. It will leave Lima at 8 a.m. Wednesday, arrive at Toledo at noon and Detroit 4 p.m. the same day.

The articulated unit has a length over all of 121 ft. and a seating capacity for 132 passengers.

Will Confer on Situation.—The Mobile Light & Railroad Company has requested the members of the Alabama Public Service Commission to visit Mobile and go over the railway situation with officials of the company. Recently the company asked the permission of the City Commissioners to discontinue its Michigan Avenue and Wilkinson Street lines. The company also asked of the city commission the right to extend certain lines.

Bill Reported Unfavorably.—A bill offered in the Maryland General Assembly providing that separate electric railway cars be furnished for white persons and negroes has been reported unfavorably by the committee and the unfavorable report adopted by the House of Delegates.

Files Protest Over Paving.—Protest has been filed by Madison Railways, Madison, Wis., with Council in connection with a bill received from the city requesting payment of the company's share of the expense in excavation work completed in the railway zone on East Johnson Street. Dudley Montgomery, vice-president of the company, pointed out that a contract entered into between the city and his company on May 9, 1923, provides that the company is released from such obligations. The city maintains, however, that under the terms of the contract the company is bound to pay the entire excavation cost.

Two Resolutions Affect Baltimore Company.—The United Railways & Electric Company, Baltimore, has been made the target of two resolutions introduced in the Maryland General Assembly in session at Annapolis. One would authorize and direct the Public Service Commission to force the company to man all its cars with motormen and conductors and is a move against the one-man cars now used on some of the lines. The other would prohibit the collection of more than one fare within the limits of the city.

"Hail Columbia" New Magazine.—"Hail Columbia," a new magazine published by the Columbia Gas & Electric Company, described as "a monthly publication through whose pages the employees and friends of the Columbia Gas & Electric Company may obtain a broad view of its aims and accomplishments and become better acquainted with the underlying principles on which the company was founded," has published its first number, dated January, 1924. The opening issue contains a foreword by P. G. Gossler, president of the company, announcing the inception by Columbia of a customer-ownership policy. A map entitled "The Land of Columbia" shows the territory served by the Columbia operating companies. Among the properties which the company controls is the Cincinnati, Newport & Covington Light & Traction Company.

Other Dynamiters Are Indicted.—William H. Smith, Jr., who is under sentence of one year in the Erie County penitentiary and a fine of $3,000 for conspiracy in connection with the dynamite outrage at Ellwood, N. Y., during the International Railway strike in August, 1922, has been indicted by the Niagara County grand jury on charges of grand larceny and burglary for the alleged theft of quantities of dynamite on Aug. 14, 1922, three days before the railway explosion. He pleaded not guilty when arraigned in County Court at Lockport and was held under $10,000 bail for trial. Smith is now on bail pending an appeal to the United States Circuit Court of Appeals from the Federal court conviction for alleged conspiracy to violate the Sherman antitrust law for alleged interference with interstate traffic. William VanDell, Lockport, a former employee, has been indicted by the county grand jury on similar charges.

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Financial and Corporate

$679,632 Gain for Boston Elevated

Road Has Largest Year in Points of Gross Receipts and Passengers Carried—Increased Labor Costs a Burden, but Public Trustees Look Hopefully Toward Future

THE year 1923 was the largest in points of gross receipts and passengers carried in the experience of the Boston Elevated Railway. It was the fifth calendar year of public operation. There was a gain of $679,632 for the year, compared with $1,412,189 for 1922.

Owing to the increase in labor costs that followed the arbitration award of October, which was retroactive to July 1, 1923, the cost of service during the last six months of the year showed a substantial increase. In fact, the increase in wages made it necessary to call upon the reserve fund to help meet the cost of service. On Jan. 1, 1924, the balance in the reserve fund was $624,889.

In July, 1923, the trustees turned over to the Commonwealth $1,114,557 for distribution to the cities and towns which contributed to the loan assessment to meet the deficit of the first year of public operation. There remains a balance of $2,348,397 still due to the municipalities on this loan.

The average receipts per passenger for the year were 8.923 cents. The allocation of the receipts is shown in one of the accompanying tables.

As far as operating cost and operating revenue are concerned, the public trustees say it may be safely predicted that at the end of the year which will close on June 30, 1924, it should be found that receipts have at least been equal to expenditures so that there should be no deficit to assess on cities and towns served. This result is expected despite the fact that the increase in wages during the past year will add approximately $2,500,000 to the labor cost for the year ended June 30, 1924, on more than twice the excess of revenue over the cost of service for the preceding year. As the trustees see it, the answer to the question is that unusual freedom from expense in the removal of snow has continued so long as seemingly to assure a small rather than a large expense for the entire season.

Another reason for the faith of the trustees is their belief in the continuance of the increased traffic which has made the past calendar year a record breaking one in the number of passengers carried. This increase marks the practical restoration of traffic lost at first under the 10-cent fare, a restoration due in large part to the introduction of 5-cent fare lines that are now carrying more than one-quarter of the traffic. Another thing, the results are beginning to be shown in a really appreciable way of economies long in preparation. As a specific instance it is pointed out that through the introduction of modern boilers at South Boston, as well as the introduction of new light-weight cars—notwithstanding an increase of 3,474,577 miles and of 25,555,755 passengers carried—13,409 fewer tons of coal were burned than last year. After all, however, the trustees say it must remain true that whatever compensating factors may be found, the increased cost of labor will inevitably tend to check the development of additional 5-cent fare lines and improvements in service, and will delay the reimbursement of cities and towns.

The trustees are cognizant of the need of extensions of the rapid transit system to meet the demands of heavy traffic, and they refer to specific improvements of intimate interest to

STATEMENT OF TOTAL REVENUE PASSENGERS CARRIED BY THE BOSTON ELEVATED RAILWAY

1923	382,149,697
1922	356,593,942
1921	337,252,080
1920	335,526,561
1919	324,758,685
1918	348,664,700
1917	381,017,338
1916	373,577,908
1915	352,469,586

ALLOCATION OF RECEIPTS PER PASSENGER OF THE BOSTON ELEVATED RAILWAY IN 1923

	Cents
Labor	4.246
Interest on bonds and notes	0.606
Rent of subways and tunnels	0.530
Rent of based roads	0.834
Coal	0.482
Depreciation	0.524
Damages	0.215
Material and other items	0.866
Taxes	0.442
Total	8.745
Excess of receipts over cost of service	0.178
Average receipts per revenue passenger	8.923

REVENUE RIDES PER CAPITA ON BOSTON ELEVATED RAILWAY

1923	320
1918	300
1913	298
1908	277
1903	262

COMPARATIVE DIVISION OF RECEIPTS AND EXPENDITURES OF BOSTON ELEVATED RAILWAY FOR YEAR ENDED DEC. 31.

	1923	1922	1921	1920	1919
Total receipts	$34,096,813	$32,699,176	$33,277,025	$34,031,636	$29,498,583
Operating expenses:					
Wages	$16,224,277	$14,772,341	$15,563,255	$17,216,445	$15,539,105
Material and supplies	3,236,805	2,903,650	3,093,934	3,310,858	3,640,065
Injuries and damages	822,775	555,355	518,249	640,165	701,907
Depreciation	2,004,000	2,004,000	2,004,000	2,004,000	2,004,000
Fuel	1,842,396	1,853,112	1,663,618	2,597,654	1,815,262
Total operating expenses	$24,130,253	$22,088,458	$22,843,056	$25,769,122	$23,700,339
Taxes	1,688,139	1,587,186	1,546,758	1,142,987	1,045,502
Rent of leased roads (including dividend rental under chapter 159, Acts of 1918)	3,185,577	3,646,595	4,203,064	4,102,230	4,002,656
Subway and tunnel rents	2,026,936	2,008,417	1,963,737	1,790,432	1,516,047
Interest on bonds and notes	2,316,029	1,891,315	1,494,258	1,514,963	1,555,790
Miscellaneous items	70,247	65,016	54,707	59,069	60,348
Total cost of service	$33,417,181	$31,286,987	$32,105,580	$34,378,803	$31,880,682
Loss for year				$347,167	$2,382,099
Gain for year	$679,632	$1,412,189	$1,171,445		

Profit and loss items not included in above.

TRAFFIC STATISTICS OF THE BOSTON ELEVATED RAILWAY FOR YEAR ENDED DEC. 31.

	1923	1922	1921	1920
Round trips operated	6,488,082	6,059,531	5,773,584	5,764,347
Passenger revenue	$33,297,951.50	$31,834,022.77	$32,253,629.59	$33,108,946.48
Passenger revenue per car-mile (cents)	61.61	62.94	64.89	64.62
Passenger revenue per car-hour	$5.71*	$7.09	$7.36	$7.16
Passenger revenue mileage	54,049,665†	50,575,088	49,706,697	51,237,527
Passenger revenue car-hours	5,826,993*	4,487,400	4,381,815	4,627,295
Revenue passengers carried	382,149,697	356,593,942	337,252,080	335,526,561
Revenue passengers carried per car-mile	7.070	7.051	6.785	6.548
Revenue passengers carried per car-mile	65.58*	79.47	76.97	72.51

* Car-hours, American Electric Railway Association Standard, adopted Feb. 1, 1923. † Including motor bus mileage 465,382.

COMPARATIVE POWER STATION STATISTICS OF THE BOSTON ELEVATED RAILWAY

	1923	1922	1921	1920	1919	1918	1917
Tons of coal burned	260,032	273,441	215,870	258,087	287,670	281,677	270,452
Pounds of coal per kilowatt-hour	2.264	2.553	2.174	2.353	2.835	2.772	2.309
Average price of coal per ton	$7,085	$6,777	$7.71	$10.07	$5.91	$6.26	$4.19
Net cost of power for car service per kilo-watt-hour (cents)	1.227	1.414	1.172	1.921	1.307	1.158	.620
Net cost of power per total revenue car-mile (cents)	5.468	6.153	4.815	8.538	5.439	4.668	2.573
Direct current annual output (kilowatts)	257,270,357	239,905,874	222,461,060	245,676,503	239,892,118	227,582,057	262,343,882
Direct current maximum hour output (kilowatts)	82,965	78,755	75,905	72,295	71,760	67,965	79,535

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HISTORY OF THE 1919 LOAN ASSESSMENT ON CITIES AND TOWNS (CHAPTER 159, SPECIAL ACTS OF 1918)

Allocation of Assessment on Cities and Towns of Boston Elevated Deficit, Year ended June 30, 1919.

Cities and Towns	Passengers	Per Cent	Amount of Assessment	Distribution of July, 1922, Repayment	Distribution of July, 1923, Repayment	Balance Due
Boston	2,100,423	71.9330	$2,863,042	$372,034	$790,029	$1,700,978
Cambridge	283,475	9.7081	386,397	50,209	106,622	229,564
Somerville	122,583	4.1981	167,090	21,712	46,106	99,271
Brookline	74,553	2.5532	101,621	13,205	28,040	60,375
Medford	59,754	2.0464	81,449	10,583	22,475	48,390
Malden	55,838	1.9123	76,112	9,890	21,002	45,219
Everett	54,823	1.8775	74,727	9,710	20,619	44,397
Watertown	41,198	1.4109	56,155	7,297	15,496	33,367
Arlington	32,477	1.1122	44,267	5,752	12,215	26,299
Chelsea	29,659	1.0157	40,426	5,253	11,154	24,018
Newton	27,201	.9316	37,079	4,818	10,231	22,029
Belmont	18,746	.6420	25,552	3,320	7,058	15,180
Quincy (Commonwealth of Massachusetts)	15,569	.5332	21,227	2,757	18,464	.....
Stoneham (Commonwealth of Massachusetts)	3,674	.1258	5,007	656	4,356	.....
Commonwealth of Massachusetts*	.....	.....	.....	.....	690	†690
Totals	2,919,973	100.00	$3,980,151	$517,196	$1,114,557	$2,348,397

Based on traffic counts made July 24, 25, 26, 27, 1919, in accordance with the provisions of section 14, chapter 159, Special Acts of 1918.

* From the July, 1923, repayment the Commonwealth of Massachusetts deducted $690.24 to reimburse themselves for the difference between 126 days' interest at 4.28 per cent on $4,000,000 (note issued July 17, 1919, due November 20, 1919) and $3,980,151.67, the amount paid to the Boston Elevated Railway Company $297

And interest from July 17, 1919, to July 19, 1923, on amount the State deducted to pay assessment of Quincy and Stoneham 393

Amount of expense to State to be assessed to towns and cities pro rata to their original contribution $690

† Credit.

Boston that should be carried out. In this connection they look forward hopefully to the report of the Metropolitan Planning Board and to the adoption of a comprehensive plan for the orderly and consistent development of separate trunk lines to provide a harmonious and well devised system of transportation for Boston and suburban cities and towns. The trustees see money at hand as needed at lowest prices for subways, tunnels and permanent structures through municipal investment, to be repaid in rentals by the operating lessee, but immediately in the foreground they see the outstanding need for capital for the purchase of additional cars, for enlarged power and shop facilities, and other equipment. To carry out these last-mentioned improvements additional capital can only be procured by the sale of securities of the Boston Elevated Railway, either in the form of stocks or bonds. At the time of the passage of the public control act in 1918 it was believed that the dividend rate of 6 per cent assured it would be possible to issue new stock and obtain new capital in that way, but such has not been the case. On this point the trustees say:

> Quite likely this is due in part to the indefiniteness of the period of public control which under Chapter 159 of the special acts of 1918 continues until 1928, and thereafter until terminated by act of the Legislature. The investor does not know what action the Legislature may take, and consequently this stock does not hold the position which certainty of return would produce. This element of doubt also adversely affects the marketing of long-term bonds.

Astoria System Offered for Sale

The electric railway system of the Pacific Power & Light Company, operating in Astoria, Ore., has been offered to the city, the port commission or any interested party who will operate it, for the salvage price of $70,000. The valuation placed on the system by the State Tax Commission was $262,000.

The company has notified the city that it would suspend operations on March 1 and Guy W. Talbot, president, advised the city officials at a recent conference that it was impossible for the company to change its plans. He states that the railway has lost money for several years, and that an investment of $110,000 would be necessary to restore the system through the area burned in the big fire that practically destroyed the city a year ago.

Mr. Talbot stated that as a result of the inroads in the railway business by buses and privately owned cars the line was wholly incapable of operating at a profit. He said that in 1923 the net loss was $42,718. The loss in 1922 was $33,500; in 1921. $36.500; in 1920, $17,000 and in 1919, $23,000.

At the same time the City Manager of Astoria recommended that the city advertise for bids for a franchise to operate an intracity bus system. The commission has since voted unanimously to empower the manager to secure such bids.

Merger in New Jersey a Possibility

A merger bill has been introduced in the Legislature of New Jersey, designed to facilitate future financing of utility development. The bill is in the interest of the Public Service Corporation of New Jersey, but it has been explained that it is quite possible the merger enabling act may never be made use of by the Public Service. In view of the facts, however, that the time for introducing bills without unanimous consent was expiring, and that the Legislature would shortly adjourn for another year, it was deemed wise to have the merger bill introduced so that, if passed, necessary legal machinery required for this particular plan would be available. Other plans under consideration require no change in existing law.

On behalf of the company it has been explained that the Public Service group has reached a point in its continuing development which makes its financial requirements approximately $20,000,000 a year. The outlook is that the demand for increasing utility services, to keep pace with population and industrial growth, will make similar requirements an annual necessity for some time to come. A number of plans designed to meet this financial prospect have been discussed, but none of these possible plans has yet been completed in detail, and the merger plan is merely one of those under consideration, because of its ability to provide a broader supporting basis for future financing.

Interest Defaulted by Michigan Interurban

The Grand Rapids, Holland & Chicago Railway, Holland, Mich., operating between Grand Rapids, Holland and Macatawa Park, defaulted in the payment of interest on its bonds due on Feb. 1 and a committee headed by Steward Hanley, Detroit, as chairman, has been appointed to protect the interests of the bondholders.

There are $1,475,000 of first mortgage twenty-year bonds outstanding. They were extended at 7 per cent to Aug. 1, 1924.

It is explained that the position of the company was affected among other things by the decision of the Michigan Supreme Court, dated Dec. 19, 1923, requiring the company to pave between its tracks running through the village of Grandville, involving the expenditure of approximately $70,000 by May 1, 1924, or forfeit its franchise.

Separation of Railway and Light Properties Approved

The meeting of stockholders of the Commonwealth Power Corporation has been held, the organization of the Electric Railway Securities Company has been effected and the transfer of the assets of the Commonwealth Power, Railway & Light Company has been made. The last-mentioned company is now prepared to distribute to holders of its common stock one share of Commonwealth Power Corporation common stock and one-half share of Electric Railway Securities Company capital stock for each share of common stock of Commonwealth Power, Railway & Light Company surrendered for cancellation.

As explained previously in the ELECTRIC RAILWAY JOURNAL the plan contemplates the segregation of the former railway and the electric light and power properties of the Commonwealth Power, Railway & Light Company.

The Electric Railway Securities Company either directly or through the Union Railway, Gas & Electric Company, by ownership of stock of the companies, will control the Grand Rapids Railway, the Michigan Electric Railway, the Michigan Railroad, the Grand Rapids, Holland & Chicago Railway, the Saginaw Transit Company, the Rockford & Interurban Railway and the Janesville Traction Company. These companies have outstanding stocks and bonds to the amount of $52,361,596, of which $24,422,603 are owned

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by the Electric Railway Securities Company.

An initial dividend of $1 a share has been declared on the common stock of the Commonwealth Power Corporation for the quarter ending April 30, 1924.

Detroit Commission Will Revise Purchase Contract

The City Street Railway Commission of Detroit is working upon a plan of revising the purchase contract covering the lines now included in the municipal railway, so that the period of payment can be spread over a longer period of time, thereby making available more of the earnings of the Detroit Street Railways for improvements of all kinds.

Ross Schram, assistant general manager, calls attention to the large amount that must be set aside as charges necessary to repay the original $15,000,000 bond issue and take care of the purchase of the D. U. R. system over a ten-year period. Approximately 9 cents from every car-mile operated is required to meet these fixed charges, he stated. The actual cost of operating a car-mile is approximately 32 cents. Adding to this 9 cents for fixed charges makes it necessary for each car operating one mile over the system to earn a fraction more than 41 cents, while the average earnings per car-mile is 43.7 cents.

It is further pointed out that the system is operating upon the second lowest fare in any large city in the United States, while it is paying the second highest rate of wages to its platform employees.

State Body Asked to Approve Brooklyn Stock Increase

The Brooklyn City Railroad has applied to the New York Transit Commission for approval of the issuance of $4,000,000 in additional capital stock of the company, to cover the purchases of rolling stock made on its behalf by the Brooklyn City Development Corporation.

In its petition the railway states that it made expenditures from earnings in excess of $4,900,000 consisting of $500,000 on track and roadway, $150,000 for converting and improving the cars and $4,260,000 in the purchase of the capital stock of the Brooklyn City Development Corporation. The latter corporation has used the sum so realized, the petition states, in the purchase of additional cars.

The petition further says that in connection with the addition of the new capital stock to the existing securities of the Brooklyn City Railroad, it will dissolve the Brooklyn City Development Corporation and have transferred to it the rolling stock purchased by that company. The new shares will be divided pro rata among the shareholders of the Brooklyn City Railroad if the issue of the $4,000,000 requested is approved by the commission.

The commission has fixed Feb. 18 as the date for a hearing upon the petition.

As announced previously in the ELECTRIC RAILWAY JOURNAL, the stockholders have already approved the proposal to issue the additional stock.

Amendment to End Tax-Exempt Issues Fails

The constitutional amendment designed to stop the issuance of tax-exempt securities failed in the House on Feb. 8 because it lacked seven votes of the necessary two-thirds.

Passage of the amendment was asked by President Coolidge and Secretary Mellon. Most of the votes against it came from the Democratic side of the House, but eighteen Republicans voted "no," while sixty-nine Democrats voted in the affirmative. The chief argument of the opposition was that state rights would be invaded.

$1,250,000 to Montreal Tramway for Terminal Section

Sale of the Montreal Terminal Section of the Montreal Tramways system is authorized in a bill which passed the private bills committee of the Legislative Assembly on Jan. 31. The company cannot sell any portion of its system without an amendment to the contract between the company and the city. It was explained that there was no intention of depriving the district at present served by the line of service, and that the new line necessary would be built before the sale was effected and the line turned over.

The tramway will receive $1,250,000 for the line from the Canadian National Railways, which needs another outlet to the eastern end of the Island of Montreal. The money which the tramway will receive for the line will either go to building the new track needed, or, if not needed for capital expenditures, will go into one of the various funds.

Auction Sales in New York.—At the public auction rooms of A. H. Muller & Sons there were no sales of electric railway securities this week.

Wants to Abandon.—The Pennsylvania & Ohio Traction Company of Ashtabula recently petitioned the State Public Utilities Commission for authority to abandon its service connecting Conneaut, Ashtabula and Jefferson, Ohio.

Officers Elected for Successor Road.—The first meeting of the new Gardner-Templeton Street Railway was held on Feb. 5. Officers were elected as follows: Charles Mulhado, president; Edgar A. Shepardson, vice-president, and Ralph Kelly, secretary and treasurer. Louis Starkey has been named superintendent of the line. The company took over control of the line on Feb. 7.

Conditional Suspension Authorized.—The San Diego Electric Railway has been authorized to suspend service and to abandon and remove its tracks and appurtenances on the so-called Old Town line in San Diego, Cal., conditional upon the establishment of regular bus service. The company is also authorized to suspend service and to remove the tracks on the so-called Ocean Beach line between the intersection of Rosecrans and MacAulay Streets and the intersection of Voltaire and Bacon Streets, conditional upon regular operation of the new high-speed railway service and regular operation of a bus service.

Will Pay Tax.—The Denver Tramway, Denver, Col., is ready to pay to the city of Denver the $205,000 awarded the city by the decision of the United States Court of Appeals, St. Louis. The amount is the accumulation of the $5,000 a month franchise tax the tramway agreed to pay the city, and did pay up to the time the company went into the hands of a receiver.

Bus Supplants Railway.—Unless the city of Greeley, Col., grows very much larger it is doubtful whether there will be any more tramway service provided for its residents. The line which did operate there, known as the Greeley & Denver Railroad, suspended service some time ago because it was unable to meet expenses. When it was found that the tramway could no longer continue, F. E. James, a local automobile dealer, started a bus line with twenty vehicles. The railway did likewise, and for some months both the James Company and the railway gave bus service, but the railway finally withdrew its vehicles. The tracks, trolley and all the equipment formerly used by the Greeley & Denver Railroad has been sold as junk to M. S. Radetzsky, Denver.

Board of Trustees Appointed.—The Selectment of Athol, Mass., have appointed a board of five trustees to manage the Athol & Orange Street Railway, which is to be put under town management in about a month.

$548,020 Taken to Meet Board Payments.—The operating fund of the Seattle Municipal Railway was recently invaded to the extent of $548,020, to help meet the railway's bonds and interest payments, due on March 1. This leaves a deficit of $80,000 in the operating fund, which will be shortly repleted by daily earnings. Payment on the principal on March 1 is $833,000. The interest payment due then is $363,100. This makes the total payment $1,196,100.

Denies Company Is Negotiating for Tulsa Lines.—J. A. Frates, vice-president of the Oklahoma Union Railway, Tulsa, has advised the press that reports to the effect that his company is negotiating for the purchase of the lines of the Tulsa Street Railway are in error. Rumors in Tulsa and elsewhere have had it that the Oklahoma Union was a bidder for the Tulsa property.

Receiver Appointed.—J. H. Bridgers has been named receiver of the Alamance Railway, Burlington, N. C. The line connects Burlington, Graham and Haw River. It has been operating 8 miles of line.

Seeks to Abandon.—The Pacific Electric Railway has applied to the California Railroad Commission for permission to abandon service on its Laurel Canyon line in Sunset Boulevard, Hollywood, from Gardner Junction to the end of the line. The Los Angeles Motor Bus Company, which is controlled by the Pacific Electric Railway and the Los Angeles Railway, has placed in operation on that route service with ten-minute headway.

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Traffic and Transportation

Last Fare Hearing in Atlanta

The fifth and for a time the last public hearing of the Georgia Railway & Power Company on its petition for increased fares and the elimination of jitneys was held on Feb. 6.

Sam Schlesinger, head of the Atlanta Jitney Bus Association, had figures to show that the jitney operators were paying into the city treasury in taxes an amount equal to more than 3 per cent of their gross income. Seven-cent fares for jitney buses instead of the present 10 cents, with a possible reduction in fare to 5 cents later on, were promised by Mr. Schlesinger on behalf of the jitney association. Mr. Schlesinger also commented upon the new line of Brown buses, which started recently to operate from the Brookwood Station on Peachtree Street to the central portion of the city.

Eugene C. Calloway, prominent Atlanta business man, spoke in favor of the fare increase, pointing out that if the railway was unable to extend its lines so as to serve the suburbs of the city, this would result in higher rents and greater congestion in the downtown area of the city, a condition every one was trying to avoid.

Indications are that this will be the last public hearing held on the proposed rate increase for from ten days to a week, when the report of the City Council's auditing committee will come up for discussion. If the report of the auditing committee shows the financial condition of the company to be substantially as stated in the petition, it will settle matters for the Georgia Railway & Power Company in the public mind. The company is asking for an increase in fare from 7 to 10 cents, for the privilege of asking 2 cents for transfers, and for the elimination of jitneys from the streets on which its lines are operated. Unless these things can be secured, the company has warned the public that it cannot make any extensions or improvements in its service, and may be forced to cease operation.

John A. Beeler, consulting engineer, New York, has been employed by the city of Atlanta, Ga., to make a general traffic study looking toward relief of congestion and more effective operation of the street cars. He is employed by the city and will report to the city, but the Georgia Railway & Power Company has agreed to pay for the work.

Five-Cent Fare in Washington Declared Ruinous

The Public Utilities Commission of the District of Columbia recently struck several body blows at the proposal for a 5-cent fare in the District in a letter dispatched to Senator L. Heisler Ball, chairman of the Senate District committee. The high light of the letter is a statement of figures showing that the two railways of the District would have lost a total of more than $1,000,000, even if they did not have to pay taxes, had a 5-cent fare been in effect during the past year.

The letter was written by the District Commissioners as a report on the Senate bill which would prohibit the Public Utilities Commission from fixing rates of fare for railways in excess of those stipulated in their charters. Since the 5-cent fare is stipulated in the charters, the bill would by such wording make the 5-cent fare the maximum in the District.

The letter declared that the effect of a cash fare of 5 cents with tickets at the rate of six for 25 cents, as provided by the terms of this bill, would be ruinous to the railways, and disastrous to the efficient service now furnished the public by those local corporations.

Arrangements Made for Bus Service in British Columbia

De luxe motor bus service will be given between Vancouver and New Westminster, 12½ miles distant, by a company to be formed by the British Columbia Electric Railway and which will be known as the British Columbia Rapid Transit Company. The new company will have a capital of $500,000.

There is at present an interurban line operated by the railway between the two cities, on which a twenty-minute service with multiple-unit trains is given. For many years jitney service has been competing on the highway paralleling the interurban line.

The British Columbia Electric Railway has now decided to operate de luxe buses between its own terminals, probably on a twenty-minute headway, in competition with its own railway. Details as to number of buses, fares to be charged, etc., have not yet been arranged. At present the railway fare is 35 cents return, whereas the jitney fare is 70 cents return.

Rerouting in Davenport Proves Effective

Tri-City Railway Gives Better Service Following Track Abandonment and Construction— Ten-Cent Fare in Effect

A COMPREHENSIVE rerouting of electric railway lines in Davenport as a means of meeting present-day conditions, lowering the cost of operation, eliminating parallel trackage, providing for future expansion, cutting out loops and giving better service has been put into operation by the Tri-City Railway of Iowa and is proving its practical efficiency despite the severe handicaps of heavy snows and cold which accompanied the change.

The total cost of the rerouting is $102,000, of which $77,000 is for new tracks and passing tracks and $25,000 for track abandonment. The plan was approved by the City Council after months of negotiations and was accompanied by a change in fares. Instead of the old 8-cent flat fare a new cash fare of 10 cents was put into effect, with the provision of sale of tickets at the rate of three for a quarter and fifteen for a dollar. The sale of the tickets at the rate of fifteen for $1 has been heavy since the rerouting went into effect and the average of fares has not been quite as high as the city had estimated. The fare arrangement is a tentative one and according to an ordinance provision may be changed this summer if it is found that the revenues of the company do not provide a sufficient return on the investment.

One of the features of the new system of operation is more frequent service during the peak hours. When the old schedule provided for a fifteen-minute service throughout the day and early evening, the new schedule betters this service considerably by furnishing a ten-minute schedule during the rush hours. On main trunk lines through the business district ten-minute schedules have been raised to seven and one-half-minute intervals and seven and one-half to five-minute intervals during the rush periods.

The Davenport system had originally been built up by competing companies and had never been completely revised. Some changes for the better had been made, but before the recent changes were put into effect the company had never been able to convince the conflicting interests, business and residential, that a comprehensive revision of lines and schedules should take place. Individual lines furnished a fifteen-minute interval of service throughout the day, with some trippers during peak hours. Service on separate lines could not be co-ordinated on the main line tracks and this caused "fleeting" of cars during certain periods. The company was confronted yearly with city paving programs which required large expenditures for track paving. This great expense made it necesary to work out a system which would retain only the track necessary to give ample transportation needs for the present and to provide for future expansion.

In working out a comprehensive rerouting plan the officials of the Tri-City Railway sought to:

1. Cut out all loops at end of lines to provide for future extensions and economize in operations.
2. Pair lines which provide the maximum of through trips without transfer.
3. Route lines to operate through the business district instead of looping.
4. Retain lines which will provide service, with maximum walking distance of three blocks in so far as topographical conditions and present property will permit.
5. Establish main trunk lines for business district operating two or more lines over the same track, branching out into the residential districts at the ends.
6. Regulate the length of branch lines so that an equal interval of service can be maintained on trunk lines.
7. Vary the interval of service on lines to meet the demand.

To carry out these principles extensive track changes were necessary and these included track abandonment, construction of new single track and construction of new passing tracks. Four

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miles of track, duplicating lines and overextended lines were abandoned. One-half mile of new single track was constructed to connect sections of old lines and eight passing tracks were installed.

The completion of the project is marked by public good will, due largely to the method in which the negotiations with the city were conducted. The project was announced in a series of newspaper advertisements in which all angles of the proposition were explained. It was also discussed by various civic bodies, and the City Council and traction company received the benefit of suggestions from the public through these civic organizations.

Company Paper Fulfilling Its Mission

Baltimore Trolley Topics, published by the United Railways & Electric Company, with the January issue entered upon its eighth year. The management is enthusiastic over the extent to which this little paper has fulfilled its mission, which is accounted for largely by the high tone the publication has preserved consistently. While each issue of the publication is quite naturally given over to current news, the file of the paper does afford a good news if not technical record of the history of the principal doings of the company.

Additional Time for Improvements at Schenectady

There was a hearing on Feb. 7 before Public Service Commissioner Van Voorhis upon the petition of the Schenectady Railway for an extension of time in which it is to comply with the terms of an order issued by the commission last September directing the railway to make certain improvements and additions to give better service.

It was stated on behalf of the railway that orders had been placed for ten new modern city cars and that it has been promised the cars would be delivered some time between March 15 and March 30. The company asked that the terms of the order last September be extended until June 1. President E. M. Walker said the service is now apparently satisfactory and that instead of receiving letters of complaint the company is in receipt of commendatory communications.

It was further stated that a company would at once apply to the Common Council for franchises for authority to operate two bus lines to serve as feeders to the Schenectady Railway with transfer privileges between the trolley and the bus lines. The lines are to be known as the Bellview and Mount Pleasant lines. In this connection the Schenectady Railway Bus Line, Inc., has been incorporated for a period of fifty years with a capital of $30,000.

The hearing was closed with the understanding that prior to June 1 the company will submit a detailed report of the improvements ordered by the commission.

The ultimate effect of the understanding arrived at will probably be to stay the proceedings now pending in the Supreme Court to penalize the railway for failure to comply with the commission's order. This proceeding antedated Mr. Walker's assumption of the presidency of the company.

New Trains and Faster Runs on Illinois Traction System

Four fast trains have been added to the daily schedule of the Illinois Traction System between Springfield and Danville. This is the outstanding feature of the general change in schedule which went into effect on Jan. 13.

Where the previous running time between Springfield and Danville of the regular limited trains was five hours and five minutes, the four new trains will each make the run in four hours and fifteen minutes, cutting fifty minutes from the running time on the 120 miles between terminals. The trains leave each terminal at 9 a.m. and 1 p.m.

Four fast trains daily have also been introduced on the Peoria-Bloomington-Decatur Division.

The 9 and 11 p.m. trains out of Springfield, Champaign, Danville and Decatur have been consolidated into one train, leaving each of these points at 10 p.m. Where consolidation of evening trains has taken effect, it is due to paralleling hard roads and the resulting increase of automobile travel, which during the past years has made increasingly heavy inroads on the passenger business of railroads in general. Traction operating officials have endeavored to consolidate the late evening trains with a minimum of inconvenience to the railway passenger.

Other changes between Danville and Springfield are of minor nature and consist mostly in shortening the running time where possible.

Wants Jitneys Under Commission Control.—Clinton Q. Richmond, president of the Berkshire Street Railway, Pittsfield, Mass., has petitioned the Massachusetts Legislature for an act to place all "jitney" buses under the control of the State Department of Public Utilities, in pursuance of a recommendation made by that department in a recent report to the Legislature.

Increase in Fare Allowed.—An increase of fare has been granted the Texas Electric Railway by the City Commissioner at Sherman, effective on Feb. 15. The former fare was 5 cents. The new fare is 7 cents with four tokens for 25 cents.

Railway and Bus Co-operate.—C. W. Richards, general passenger agent of the Denver & Interurban Railroad, Denver, Col., who has just returned from Chicago, says that plans have been arranged which will permit through passengers a ten days stop over in Denver. Denver & Interurban has completed arrangements with the Glacier Automobile Company whereby a ticket can be purchased at Denver, the various coupons attached being honored by the Glacier people for various trips "on the side," these trips to be made via bus or automobile. During the summer season the Denver & Interurban will run daily cars from Denver to Eldorado Springs.

Overhead Registers in Use.—The use of tokens and also of hand registers has been abolished on cars of the Northern Massachusetts Street Railway running east of Athol fair grounds to South Gardner, Baldwinville and Templeton, effective Feb. 4. Overhead registers have been installed.

Eight Cents Allowed.—The Ogdensburg Street Railway, Ogdensburg, N. Y., now operated by a receiver, has been given permission by the Public Service Commission to charge an 8-cent cash fare in Ogdensburg, in place of a 7-cent fare. The company is further permitted to sell five tickets for 35 cents and to charge school children during certain hours on school days a fare of 5 cents. It was shown at the hearing before the commission that the revenue per car-mile was less than on any other system in the state, except on a line near Buffalo, also in the hands of a receiver, and on a line on Long Island which recently suspended operations. The evidence submitted showed that based on actual operations for nine months and three months estimated the company in 1923, after paying its operating expenses and taxes, had a balance of $2,984, or a return of less than 1¾ per cent on the value of its property.

Bus Bills Introduced—Two bills were introduced in the New York Legislature on Jan. 30 to permit cities to own, operate or lease bus lines. Under a measure sponsored by Assemblyman McCarthy, New York City would be authorized to establish bus lines with a fare not to exceed 5 cents, under the management of the Commissioner of Plant and Structures. Senator Lacey proposes adding a new section to the transportation corporations law permitting cities to own or operate bus lines without obtaining a certificate of convenience and necessity from the Public Service Commission.

Will Extend Bus Service. — The Connecticut Company will extend the Brooklawn-Ash Creek bus service in Bridgeport during hours of heavy travel. The extension will cover Tunxis Hill Road to Knapps Corner.

Buses in Operation. — Three new buses purchased by the Birmingham Railway, Light & Power Company as permanent equipment are now in service in Birmingham. The last of the three was put in service on Feb. 7 on Milner Heights and the other two went into service several days ago on Avenue F. All three buses are operating as extensions of car lines in territory which formerly had bus or jitney service which was discontinued under the settlement ordinance adopted by the city, by which jitneys were banned. A fourth bus is held in reserve for emergency. Transfers are given from the buses to the cars and from cars to the buses. The regular 2-cent transfer charge is made. The four new buses take the place of three which were leased for temporary operation some time ago.

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Fare Increase Wanted in Petersburg.—Officials of the Virginia Railway & Power Company have addressed the City Council at Petersburg, Va., stating that the company plans to apply to the State Corporation Commission for an increase in fare in Petersburg. The Petersburg City Council has been asked to recommend a change from 5 cents to 6 cents cash, with five tickets for 25 cents, on the ground that the members of this Council are familiar with the needs of the property.

Will Run Free Buses.—In a movement for a reduction of interurban fares to Culver City and Palms, Cal., the commuters of those two centers have decided to operate two free buses and 200 motorists have agreed to take machine loads of passengers to and from work. For some time an effort has been made to persuade the Pacific Electric Railway, Los Angeles, Cal., to lower rates. When this was unsuccessful, the free-bus plan was decided upon. At a recent meeting attended by civic leaders, the sum of $3,000 was pledged to pay for the buses. Another $5,000 has since been contributed. As no fare is to be charged, the buses can be operated without a franchise from the State Railroad Commission.

One-Man Cars on New York Interurban.—One-man cars have been installed on the interurban line of the United Traction Company between Albany and Cohoes. There are two 7-cent zones on this line and they overlap each other to take care of the local traffic out of the two cities. The passenger riding beyond the limits of the one-fare zone on entering the car receives a colored slip, which is surrendered on his exit. Those passengers riding within the zone receive no slip.

Will Start Another Bus Line.—The Boston Elevated Railway will establish a bus line between Everett Square, Dorchester, Mass., and Head House, City Point, South Boston. General Manager Dana has been authorized to make the final arrangements by the trustees of the company for the bus line, which the company plans to operate from May 30 to Oct. 12.

Reduction Approved. — The Public Service Commission has approved the reduction in book rates from $5.50 to $5 on the Rochester, Lockport & Buffalo Railroad line between Burrows Street, Rochester, and Lockport terminal. The book contains 200 miles of transportation. The reduction became effective Feb. 1, 1924.

Fare Increased.—The Philadelphia & West Chester Traction Company, Upper Darby, Pa., has announced an increase in fare, beginning Feb. 27, when the zone fare will be 7 cents instead of 6 cents, with four strip tickets for a quarter. Increased cost of maintenance, in view of recent extensive improvements, is given as the reason for the increase. The lines affected are those to West Chester, Ardmore, Media and Sharon Hill.

Six-Cent Fare Not Sufficient.—J. E. Zimmerman, president of the Penn Central Light & Power Company in a recent address before the Lewistown, Pa., Chamber of Commerce said that the Lewistown & Reedsville Electric Railway earned only 3 per cent on its investment during 1923, and that it was necessary to increase the fares from 6 cents to 7 cents. He showed that during the period from 1918 to 1923 inclusive the increase in income of the company, operating between those towns, was only $22,000, or less than $4,000 a year, while the increased expenses of operation was $60,000, or $12,000 annually. The gross revenue of the company averaged $150,000 a year. A 7-cent fare would provide $24,000 additional revenue annually.

First Bus to Be Operated.—The Fitchburg & Leominster Street Railway, Fitchburg, Mass., has received its first new bus. It will be used to make the trip from Fitchburg center to the Burbank Hospital.

Passenger Identification Checks.—In the new front entrance, center exit surface cars on the lines of the Brooklyn City Railroad the passenger pays as he passes the conductor, who is stationed in the well at the center. In order to facilitate passenger movement and add to the convenience of the passenger conductors have been supplied with identification checks which are handed by the conductor to passengers who have passed him and stand in the rear of the car and then discover seats vacant in the front end among the passengers who have not yet paid their fares. When the passenger who holds the identification check leaves the car he returns the check to the conductor.

Straight Ten-Cent Fare Asked.—The Fitchburg & Leominster Street Railway, which connects Fitchburg and Leominster, Shirley, Lunenburg and Ayer, has filed a request with the State Department of Public Utilities for a tariff canceling sale of tickets, allowing 8⅓ cents per ticket, and establishing a straight 10-cent fare.

Buses Will Serve on Carless Routes.—Plans have been completed by the Houston Electric Company to place six twenty-nine-passenger buses in service in Houston, Tex., on April 1 on a route that is not served by street cars but which has been served for a long time by private jitney lines. The date set is the time for all jitneys to cease business in Houston under the terms of an ordinance instituted by the voters of the city at a recent election. The new line will traverse Austin, Holman, Crawford and McGowen Streets.

Bus Line as Feeder Started.—The Eastern Texas Electric Company, Beaumont, Tex., has started a bus line from Port Neches to Nederlands, as a feeder for its interurban line now operated from Beaumont to Port Arthur. Buses seating twenty-five passengers are in service on regular schedule to meet cars of the Beaumont-Port Arthur service.

Plans Bus Line.—The Portland Railway, Light & Power Company, Portland, Ore., plans the establishment of a bus line over the Ross Island bridge to accommodate a territory not now served by the railway. President Franklin T. Griffith has asked City Commissioner Mann, in charge of public utilities, for a conference on the subject. Commissioner Mann stated that as long as the company complied with the provisions of the motor bus law no objection would be had by the city to the operation of the line. The City Council will permit no street car lines to pass over the new Ross Island bridge.

Transfer System Simplified.—One of the first steps under the new management to simplify the transfer system of the Pittsburgh Railways, Pittsburgh, Pa., was the announcement that restrictions limiting the issuance and acceptance of crosstown transfers to the city line would be lifted. Under the new regulations, the transfer to a crosstown car will be issued on a fare paid within the first fare zone and upon transfers received from shuttle lines within the first fare zones. Transfers received from the crosstown route are to be given to the limits of the first fare zone and for transfers to shuttle lines within the first zone.

Orders Change in Fare.—The California Railroad Commission recently decided that the fare and commutation charges of the San Francisco-Oakland Terminal Railways between San Francisco and Piedmont were unjust and unduly discriminatory. The commission has therefore ordered the railway to submit for its approval a tariff for passenger fares, removing the discrimination. The city of Piedmont had filed a complaint against the railway alleging that the one-way and commutation fares between San Francisco and Piedmont were higher than the fares between San Francisco and Berkeley.

Referendum to Decide Fare.—The City Council of St. Catharines, Ont., has decided to submit to the taxpayers of the city the application of the Canadian National Railways to raise its local fares from 5 to 7 cents. The date of the referendum has not been fixed. The Canadian National also has petitioned the City Council for exemption from local taxation and relief from paving between its tracks in St. Catharines. It also has asked for permission to increase its fare from 5 cents to 8 cents on its line to Port Dalhousie from St. Catharines. The Port Dalhousie Council opposed the proposed increase.

Book Review

Alternating-Current Armature Winding

By Terrell Croft, consulting engineer. McGraw-Hill Book Company, Inc., New York, 1924. 352 pages, illustrated.

This is a practical book on the principles and methods of winding and rewinding alternating-current motors. It is written for the practical man, and there is no mathematical treatment of armature winding save a few examples that have been worked out for specific cases. The book is well illustrated, and the latter half is given over completely to induction motor connection diagrams. This book should be of value to the electric railway shop man who has occasion to rewind alternating-currrent motors.

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Personal Items

C. D. Smith Made General Manager

Former Superintendent of Transportation at New Brighton Appointed to Succeed W. H. Boyce

Clinton D. Smith has been appointed general manager of the Beaver Valley Traction Company and the Pittsburgh & Beaver Street Railway with headquarters at New Brighton, Pa. He succeeds W. H. Boyce, who became commercial manager of the Pittsburgh Railways on Feb. 1.

Anticipating that Mr. Boyce would leave the Beaver Valley when the Pittsburgh Railways were discharged from receivership, Mr. Smith accepted the position of superintendent of transportation at New Brighton eight months ago and has had the advantage of that advance experience on the property. Before going to the Beaver Valley, Mr. Smith was general superintendent of the Pennsylvania-Ohio Electric Company, Youngstown, Ohio.

C. D. Smith

One of the younger men in the railway industry, his advancement has been rapid. Completing a special engineering course, he became traffic investigator for the Public Service Railway of New Jersey. He remained with the Public Service until 1916, when he accepted a position as superintendent of traffic and schedules with the Pennsylvania-Ohio Electric Company, Youngstown, and was later promoted to superintendent of transportation, then to general superintendent.

The selection and appointment of Mr. Smith as general manager of the Beaver Valley Traction lines was made by E. E. Hamilton, vice-president in charge.

Mr. Smith was born in Harrison, N. J., on June 27, 1888. He was educated in the public schools and matriculated at the Worcester Polytechnic Institute, Worcester, Mass., graduating in the department of electrical engineering in 1912. Immediately after graduation he entered the railway engineering course of the Public Service Railway and pursued the study of operation until 1916.

Mr. Smith is a member of the committee of the American Electric Railway Transportation & Traffic Association on the merchandising of transportation and is a strong advocate of the need for railways to give a complete service upon a basis of selling the rides furnished and having the convenience, surroundings and equipment of a standard to justify their sale and purchase.

As general superintendent of the Pennsylvania-Ohio Electric Company he was one of the first in the industry to recognize the possibilities of the motor coach for providing service in districts where the expenditure of constructing and maintaining electric lines would not be justified. Largely as a result of his advocacy of the use of the bus many communities in Youngstown and adjacent thereto have frequent motor coach service which gives to the residents access to all parts of the city and surrounding territory through transfer to the electric lines.

Mr. Viergever and Mr. Degener Advanced with Michigan Properties

At a meeting of the directors of the Michigan Electric Railway, Michigan Railroad, Grand Rapids, Holland & Chicago Railway and the Lansing Southern Railroad on Feb. 4, Niel M. Viergever was elected secretary of the companies, as well as a director of all except the Michigan Electric Railway, and O. H. Degener, who has been acting in the capacity of assistant treasurer, was elected treasurer of the companies. J. W. Glendening, former secretary and treasurer, resigned to accept a position in the East, announcement of which will be made later.

Mr. Viergever has been with the Grand Rapids Railway for the past eighteen years.

Mr. Degener has been with the Michigan Electric Railway, successor of the Michigan United Railways, in various capacities, for the past seventeen years, having entered the employ of the Michigan United Railways in 1907, filling various positions until he was elected to his present one.

Mr. Glendening went to Jackson with Mr. Collins, as his assistant and as treasurer of the companies under his management, at the time Mr. Collins became vice-president and general manager of the Michigan United Railways and the Michigan Railway in 1912. In 1919 he was elected secretary of the company and for the past year and a half has held the position as secretary and treasurer. Previous to that time, from 1907 to 1912, he was with the companies operating the railway, electric and gas properties in Saginaw and Bay City.

T. T. Parker Made Vice-President

An innate love for things electrical in his youth in a small Illinois town, growing through high school days in Kansas and finally landing him near the top as vice-president and general manager of the Dubuque Electric Company has been the career of T. T. Parker. Until recently he has been general manager of the company.

Mr. Parker's first real electrical work was a four-year course at the Kansas State Agricultural College at Manhattan, in 1907. Then he set poles, strung wires, sold power and did a multitude of other things.

He was with the Kansas Electric Utilities Company at Parsons for two years as a power salesman and commercial manager. Then he went to the Union City (Ind.) Electric Company as manager. He was there for a three-year period. His first appointment as general manager was at Emporia, Kan., with the Kansas Electric Power Company. He was in charge of the Emporia division, embracing five counties. By his activity there a non-paying railway line was made productive through discontinuance of cars and the substitution of buses.

T. T. Parker

Walter S. Wyman has been made president of the Central Maine Power Company, Rockland, Me. In 1899 Mr. Wyman was elected general manager of the Waterville & Fairfield Railway & Light Company with offices at Waterville, Me. He held this position until June, 1901. Mr. Wyman's connections have been almost entirely in the lighting and power fields.

John Carl, storekeeper at the Chestnut Street shops of the Indiana Service Corporation, Fort Wayne, Ind., for the last eight years, has been assigned to special work at the Spy Run power station in connection with the installation of new equipment. Erwin Firestine, who has been assistant storekeeper, has succeeded Mr. Carl as storekeeper.

Ernest Barker, formerly master mechanic of the Charleston Consolidated Railway & Lighting Company, Charleston, S. C., resigned Feb. 1 to accept the position of general foreman with the Georgia Railway & Power Company at Atlanta. Previous to Mr. Barker's connection with the Charleston property

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he served five years in charge of equipment for the Public Service Railway at Edgewater, N. J. Mr. Barker has had extensive experience with the Interborough Rapid Transit Company and general electrical experience in many branches. His early education was received in the schools of England, where he was born.

H. C. Donecker has resigned from the Public Service Railway, Newark, N. J. He had lately been assistant to Vice-President E. W. Wakelee. Before that he was assistant general manager of the company. Mr. Donecker went to the Public Service Railway in 1913 from the post of secretary of the American Electric Railway Association. He has been engaged in street railway work since 1890, both in the operating and manufacturing ends.

Patrick Troy has been appointed shop foreman of the New York & Queens County Railway, Woodside, N. Y. Mr. Troy had until recently been general foreman of car repairs of the Third Avenue Railway System. He has been engaged in work in the street railway field in New York City since he entered the employ of the Metropolitan Street Railway in 1897.

William I. Whitefield is now electrical engineer of the Roanoke Railway & Electric Company, Roanoke, Va. He replaces W. G. Clayton, who was assistant general manager and electrical engineer.

Halbert O. Crews, appointed to take charge of general publicity work for the Chicago Surface Lines, assumed his duties on Feb. 4. Mr. Crews went to Chicago from Springfield, Ill., and entered the utility field with a broad background of newspaper and publicity experience. He was managing editor of the Springfield *News Record* from 1913 until that paper was sold in 1919 and suspended publication. In 1918 he was publicity manager for the Illinois Centennial Commission and has since been engaged in general editorial and publicity work. As superintendent of reports for the State of Illinois in 1920 and 1921, he edited all state reports prepared during that period. During the recent campaign for a new constitution in Illinois Mr. Crews, as secretary of the committee on submission, was in charge of publicity. He has also edited the last four blue books, which are issued every two years by the Secretary of State.

Willard F. Graves has been appointed chief engineer of the Terre Haute, Indianapolis & Eastern Traction Company, with headquarters at Indianapolis. Mr. Graves was formerly for nine years chief engineer of the Montreal Tramways. He has also been connected in the past with the South Side Elevated Railway, Chicago, and the Chicago City Railway and has acted in a consulting capacity at various times for the Detroit United Railway, the Halifax Tramway & Power Company and the Quebec Railway, Light, Heat & Power Company. He has served as chairman of the committee on way matters of the American Electric Railway Engineering Association. A portrait and a biography of Mr. Graves were published in the ELECTRIC RAILWAY JOURNAL for Dec. 1.

M. H. Frank Has Had Varied Career in Utility Field

M. H. Frank, the new manager of the electric railway department of the Eastern Wisconsin Electric Company, at Fond du Lac, Wis., has had many and varied experiences in the utility field. His earliest connection dates back to June, 1908, when for G. W. Thornton & Sons, in Elkhart, Ind., he operated a traction engine for a threshing outfit. He later served with the Fort Wayne Electric Works, in Fort Wayne, and still later with the Indiana & Michigan Electric Company as assistant construction engineer, and then as resident engineer. In September, 1913, he became identified with the Fargo Engineering Company, in Jackson, Mich., as assistant testing engineer.

From June, 1916, to April 15, 1918, he was associated as operating engineer with the Galesburg Railway, Lighting & Power Company in Galesburg, Ill. In this capacity he had direct charge of all construction work. He also managed the city railway and interurban railway systems, along with

M. H. Frank

his work of general operation covering manufacture of electricity and distribution of electricity for light and power purposes. In 1918 he joined the forces of the Eastern Wisconsin Electric Company in Fond du Lac as manager of the gas and electric end of the business, but in 1922 he was made manager of the electric utilities of the Eastern Wisconsin Electric Company, supplying the city of Sheboygan. This placed him in direct charge as manager of all the electric and gas utilities of the Eastern Wisconsin Electric Company. On Jan. 1 of this year, in addition to the above activities, he assumed management of the electric railway lines as well. Mr. Frank completed a four year course in electrical engineering, receiving the degree of bachelor of science in electrical engineering and an advance degree of electrical engineer.

In his new position with the Eastern Wisconsin Electric Company, reference to which was made previously in the ELECTRIC RAILWAY JOURNAL, Mr. Frank succeeds B. W. Arnold.

John S. Allen has been selected by the Madison Railways, Madison, Wis., to fill the position of consulting engineer to that company. For the last three years Mr. Allen has been engaged in consulting engineering practice at Madison. Before that he was a member of the State Railroad Commission for four years. His experience with that body has given him an opportunity to gain a keen interest into the affairs of the company. In his first duties he will deal with relations between the riding public and the company. Mr. Allen will continue his private business.

E. L. Marriage, for the last two years in charge of public relations for the Des Moines City Railway as assistant to F. C. Chambers, president of the company, has been elected to the board of directors of the company. Since Mr. Marriage joined the Des Moines organization two years ago the change in public sentiment toward the company has been little short of remarkable. Mr. Marriage has not hesitated to tell the public of the betterments made by the company in its service and to the physical property. In this work he has used newspaper advertising, car cards and various other media. A little folder placed in racks in the cars every week called the "City Railway News" has been an important factor in this educational work.

C. J. Crampton, formerly superintendent of the safety and efficiency department of the Dallas Railway, has been placed in charge of the newly created public relations department of the company, the central idea of which will be merchandising service. Mr. Crampton has been relieved of all duties in connection with the operation of the Dallas Railway and will devote his time exclusively to the department of public relations, in which he will be the contact man between the public and the railway. As explained elsewhere in this issue of the ELECTRIC RAILWAY JOURNAL, the department of safety and efficiency has been abolished and the safety work heretofore carried on by Mr. Crampton for the company has been turned back to the operating department.

R. W. Curran, formerly general superintendent of the St. Joseph Railway, Light & Power Company, St. Joseph, Mo., has been appointed general superintendent of the Portsmouth Street Railroad & Light Company, Portsmouth, Ohio. This property was recently acquired by the Henry L. Doherty interests. Mr. Curran served a year and a half with the Doherty interests in Denver, following which he worked for a year at Massillon, Ohio, and a year and a half at Elyria, Ohio. Later he spent a year in the New York Doherty office, to be followed by three years service with the Dominion National Gas Company of Buffalo, N. Y. He was identified with the Ohio Public Service Company of Warren, Ohio, for five years. It was from Warren that he went to St. Joseph, where he held the position of general superintendent for a year. As noted previously his place at St. Joseph has been filled by D. C. McClure of Denver.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

$2,146,506 Net for Brill

Car Building Concern Enjoys Good Year —$100,000 Set Aside to Develop Self-Propelled Vehicle Field

For the year 1923 the combined output of the four plants of the J. G. Brill Company amounted, in sales value, to $18,167,486.

The combined output for each of the past six years follows:

1918	$16,761,155
1919	14,210,622
1920	17,537,293
1921	7,647,899
1922	10,177,583
1923	18,167,486

The net profit of the company for the year was $2,146,506 after deducting from the earnings the cost of maintenance and repairs, amounting to $592,035, together with all other charges, and after setting aside out of earnings the following reserves—for depreciation of plant and equipment, $231,148; for federal and state income taxes, not yet due, $347,896; for special depreciation, $150,000; and for development of gasoline-propelled vehicles, $100,000.

CONSOLIDATED PROFIT AND LOSS ACCOUNT OF THE J. G. BRILL COMPANY AND SUBSIDIARIES FOR YEAR 1923

Total net sales billed		$18,167,486
Cost of sales, including operating, selling, administration and general expenses and depreciation for the year		15,525,021
		$2,642,465
Miscellaneous income		101,937
Operating profit		$2,744,402
Less reserves:		
For federal and state income taxes	$347,896	
For special depreciation	150,000	
For development of gasoline - propelled vehicles	100,000	
		597,896
Net profit to surplus		$2,146,506
Earned surplus at Dec. 31, 1922.		$3,582,971
Less:		
Adjustments of patents and good will.	$199,670	
Miscellaneous adjustments—credit	16,499	
		183,171
		$3,399,800
Add profit as above		2,146,506
		$5,546,306
Less dividends paid:		
Preferred	$320,600	
Common	240,510	
		561,110
Earned surplus at Dec. 31, 1923		$4,985,196

The amount of work on hand at the close of the year was $3,500,000.

Since the organization of the company in 1907, it has been customary, in making the annual report, to show as one item, under "value of properties," the amount carried on the books as representing the real estate, buildings and equipment and an amount representing patents and good will. It was felt that a restatement of this entire account should be made to set forth more clearly the exact condition of the company, and an appraisal was made to determine the present value of the real estate, buildings and equipment owned by the company. It indicated a substantial, increased present value over the depreciated book value. Although the good will and patents are considered to be extremely valuable, the directors decided to reduce their value to the nominal amount of $1 each, and to substitute as far as possible the increased tangible value shown by the appraisal, charging the balance, $199,670, against earned surplus.

Believing that there is an increasing demand for gasoline-propelled passenger vehicles for use both on steam railroads and on the highways, the company has been taking steps to increase the efficiency of this class of transportation equipment and has decided to set aside a reserve of $100,000 for further development of this branch of the business.

Historical Railway Booklet Published

The Westinghouse Electric & Manufacturing Company has recently released a fifty-four-page publication entitled "A brief Outline of the Development and Progress of the Electric Railway Industry." This booklet sets forth briefly the history of the electric railway industry, from the installation of the first permanently fixed rails to the production of the powerful electric locomotives of today. A wealth of illustration, including photographs of modern equipment and sketches of the earliest railway apparatus, adds greatly to the interesting character of the publication.

In the introduction, "Reminiscences of Electric Railway Development," L. M. Aspinwall of the Westinghouse company discusses the early trend of railway motor design and the problems encountered in the development of control apparatus.

Chapter 1 of the booklet includes the evolution of electric railway transportation from 1700 to 1885, describing the various inventions and experiments in the early stages of its history. This chapter is followed by a résumé of the development and service of the Westinghouse company in all branches of the electrical industry.

Chapters 3 and 4 recount the development of railway motors and control from the building of the first double reduction motor to the extensive equipment being manufactured today.

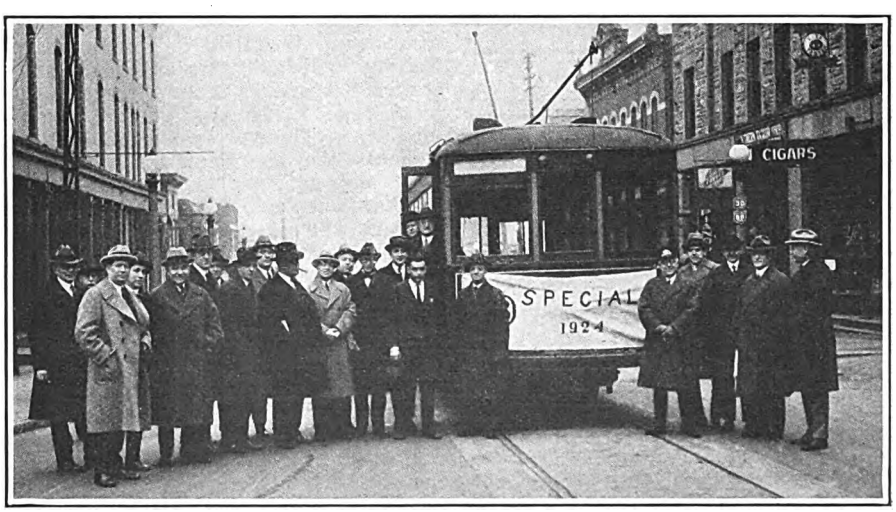
Electric railway history from 1894 to the present is set forth in the next chapter, after which a story of the first interurban railway in the United States is recounted. A discussion of freight haulage by the electric railway and the past and present tendencies of electric railway cars are included in the next chapters.

Succeeding chapters in the publication portray the extensiveness of Westinghouse service and the methods of the company in rendering effective service to its customers through various works, offices, service stations and warehouses, and through engineering studies and many informative publications and advertising programs.

Equipment maintenance and upkeep for electric roads is treated briefly in a four-page discussion of that subject. A short description of the electric railway industry as it is today concluded the publication.

O.B. Salesmen Use the Trolley

When Ohio Brass Company salesmen are called in for their annual sales conference a special car is chartered for their use in traveling between their hotel and the main office of the company where the business sessions are held. This special trolley has become a well-established feature of the annual sales convention. The car is provided in Mansfield by the Ohio Public Service Company. This is just another sample of how manufacturers can cooperate with railway companies—when they stop to think about it.



Manufacturer Charters Car for Use at Salesmen's Meeting

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Metal, Coal and Material Prices

Metals—New York	Feb. 13, 1924
Copper, electrolytic, cents per lb	12.75
Copper wire base, cents per lb	15.375
Lead, cents per lb	8.275
Zinc, cents per lb	6.737
Tin, Straits, cents per lb	54.00
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.825
Somerset mine run, Boston, net tons	2.25
Pittsburgh mine run, Pittsburgh, net tons	2.00
Franklin, Ill., screenings, Chicago, net tons	1.825
Central, Ill., screenings, Chicago, net tons	1.35
Kansas screenings, Kansas City, net tons	2.25
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$6.60
Weatherproof wire base, N. Y., cents per lb	17.00
Cement, Chicago, net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal	$0.95
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	11.74
Turpentine, (bbl. lots), N. Y., per gal	$1.00

Rolling Stock

Birmingham Railway, Light & Power Company, Birmingham, Ala., will receive twenty new cars on March 1.

Wheeling Traction Company, Wheeling W. Va., has placed an order with the Cincinnati Car Company at Winton Place, Ohio, for twenty-one new passenger cars.

Los Angeles Railway has ordered 722 Westinghouse type 514-L motors to equip the 120 new cars being purchased and built as a part of the 1924 program. Some of these motors will be used for replacing older equipment now in service. A number of two-motor cars are to be made four-motor cars this year and 100 controller equipment units of type K-35 have been ordered for four-motor cars and 300 type K-68 controllers have been ordered for two-motor cars. The new controllers are to be furnished by the General Electric Company.

New Brunswick Power Company, St. John, N. B., is remodeling and refitting a number of old cars.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., will soon place in operation between Waukesha and Milwaukee five new buses. The company suffered by fire on Feb. 8 considerable damage to seven of its city cars in its Fond du Lac carhouse.

United Electric Railways, Providence, R. I., recently bought three Fageol safety coaches.

Track and Line

Menominee & Marinette Light & Traction Company, Marinette, Wis., is requesting authority of the Marinette Common Council to install additional overhead and track facilities in Dunlap Square.

Canadian National Railways, Montreal, Que., proposes to spend approximately $500,000 in improvements in 1924 extending its local service in St. Catharines, Ont.

Los Angeles Railway started the extension of the Central Avenue line from the south terminal at the Goodyear plant to Seventy-seventh Street on Feb. 1. This is the second extension started since the first of the year, the other being the extension of the West Ninth Street line from Harvard Boulevard to Western Avenue, where it will connect with the crosstown bus line. The Ninth Street extension calls for ¼ mile of double-track construction and the Central Avenue line will be extended 0.4 mile.

Tri-City Railway of Iowa, Davenport, in line with its comprehensive rerouting program built 1,500 ft. of single track and constructed eight passing tracks in various parts of the city. In the service improvements installed were sixteen Nachod automatic electric blocks at a cost of $15,000 to speed up the movement of cars on single-track lines and six Cheatam electric track switches.

Alabama Power Company, Birmingham, Ala., is rebuilding a number of the trolley lines in Tuscaloosa. Many new rails and new ties are being placed, while some of the grades are being changed. With the exception of a short stretch the work of rebuilding the Holt line is completed and work is now progressing on the loop line. The company recently acquired control of the Tuscaloosa railway system.

Pacific Electric Railway, Los Angeles, Cal., has requested permission to construct a single track at grade across Commercial and Canal Streets in Long Beach.

Power Houses, Shops and Buildings

Ottawa Traction Company, Ottawa, Canada, is constructing a new modern brick and cement building for the purpose of housing a new substation and providing linemen's quarters. When completed and the new substation installed it is expected it will add materially to the effectiveness of the power distribution system.

Virginia Railway & Power Company, Richmond, Va., has purchased four Westinghouse new model multiple retort underfeed stokers and four new 512-hp. B & W boilers to be installed in a new extension to the Reeves Avenue power station at Norfolk, Va. Electrical auxiliaries have also been purchased for the Twelfth Street power house of this company at Norfolk.

Chautauqua Traction Company and **Jamestown, Westfield & Northwestern Railway** will build two automatic substations, according to an announcement by George L. Maltby, general superintendent. The new substation at Stow replaces the one damaged by fire a few weeks ago, and the new substation on the Jamestown, Westfield & Northwestern will be erected at Glenn Ewen, a point about half way between Mayville and Westfield. The portable rotary substation now in use at Westfield will be moved to some point on the Jamestown, Westfield & Northwestern line, probably at Dewittville, Mr. Maltby, indicated. Work on the new automatic substations will start soon and they will be completed and fully equipped and ready for service in four or six months. The substations are to be of concrete, fireproof construction and will be 500-kw.

Trade Notes

United States Light & Heat Corporation, Niagara Falls, N. Y., announces that effective March 1, R. M. Kincaid, who has been works manager since August, 1920, will resign to accept a position with the Garford Motor Truck Company of Lima, Ohio. J. K. Gould will carry on that part of Mr. Kincaid's work which had to do with the manufacture of batteries, his title being superintendent battery division. Otto Von Goeben will carry on that part of Mr. Kincaid's work which had to do with the device and arc welder end of the business, his title being superintendent device division. The corporation manufactures U. S. L. storage batteries, arc welders and train lighting equipments.

Okonite Company, Passaic, N. J., manufacturers of "Okonite" insulated wires and cables, splicing tapes, etc., has recently appointed the Engineering Materials, Limited, McGill Building, Montreal, P. Q., as its Canadian representative.

N. A. Petry Company, Inc., Philadelphia, makers of the Petry Bus Heating System, announces the appointment of E. R. Mason as Eastern sales representative. Mr. Mason has been associated with the Electric Service Supplies Company as Eastern sales manager, and with the Ohio Brass Company as assistant general sales agent. Mr. Mason is located at 1845 Grand Central Terminal, New York City.

Mitchell-Rand Manufacturing Company, New York, N. Y., while essentially maker of industrial and insulating compounds, is also distributor and representative for manufacturers of varnished materials, insulating tapes, etc. Recently the Mitchell-Rand company arranged to act as Eastern distributor for the Plymouth Rubber Company, Inc., Canton, Mass., and now carries in its warehouse at 18 Vesey Street, New York City, a complete stock of Plymouth friction tapes and splice, insuring immediate deliveries at no advance over prices prevailing at the mill. Maurice J. Deegan, who has had extensive experience in the sale of these materials throughout the country, is supervisor of the new tape and splice department of the company.

New Advertising Literature

International Steel Tie Company, Cleveland, has issued a folder entitled "Years Later." It explains how the second rail goes in on a steel tie foundation. The pamphlet tells in detail about a particular track job undertaken for the Cleveland Railway and its resulting revelations as to the wearing qualities of concrete foundations.

Pennsylvania Crusher Company, Philadelphia, has issued Bulletin 1014, illustrating and briefly describing "Pennsylvania" steel-built hammer mills for cement, lime and gypsum plants.

Hisey-Wolf Machine Company, Cincinnati, has issued Bulletin 3016-S describing a new wide swing motor-driven grinder.

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New York, February 23, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 63
Number 8

Last Call for St. Louis Midyear

THE St. Louis Midyear Meeting of the American Electric Railway Association on March 4 bids fair to be an exceptionally worth-while gathering. If one can judge by the work and planning of the St. Louis committeemen in preparation for the event, it is going to be one of the best the association has held.

A large attendance is also in prospect, judging by the unusually large number of advance reservations for hotel rooms and dinner places. One reason for this is that the program offers real compensation for the trip to the convention city. Traffic congestion, one of the most serious problems confronting the railway operating man, is to be given consideration throughout the whole morning session. The afternoon session will be devoted to another matter in which the electric railways have a keen interest—finance. The speakers at these sessions and for the evening banquet are men whose messages will undoubtedly give us food for further reflection.

Altogether, this last call to the meeting should induce you now to make your reservations—hotel, dinner, railroad—taking advantage of the reduced rate of fare available by use of certificates distributed by Secretary J. W. Welsh, 8 West Fortieth Street, New York City.

Physical Property Shows Progress in St. Louis

THAT much progress has been made in the rehabilitation of the property of the United Railways of St. Louis is indicated by the several articles which have appeared in this paper describing new work of the company. In this issue are articles describing new cars, track, and provisions for economical power supply. An article was published last week on the new automatic substations. An article published Sept. 1, 1923, told how substantial saving was being made in energy consumption through the installation of power-saving devices, and another article, on the new carhouse and storage yard at Broadway and Taylor Avenues, was published in the issue of April 14, 1923. The substance of these articles shows that, apart from the work done by the receiver in readjusting the finances of the company, a great deal has been accomplished along the line of placing the physical property in such shape that it can function efficiently and give real service to the public. These articles are also mentioned here to suggest to delegates to the Midyear Meeting on March 4 the things which they will find especially worth looking up while in St. Louis.

A receivership usually is regarded as a very serious undertaking that may spell the ruin of a road. While this may be true in some instances, where the property has inherent possibilities there may actually be an advantage. The receivers are unhampered by the ordinary obligations to capital, so that money that would go for interest and dividends can be applied to deferred maintenance and construction that for the good of the property should have been taken care of in the past. A wisely administered receivership, then, may be of advantage in making the property good enough that it may ultimately become a real asset to the security holders instead of the liability it must have been at the time of failure.

It has not been a simple task for the receiver, but the physical property speaks for itself, and it is understood the financial difficulties are on the road to a settlement.

It will be interesting to note the further steps in the reorganization of the St. Louis property, and see what the advantage is in having a receiver who has the courage to spend money in order to put the property in condition to save money and operate profitably in the future.

Exhibits, a Barometer of Business

THE American Electric Railway Association will decide at the Midyear Meeting at St. Louis the question of whether there shall be exhibits and the time and place of the next annual convention. A few of the leading manufacturers have been canvassed for their views on this subject, and the majority favor having the exhibits as usual, and at Atlantic City.

No one doubts that an exhibit is about the most economical method for the manufacturer to present his latest developments in equipment to a large number of railway operators. Furthermore, an exhibit is a very effective kind of sales activity. For the electric railway operator, it provides an impetus to keep abreast of the times.

Exhibits in this and all other industries have not been held in years of business depression, but not to hold the annual exhibit in a year of good business is to admit the industry is standing still. The improved financial condition of electric railways negatives such a suggestion. The record of actual sales of manufacturers in 1923 shows an exceptionally good year. The association's exhibit last year exceeded all previous records with a registration of 4,400 and exhibit space of more than 76,000 sq.ft. sold—15,000 more than at any previous exhibition. When no exhibit was held in 1921, the attendance fell to 1,500.

This year the electric light, power and gas industries and the car builders for the steam railroads will hold their usual exhibits.

The electric railways have a quarter of a billion dollars to spend for improvements during 1924. Surely the manufacturers can ill afford to omit the exhibit.

Can any one imagine the motor vehicle industry giving up the national automobile show?

Never was there greater encouragement or opportunity for equipment development work, for the rail-

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ways are earnestly seeking means of providing better transportation. Hence the progressive manufacturer will be working this year strenuously on new ideas and will need the exhibit to give first showing to his new products, as well as to display his older products—which are always new to many of the delegates who have seen the thing advertised but have not seen it first hand.

Furthermore, while a convention at Atlantic City lends itself exceptionally well to an exhibit, it is desirable now and then to hold the annual meeting at some other city, perhaps where facilities are too limited to undertake an exhibit. This may be the case in 1925.

Increasing Substation Capacity by Changing Units Has Advantages

A FEATURE of more than passing interest incorporated in the design of the St. Louis automatic substations described in the Feb. 16 issue of this paper is the arrangement for increasing the capacity of a station, not by the insertion of additional machines, but by the substitution of a larger unit in place of the one installed. The former method, which is the customary one, carries with it the necessity for anticipating, perhaps long in advance, the growth of traffic and consequent increase of load. This calls for a more expensive building, and possibly extra real estate. Although the space is provided for in the design, still there is a very considerable expense when it becomes necessary to install an additional unit, as the switchboard and all other auxiliaries must be changed accordingly.

With the St. Louis plan an increase in station load requires that the converter and its transformers must be removed and new equipment of increased rating substituted. Since modern machinery is practically always handled by means of remote control, the larger current does not necessarily demand a new switchboard, but only the substitution of necessary switches of correct rating. Such changes should be easier to make, and be less expensive, than the anticipation and installation of an additional unit.

Apart from the saving in idle investment prior to the increase in station capacity, there is the advantage that a new unit can be installed in place of a smaller one whenever the load exceeds but slightly the rating of one machine. This permits the use of machinery of such size that it approximates the daily loads much more closely than when the rating must be doubled at one operation. Of course, it is entirely possible to have units of different sizes in a manual station to approximate the demand. However, the most recent automatic substations with more than a single unit have duplicate converters so that they may be started interchangeably, thus increasing the reliability of the automatic control.

As a matter of fact, improvements in design have made it possible in the past for machines of double rating, or even larger, to be installed on the same foundations as the original machines. If the same progress can be anticipated in the future, there should be plenty of margin for growth in the system without the installation of additional units.

The major objection to the plan is that machinery must be removed from the station when its rating is increased. On a small property this would be a serious defect, but on a system as large as the United Railways, there will practically always be an opportunity to locate and use the smaller unit to advantage.

New Orleans Does the Wise Thing

NEW ORLEANS has again acted wisely. For a time, however, it appeared that much of the good work done more than a year ago in reaching a settlement of the utility problem there would be negatived by the refusal of certain members of the Commission Council to align themselves on the side of progress for the city. The story of the negotiations looking toward supplying the capital requirements of the New Orleans Public Service, Inc., as the local utility is known, has been told in the news pages as it unfolded itself.

First there was a dispute between the company and the city over the question of whether the average rate base for the year should be $52,924,928 as claimed by the company or $52,144,463 as claimed by the city. Thus there was a difference of $779,864. There was room for honest difference of opinion in regard to the disposition of most of the items, but in the aggregate these items were not important enough to affect rates except ever so slightly even if all of them were allowed to the company.

This question, however, paled before the more important one of providing the funds necessary for extensions and improvements. The return permitted to the company on the rate base is 7½ per cent. Bonds of the company secured by mortgage have been selling at rates which still reflect the uncertainties of the past, one issue to net more than 8 per cent and another more than 9 per cent. Financing by means of bonds, accordingly, was out of the question.

But the need of New Orleans was immediate. The Electric Bond & Share Company, owning the common stock, stood ready to purchase $7,500,000 of additional common stock at par to pay a 9 per cent return if earned. This, of course, looked big to some of the representatives of the city. After all, however, the return fixed for the whole property on the rate base is 7½ per cent, so that in the light of the risk taken by the holder of the common stock the rate of dividend was not incommensurate.

The financial set-up at New Orleans following the reorganization was $42,000,000 of bonds and only $12,000,000 of preferred and common stock. As a matter of fact, on the average rate base of $52,939,371 for the year ended Sept. 30, 1923, the company earned a balance of only $1,325,896 available for sinking fund requirements, dividends and surplus reserves, or 6.61 per cent on the rate base. Thus the Electric Bond & Share stood ready to stake millions of dollars on the prospects of the future. Yet it took a long while to win the members of the Commission Council over. But now that it has been done, the prospects are that affairs affecting the utilities in New Orleans will proceed along lines that will quickly result in all the advantages that follow when a public utility is so strengthened in its financial position that it can function financially and physically to the best advantage.

SOME most interesting papers and discussion on means to relieve traffic congestion and speed up local transportation were heard at Chicago before the Western Society of Engineers on Feb. 6 and 7. They are published in this issue and that of Feb. 9. They will be of special interest to electric railway men just now in view of the session to be devoted to the same subject at the St. Louis Midyear Meeting of the A.E.R.A.

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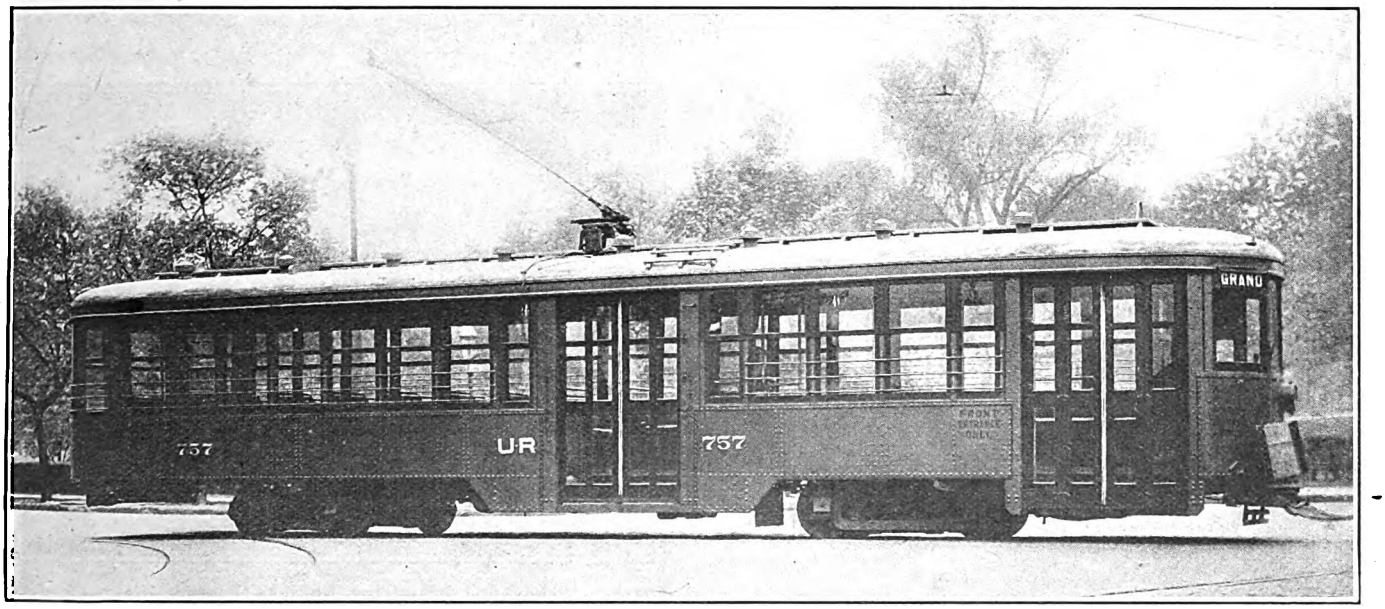
St. Louis Front-Entrance, Side-Exit Cars

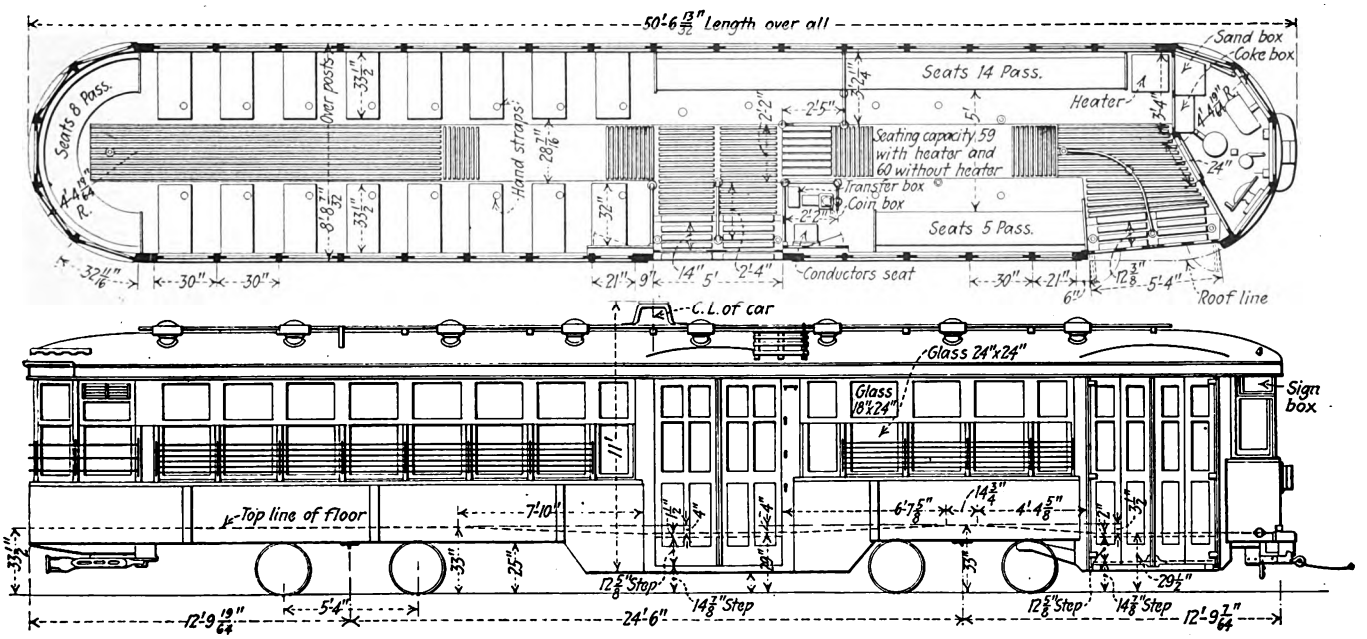
Fifty Cars Now Building Will Make Total of 201 of This Type Which Have Been Placed in Service Since 1920—Standard Design Retained Is Featured by Ramps in Floor, Inside Steps, Separate Motorman's Compartment and Aluminum Rails and Stanchions



Fifty Motor Cars of This Type Are in Process of Construction for Use on United Railways of St. Louis

A GROUP of fifty front-entrance, side-exit motor cars now being constructed in the shop of the United Railways of St. Louis, under the direction of M. O'Brien, master mechanic, will give this property a total of 201 cars of this type in service when the present lot is completed. The design has been maintained standard for each group, and the new lot is therefore almost an exact duplicate of the first group, which was described briefly in ELECTRIC RAILWAY JOURNAL, Sept. 18, 1920, page 551. One important change has been made from the first lot of these cars, in that the more recent cars have been equipped with four 35-hp. motors whereas the first group had four 25-hp. motors.

One of the features of interest is the use of ramps at both the front end and the center section to eliminate drop platforms and folding steps, and at the same time to make possible the use of a single 12⅝-in. inside step, both at the center and at the front doorway. To accomplish this with 26-in. diameter wheels the floor of the car is carried as low as possible, a clearance of 3 in. being allowed for the light car body between the floor and the wheel flange. Additional clearance is obtained by having the bottom of the floor at the front end cut out in an arc corresponding to the wheel swing, so as to prevent the wheels from rubbing against the under side of the floor when the truck parts become worn. The



Low Step Heights Are Obtained by the Method of Ramping the Floor Arrangement of Floor Strips in Aisle Is Shown in Plan

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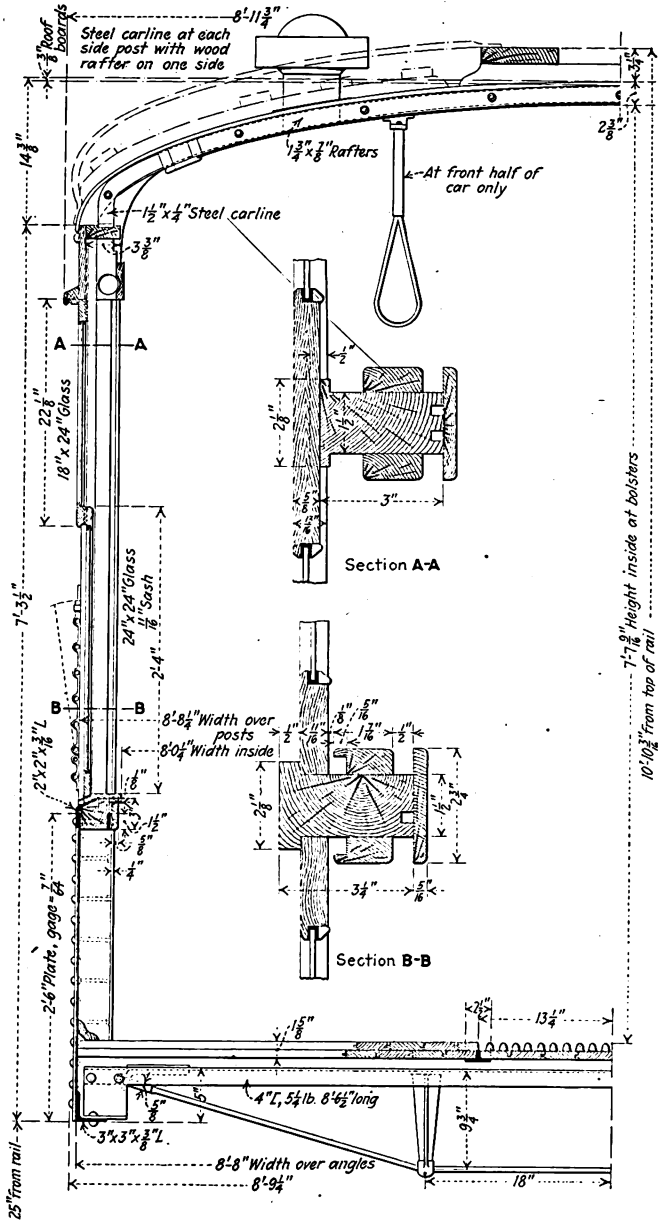
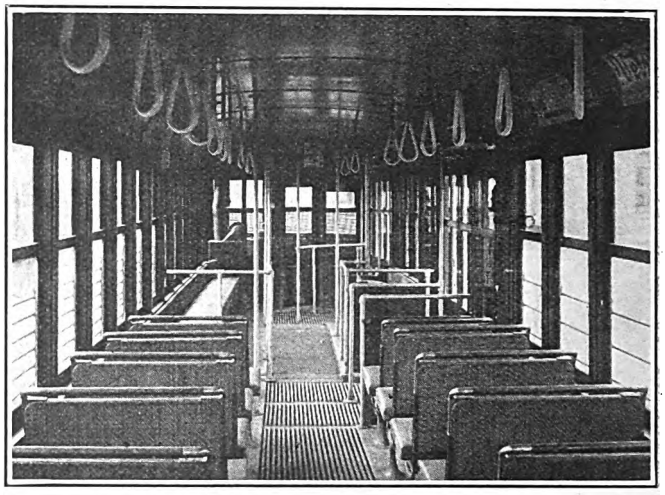


Steel Side Girder Framing and Wood Side Posts Are Used. Cross Sill Channels Are Installed with Web Horizontal to Give Additional Clearance

truck springs are designed so that they will go solid with a total deflection of 3 in., but normally will not reach this deflection with a maximum passenger load on the car.

All rails and stanchions used in the interior of the car are made of 1-in. aluminum pipe. To assist standing passengers, stanchions have been liberally provided in the front longitudinal section of the car and at the entrance and exit doors. In addition to the rail surrounding the conductor's position, a second rail has been installed on the opposite side of the car, extending out from the longitudinal seat, so as to produce in effect a narrow aisle immediately opposite the conductor. This is to facilitate the collection of fares when the car is crowded. The arrangement of these rails and stanchions is clearly illustrated in an accompanying photograph.

A step height of $14\frac{7}{8}$ in. from the rail to the inside step is obtained, with an additional rise of $12\frac{5}{8}$ in. from this step to the car floor. The heights are the same at both the front and center door openings. From the edge of the step to the edge of the body aisle the floor ramps $1\frac{1}{2}$ in. at the center door and 2 in. at the front.



Floor Ramps and Aluminum Railings Feature the Interior. Note Motorman's Compartment at the Front End

The top of the floor at the bolster is 33 in. above the rail. To reach this point, a longitudinal ramp of 4 in. in 6 ft. $7\frac{5}{8}$ in. is provided from the center, and a similar ramp of $3\frac{1}{2}$ in. in 4 ft. $4\frac{5}{8}$ in. is put in at the front. The aisle is arranged with floor strips extending across the direction of movement, to prevent passengers from slipping. In addition the edges of the floor and steps are protected by Feralun step treads.

The cars are arranged for single-end operation. The motorman is provided with a compartment built into the front end of the body. In addition to the control apparatus, this compartment contains boxes for sand and coke. A Peter Smith hot air heater is located in the front corner of the car body, immediately back of the motorman's compartment partition.

The exit is placed immediately forward of the middle of the car. The door operating equipment is National Pneumatic and the cars are also provided with interlocking control, to prevent starting before all doors are closed. The conductor's station is at the forward side of the opening. He is provided with a transfer box, coin tray and fare box.

Designed for duty on heavy city lines, the cars are 50 ft. $6\frac{13}{32}$ in. long over all. They have a maximum width of 8 ft. $11\frac{3}{4}$ in. and are 10 ft. $10\frac{3}{16}$ in. high over trolley

GENERAL SPECIFICATIONS OF NEW ST. LOUIS MOTOR CARS

Length over all ..... 50 ft. 6 13/32 in.	Control ..... K-35 G. R. 2	Step treads ..... Feralun
Width over all ..... 8 ft. 11 3/4 in.	Line switch ..... Westinghouse 801-E	Sanders ..... Nichols-Lintern
Height over trolley boards. 10 ft. 10 3/16 in.	Door operating mechanism ..... National Pneumatic safety interlocking	Registers ..... Security
Side post centers ..... 30 in.	Interior trim ..... Cherry	Hand brakes ..... Peacock
Side sash glass ..... 24 in. x 24 in.	Headlining ..... Agasote	Trolley catchers ..... Ohio Brass
Truck centers ..... 24 ft. 6 in.	Sash fixtures ..... O. M. Edwards	Trolley base ..... Ohio Brass Form No. 1
Wheel base of trucks ..... 5 ft. 4 in.	Curtain fixtures ..... Curtain Supply Co. ring 88	**SUMMARY OF WEIGHTS**
Gage ..... 4 ft. 10 in.	Curtain material ..... Pantasote	Two trucks complete less motors .. 10,414 lb.
Wheel diameter ..... 26 in.	Destination signs ..... Hunter	Four motors ..... 5,900 lb.
Type of truck ..... Commonwealth cast steel frame, built by railway	Buzzers ..... Consolidated	Body complete with control and air brake equipment ..... 23,086 lb.
Motors ..... Four Westinghouse 510-A	Fare boxes ..... Johnson	Total ..... 39,400 lb.
Air brake ..... Westinghouse SM-3 with DH-16 compressor	Heaters ..... Peter Smith hot air	
Journals ..... 3-3/4 in. x 7 in.	Headlights ..... Ohio Brass	

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boards. Longitudinal seats are used in the front section and cross seats in the rear. The operation is on the pay-as-you-pass principle. The total seating capacity is fifty-nine passengers in winter and sixty in summer, when the heater is removed. Cross seats are spaced on 30-in. centers, which corresponds with the spacing of the side posts. The design gives an interior width of 8 ft. 1⅛ in. over the side post pilasters. Using a 33½-in. cross seat cushion, an aisle width of 28 7/16 in. is obtained.

Straight side girder construction with wood side posts is used. The girder sheets are 7/64-in. material reinforced with 3-in. x 3-in. x ⅜-in. lower side-sill angles and 2-in. x 2-in. x 5/16-in. angles at the belt rails. The horizontal flange of the latter is bent up at an angle of 24 deg. so as to provide for drainage.

Ash side posts of 3¼-in. x 1½-in. section are fastened to the side girders by through bolts. The lower sash are of wood and are arranged to raise, while the upper sash, also of wood, are framed in continuous lengths and fastened permanently to the outside of the side posts. Tenoned across the tops of the side posts are wood top plates, and 1⅛-in. x 7¼-in. wood letter boards complete the side frame construction.

Flat steel carlins of ¼-in. x ¾-in. material are bolted to 1⅜-in. x ¾-in. ash carlins and are set on the top plate at each side post, to form the arch roof framing. The roof is covered with ⅜-in. tongued and grooved poplar.

To obtain maximum clearance under the floor for brake rigging and other apparatus, the body cross sills, which are made of 4-in., 5¼-lb. channel, are set on the flat instead of on edge. Round steel truss-rods on these cross sills are made of ½-in. material and are supported on malleable iron struts, 9¾ in. long. The floor is of double thickness, 1⅛-in. material. Yellow pine is used for the under floor and on the sides, but in the aisle the top layer is replaced by maple strips.

How Shall We Solve Traffic Problems?

How This Work Is Being Organized in Some Cities and Some of the Results—Why a Broader Viewpoint Is Necessary—The Traffic and Transportation Plan Should Be Made for a City Double the Present Size—Greatest Need Is Leadership, and Railways Should Supply It

By J. Rowland Bibbins
Consulting Engineer, Washington, D. C.

IN A PREVIOUS article in the ELECTRIC RAILWAY JOURNAL for Nov. 10, 1923, some elements of the traffic problem, with which every large city and traction company is confronted, were analyzed and discussed as to the broader features. Now it seems desirable to inquire whether this vastly important matter is being handled adequately, what results are being secured, also to consider whether more effective and far-sighted methods and organization are not needed.

Traffic and transportation have assumed a new significance and importance within the last decade, for they now involve things outside the operation of the railway. In fact, the operating integrity of every large railway system is coming to be not a matter of how to run street cars better, but how to run them at all. The study of traffic today is not simply one of parking signs and police regulation, as most people think, but is one which should cover the following main elements:

1. Street and highway plan, for present and future.
2. Transit service—capacity and routing.
3. Traffic organization and control, vehicle and pedestrian.
4. Railroad terminal operations; marine, in port cities.
5. Relation to the broad city plan and general public welfare.

To illustrate, most railway men conceive the private automobile as the principal offender in traffic congestion. But in a recent traffic survey the writer found that commercial vehicle traffic averaged about one-half of the total automotive traffic in the downtown district of a large city and held practically constant throughout non-rush hours—a condition which is clearly brought about in this city by the extremely defective thoroughfare plan. Railroads have continued to concentrate their local traffic close into the business district, which results in cluttering up the streets with crosstown freight movement. Few industries have taken steps toward efficient cartage control with definite routing for their trucks and delivery vehicles, such as that established some years ago by the Denver Tramway Company, in connection with its construction work. In port cities marine trucking traffic to industries and freight stations may also be found using passenger streets quite unnecessarily. Another source of congestion is that many commercial houses use the sidewalk and street for loading and are thus quite inconsiderate of the need for full street capacity.

EXAMPLES OF HOW PROBLEM IS BEING ATTACKED

How is the problem being studied? Three cases will illustrate.

1. In Baltimore, a traffic committee appointed by the Mayor has just reported after six months labor.* The report covers numerous detailed recommendations mostly pertaining to the central district. It gives little or no consideration of the proper relation of the central district to the entire city and the further development of local transportation to meet future needs. But it does lay great stress upon railroad grade separation throughout the city, citing seventy-seven locations for examination. All existing traffic regulations are proposed to be abolished and the entire matter put into the hands of the police commissioner without technical supervision or advice of any kind. And the far greater problem of an adequate transportation plan seems not to be comprehended in the report.

2. In Washington, the United States Senate committee of the District of Columbia, after long hearings, has finally reported to Congress. This report goes much further. While urgent recommendations are largely confined to disciplinary measures to secure quick relief, the report does recommend "a thoroughgoing engineer-

*This report was reviewed in ELECTRIC RAILWAY JOURNAL, Feb. 9, 1924, page 232.

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ing survey" of local transportation and development covering:

Determination of conditions and facts from detailed traffic surveys.

Relative value of present streets and facilities.

Future trends and needs of Washington.

Means of simplifying street car routing and operation, and increasing loading speed.

Approximate cost of improvements and means of financing.

3. Indianapolis has perhaps visualized this program most concretely under the auspices of the City Plan Commission. Zoning is an accomplished fact in this city. The commission next turns to the transportation plan, broadly conceived, the first step of which is the development of a city-wide, comprehensive traffic thoroughfare system. These thoroughfares are being classified and designed for auto speedways, boulevards, local and rapid transit streets and heavy traffic streets, with particular reference to the by-passing of traffic foreign to the central business district.

The next step will be to develop traffic organization and control involving the usual multitude of details, particularly to afford relief to the central district.

The third step will seek improved rail routing and operation, particularly in the congested district, but also as it affects the entire transit system. This involves to some extent both previous steps, with these objects:

To untangle downtown traffic and railway looping by decreasing both car and vehicle interference so as to release traffic capacity.

To increase speed of transit through, and loading speed within, the terminal district.

To increase the facility of through movement and decrease necessity of transferring as far as possible.

To secure a better passenger distribution and pick-up throughout the business district.

To provide traffic capacity for inevitable future growth of the transit system, at the same time making a provision for the adoption of the motor bus when and where practicable.

The fourth step involves railroad terminals, line and grade separations, as all these factors involve city development, continuity of main thoroughfares and the relief of traffic and transit obstructions, now so serious. The sequence of these railroad developments is particularly important, and the location of new lines so as best to round out the city in residential settlement.

Other investigations are continually being reported by automobile clubs, electric railways, chambers of commerce, newspapers, civic clubs and the interminable sporadic efforts of local improvement associations. Most of these efforts are voluntary or directed toward the protection of definite interests.

Only in Boston, with its forty-two surrounding communities, has a well-conceived transportation plan been put under way. This is adequate in scope but unfortunately hampered by limited working funds. Chicago, Pittsburgh, St. Louis and Los Angeles have approached the problem in parts at different times.

What the situation needs is leadership. And the railway industry, with its personnel most skilled of any of these groups in the art of transportation, seems best qualified to and should take and hold leadership with courage and perseverance. It should assume a positive rather than a negative attitude; i.e., what to do rather than what not to do. To put the programme concretely:

1. Organize co-operatively adequate technical and factual surveys of local conditions, traffic movement, and the needs of present relief and future development whether by rail, bus, rapid transit or steam suburban service. The financial support for such work should not be niggardly, but commensurate to its vital importance to the industry.

2. Develop a comprehensive traffic and transportation plan based upon this factual survey which shall furnish the authorities and people with a guide to reasonable future action and development. Minor details of traffic control are entirely subordinate in first importance.

3. Organize a competent local civilian advisory body to consider this plan, subject it to constructive criticism and to furnish the powerful support which such a body can give. This is its proper function.

4. Spread broadcast by every educational means properly available the theory, purpose and advantages of the transportation plan so that the authorities may be better qualified in their official actions to express more directly the enlightened opinion of the community.

5. Start now to carry out the plan as fast as conditions warrant.

Some detailed problems have received practically no study. Yet they are of the greatest importance. Many of these so-called traffic problems are subject to the same analysis as street railway and railroad operation. For example:

Efficiency of the police traffic signals and effect on track capacity, headway and routing.

Proper relation of signal duration to traffic volume. Best type of signal for varying traffic conditions—fixed, flexible, block signal.

Best means of segregating traffic, horizontally and vertically.

Adequate relief of congested district from foreign traffic.

Three-track express idea in traffic routing.

Determination of the average parking time demand for different classes of traffic and facilities needed for each.

Economic design of traffic roadways for their particular service.

Here are essentials for the future toward which every large railway system should be working:

Increase of 10 to 20 per cent in car schedule speed—imperative to meet private automobile competition.

Doubling the efficiency of use of roadways by traffic. It can be done now in many cases.

Large increase in efficiency of police signal control. This is the critical or key point of attack.

Development of cheap day storage by efficient alley-garages; municipal undertaking if necessary

Development of limited-stop express service by car or bus to major outlying sub-centers whenever feasible.

Cartage control of commercial vehicles by business or industry operating them, especially routing.

Higher efficiency and control of off-track railroad freight movement, especially higher unit loads and routing.

Standardization of large vehicles to economize in the great cost of providing adequate roadways.

Development of the arcade plan of street widening, where full widening is not feasible.

More high-class railroading in traffic organization, movement and control.

Every city should be at work on its traffic and transportation plan. The more one studies these complex traffic operations, the more it becomes evident that one-sided or part solutions will be totally inadequate to secure lasting results even if temporary relief is secured. The scheme of organization proposed therein is simply in line with the modern tendency toward research. It embodies co-operative effort so essential in the final stage of the proceedings. We should plan now for a city of double the present size without stopping to quarrel at just what time this growth probably will be reached.

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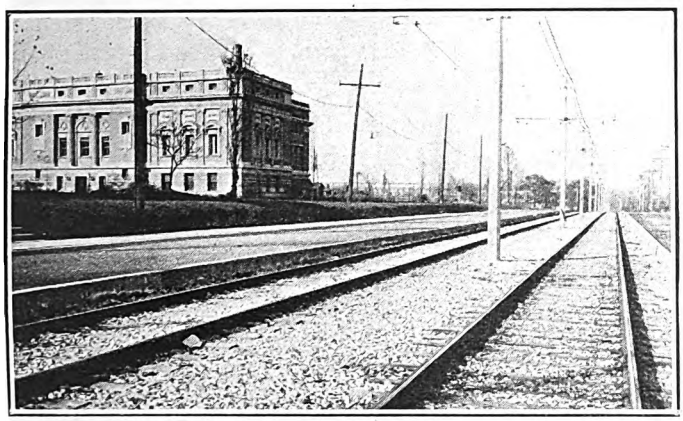
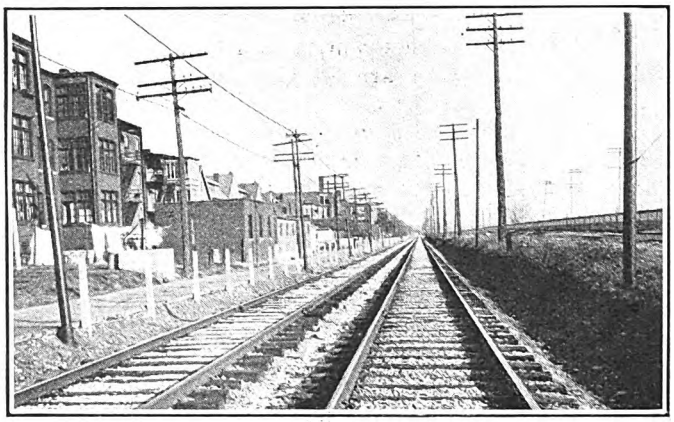
St. Louis Track Construction Includes Novel Features

Open Construction with T-Rail on Rock Ballast Is Used on Reservation or Private Right-of-Way in City Streets — Granite Flange Blocks Are Used with T-Rail in Paved Streets — Special Machinery Facilitates Construction Work

OF THE 518 miles of track of the United Railways of St. Louis, serving a population of 900,000 in the city of St. Louis and 100,000 in University City and St. Louis County, 144 miles are of the open T-rail ballasted type of construction. Approximately 17 miles of this track are located within the city and in incorporated suburban towns and are laid in reserved strips in the center or alongside of public streets. Adjoining large parks and cemeteries, these reserved strips are placed alongside of the paved roadway, while in other locations they are placed in the center of the street. This arrangement facilitates the movement of traffic by keeping the automobiles, etc., clear of the tracks. The crossings over the right-of-way are placed at such intervals that the cars are permitted to operate at comparatively high speeds.



Concrete Center Pole Construction Is Used Extensively on Private Right-of-Way in St. Louis



Approximately 17 Miles of Track in City and Suburbs Are Laid in a Reserved Strip

In some cases the city when improving the street has simply provided for pavement outside of the space occupied by the tracks and has permitted the company to occupy the reserved strip without any expressed franchise agreement. In such instances the railway, since it holds no title, is not required to pave the adjacent roadways. In other locations the company holds title to a private right-of-way in the center of a street and ownership obligates it to pay certain portions of the cost of paving the vehicular roadways. Such expense, however, is always considerably less than the cost of paving the space in which the tracks are located, so that the arrangement results in considerable economy.

An extension approximately 2 miles in length which was made some years ago into a comparatively well built up section west of the city furnishes an interesting example of the method used for acquiring a private right-of-way in a new district. The agreement to make the extension stipulated that the tracks were to be located in a 24-ft. private right-of-way between two 23-ft. streets, a total width of 70 ft. An existing street along the route varied in width from 50 ft. to 60 ft. Special deeds were prepared to transfer all property required for the 70-ft. street, and not yet dedicated to public use, to a trust company which held it in trust until the tracks were completed. Prior to the completion of the track, an agreement was entered into with each municipality through which the line ran to vacate the old streets upon the condition that the line was built and the new streets were dedicated. Upon completion of the track the trust company conveyed to the railway company its private right-of-way and then dedicated to public use the two 23-ft. streets on each side. Certain crossings were specified in the franchise ordinance passed by each city.

Since the completion of this line several of the streets on each side of the tracks have been paved and the cost of the pavement of such streets has been considerably less than would have been the cost of paving the tracks had they been laid in a public street. These cities were of the third and fourth class and street pavements are paid for on the front-foot basis. The company, therefore, paid one-half the cost of improvement of roadways in each case.

Wydown Boulevard, in the city of Clayton, furnishes another interesting example of this type of construction. The tracks are located in a 30-ft. right-of-way on each side of which a 45-ft. street is built. A 5-ft. strip on each side of the right-of-way has been left after the subdivision and improved with grass and trees. The streets are well paved and are built up with very high grade residences, on land that sells for more than $100 per foot.

A broad city planning idea has been generally accepted in St. Louis County. As a result the United Railways has received co-operation from the subdividers of lands along its county lines. In some cases the railway company has furnished tentative plans for the subdivision of a large number of tracts and has gone to considerable trouble to assist subdividers in order to

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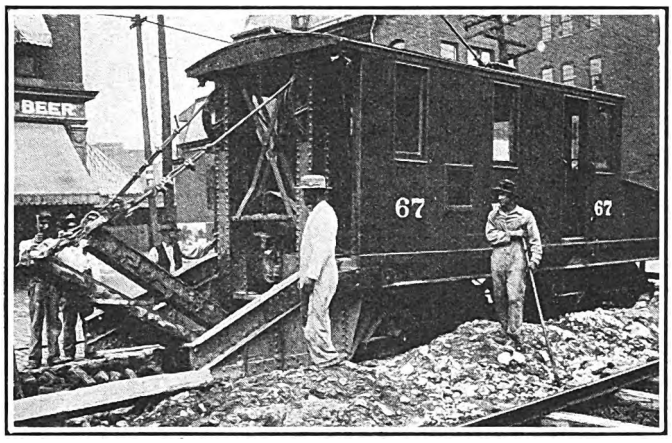


Rail Breaker Facilitates Track Reconstruction. The Wings on the Sides Shear Off Ties and Paving as the Rail Is Pulled Out

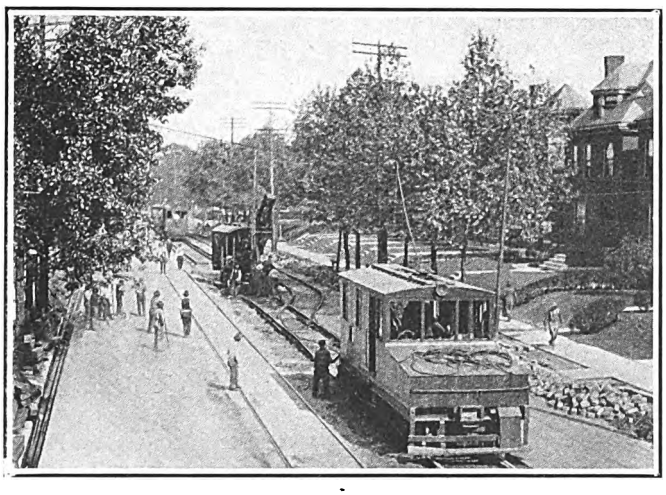
demonstrate that such land could be subdivided properly from a sales standpoint and at the same time leave satisfactory lines of communication across the tracks without an excessive number of crossings. After several years of such co-operation with land owners the engineers of the railway are generally consulted about proposed subdivisions and in almost all cases have been able to secure a great improvement in original plans.

TYPES OF TRACK CONSTRUCTION

Paved track in streets comprises a total of 338 miles and in addition there are 36 miles in carhouses and yards. Of this total 191 miles are laid with new modern rails on concrete foundations and paved with hard pavements, 85 miles are laid with obsolete types of side bearing girder rails on concrete foundations, 19 miles are obsolete types of side bearing girder rails on ballasted foundations and 45 miles are track special work.

The new rails used by the United Railways in paved streets are Lorain, 9-in., 132-lb., section 440; Lorain, 7-in., 103-lb. girder, section 426 or 478; Lorain, 7-in., 95-lb. T, section 400, and Lorain, 7-in., 91-lb. T, section 375. A large percentage of this T-rail replaced obsolete types of 7-in. girder rails which had been laid on concrete foundations. The 9-in. girder rail is used in the downtown district and the 7-in. is mostly in paved streets where there has been a large amount of vehicle traffic.

Six-inch, 100-lb. A.R.A. T-rail, series "A," which is used in 127 miles of track, is the standard type of rail in general use except in the downtown districts or where steel-tired vehicular traffic is heavy.



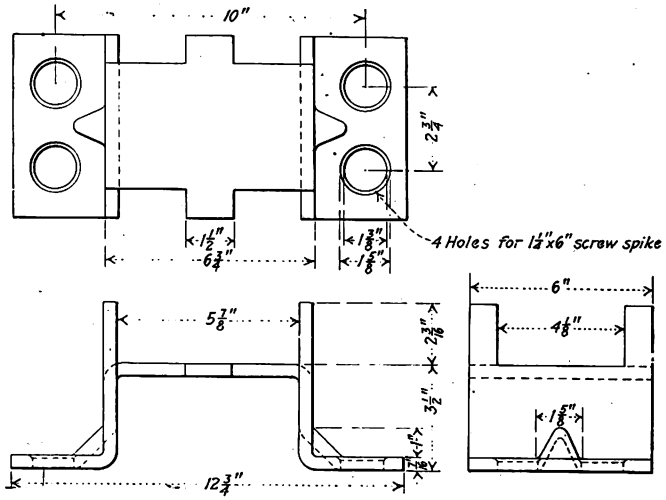
During Reconstruction Work, a Portable Siding for Work Cars Is Used and One Main Track Is Kept in Service

Most of the open track in private right-of-way is laid with 80-lb. T-rails on creosoted oak ties with gravel or broken stone ballast.

Where obsolete types of girder rails laid on concrete foundations are replaced with new rails the 100-lb. T-rail is used, and this rail is laid on a 3-in. forged steel chair manufactured with four lugs which bend down over the base of the rail to hold it in place. Tie rods are used on standard 6-ft. spacing to hold the rails to gage. Ties which are in bad condition in old concrete foundations, through decay or spike killing, are removed and replaced with steel ties of the M-25 Carnegie type. By using the steel tie in such work it has been found easy properly to surround the new tie with concrete.

The standard track foundation is at least 12½ in. thick, 6 in. of the material being under the ties. The concrete consists of a 1-3-6 mix. The ties are 6-in. x 8-in. x 7-ft. 4-in. hewn white oak, adzed and drilled for screw spikes in the material yard before delivery on the work.

On new foundations laid for 100-lb. T-rail tracks the Vaughn type of tie plate is used. This plate is made



Forged Steel Chair Used in St. Louis for Mounting 6-In. T-Rail on Old 9-In. Foundation

of soft steel ⅜ in. x 7 in. x 10½ in., sheared so as to provide four lugs which can be bent down over the rail base. Screw spikes ⅞ in. x 6 in., placed more than 1 in. away from the rail base, hold the plate firmly to the tie. No tie rods are used in such work.

All joints in T-rail tracks are made with rolled, ten-rivet, 32-in. Nichols joint plates, 1-in. rivets being placed with an 80-ton squeezer. Joint plates and rail ends are thoroughly sand blasted before the joints are made and the spaces under the rail head and around the rail base are filled with molten spelter.

Standard new 9-in. girder rail track construction is made up of a solid concrete foundation 15 in. thick with 6 in. of concrete under the ties, using the white oak ties already mentioned. Other details include ½-in. x 6-in. x 11-in. flat tie plates, malleable steel rail clips, ⅞-in. x 6-in. screw spikes, sixteen-rivet, 32-in. forged Nichols joint plates and ⅞-in. round tie rods with standard 6-ft. spacing.

SPECIAL WORK IS MANGANESE

Practically all of the special work used by the United Railways is of the solid manganese type. Standard switches have a 100-ft. inside radius and standard frogs are used as far as possible. Comparatively few triple frogs are in use and carhouse layouts are of a simple type, containing very few triple frogs or double

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curve frogs. Switches and mates in carhouse special work are almost all open hearth material, with a 40-ft. inside radius. Spring switch locks are used on facing point switches in car yards and on main line tracks, but electric switches are used at the more important locations.

Nichols joint plates have been found to have an electrical efficiency considerably above that of the rail itself, and consequently no bonds are installed at these joints. Cross bonds between rails and between tracks are placed about 180 ft. apart or about every third rail.

Poles supporting trolley wires in streets are almost all placed along the curbs, very few being in the center of the street. Most of the metal poles used during recent years are the tubular steel or the "Bates" type. Reinforced concrete poles, 35 ft. long, have been used extensively on county lines or along private right-of-way. This type has been used for most of the center pole construction in open track.

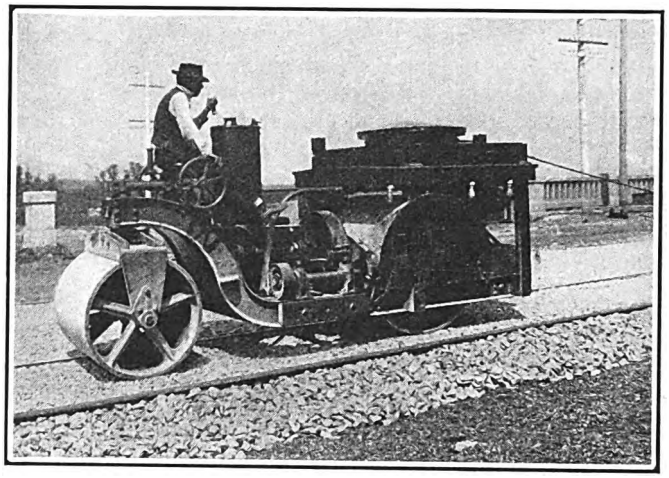
Track pavements during the past two years have been laid with new or redressed granite blocks of Missouri, Wisconsin or Carolina stone, but Missouri granite is being used almost exclusively for flange blocks in T-rail tracks. The street department of the city of St. Louis now insists upon the use of granite in track work, both for repairs, construction and reconstruction work. Paving blocks are generally laid on a sand cushion with a cement-sand grout filler, but in some cases the blocks have been laid on a cement-sand cushion with a cement-sand filler. For paving the 1-ft. space outside of the rails, special blocks 12 in. in length are purchased, and these blocks are laid on a cement-sand base and with a cement-sand filler.

Track Construction Equipment

The material handling equipment of the United Railways consists of twelve tool cars for division track foremen, approximately seventeen motor flat cars, nine motor trucks and seventeen trail flat cars. One Differential dump train, one Koppel dump train and four dump cars of the gondola type, three center dump ballast cars and two special dump trains complete the material handling equipment. The special dump trains consist of two-car units, each car containing eight dump boxes designed by the railway for distributing materials away from the track. The boxes dump over the sides of the cars in such a position that material is thrown almost completely clear of the track cut. The unit box arrangement has been found particularly satisfactory for distributing the proper proportions of sand and stone along the track for making concrete.

A rail breaking machine, two Thew shovels, one Clark pavement plow, air compressors and blasting cars make up the equipment for taking out old tracks. The Thew shovels unload directly into dirt trains which stand on a portable siding connected with a Kerwin crossover. This siding is dragged along the street by the work cars. It is of sufficient length to permit the dirt trains to serve the Thew shovel and at the same time permits the rail breaking machine to tear out the old tracks ahead of the shovels.

Old rail is removed with a rail breaking machine which consists of a two-drum 50-ton Clyde hoist, operating two rope cables each of 1⅛ in. diameter. The hoist is mounted in a car supported on a steam locomotive tender frame base. The front end of the machine is loaded down with ballast and at the rear end an "A" frame controlled by air cylinder is mounted so that it can be made to bear on the rails. The heavy rope cables attached to rail tongs are brought down from sheaves on the top of the "A" frame to points on the rail about 7 ft. behind the car. The rail breaker tears up rails, tie rods, pavements and practically all ties in ballasted tracks. In concrete tracks, however, only those ties which are larger at the top than at the bottom are pulled out.



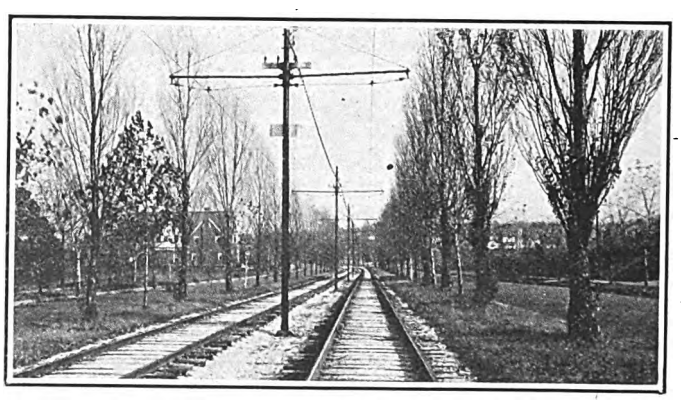
An Electric Pavement Roller, Equipped with Cable Reel

The concrete mixers in use are the Drake type fed by long chain conveyors. It is the experience of the United Railways that careful gaging of the materials placed alongside the tracks for concreting will insure a satisfactory quality, and the cost of handling is much lower than with other types of machines.

A special grout mixing car is used in mixing grout for paving filler. The completed pavements are rolled with a 5-ton roller operated by a 35-hp. railway motor. Power is supplied to the roller through a cable, the slack of which is taken up with a mine reel mounted at one end of the roller. One advantage of electric operation is that a licensed engineer is not required.

Placing of Concrete Materials

Work trains which can be used for hauling materials in bulk are plainly marked as to capacity. Blueprints which will show the capacity of the cars for various heights of crown are furnished all employees who are required to distribute materials. These prints also show the height of sideboards which will give the designated level load capacity for each car and the quantity of materials required for a large number of types of track ditches. By their use, practically all calculations by the receivers on the job are eliminated.



A 5-Ft. Grass Strip on Each Side of Way Was Put in by Arrangement with the Subdividers

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The sand is unloaded first for concrete work. It is leveled off and gives a windrow of material ordinarily about six feet wide and about six inches deep. Broken stone is then placed on top of the sand and the pile is made reasonably uniform. After this a specified number of sacks of cement per unit of length are unloaded on top of the broken stone. Spacing rods about eight feet long are marked to indicate the proper distribution of cement, and the laborers are requird to dump one sack for each space indicated by this rod.

Energy Costs Reduced by Auxiliary Steam Plants

Two Steam Power Plants Operated by United Railways of St. Louis Take Peak Loads and Enable Company to Obtain Energy at Favorable Rate

IN ORDER to use hydro-electric power advantageously for railway purposes, the United Railways of St. Louis is operating two steam plants built in 1901 in combination with purchased energy derived from water and steam. The water power is obtained at a very attractive rate, but the load factor specified in the contract necessitates the use of these auxiliary plants to carry the peak during limited periods of the day. In addition, the ever-present possibility of low water and consequently restricted hydro-electric power makes it necessary to hold the steam plants in readiness to carry a portion of the load in the event of such a contingency. They are also available as stand-by plants in case of failure of either water or purchased steam power sources.

Before the company contracted to obtain hydro-electric energy from Keokuk, the United Railways had in operation three steam power plants of various capacities. Central station had a capacity of 12,000 kw. of direct current, Northern station had a capacity of 6,000 kw. direct current and 2,400 kw. alternating current and Hodiamont station had 3,150 kw. direct current and 3,600 kw. alternating current. During this period a contract with the Union Electric Company of St. Louis allowed the railway to draw on the power company's plants for a demand load of 18,000 kw. This was available at the system load factor, which was approximately 38 per cent.

When water power became available at an attractive price, the quantity which could be purchased was limited and the load factor demanded by the power company was considerably above that at which steam power was being obtained. The daily energy allowance under the contract was 295,000 kw.-hr., with a maximum demand allowance of 22,380 kw. This is approximately equivalent to a load factor of 55 per cent. As the purchased steam-generated energy was being obtained at the system load factor, 38 per cent, it would have been necessary to decrease the load factor on this steam service in order to take advantage of the available hydro power. This, obviously, would have seriously increased the cost of energy from the steam power system, even had this been available.

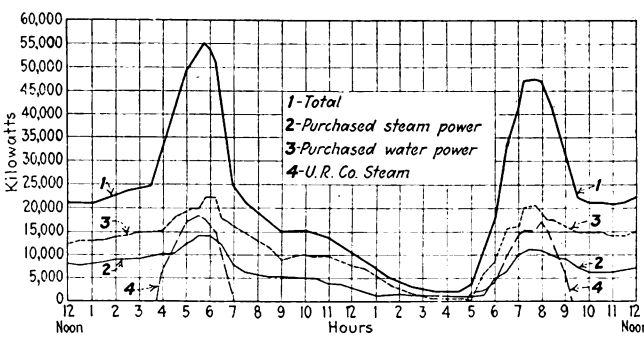
Two of the existing steam plants operated by the railway company were therefore kept in service to absorb the peak loads on the railway system. These two stations are now operated about seven hours a day, four during the morning rush and three during the evening. Hodiamont station was shut down and

QUANTITY USED AND COST PER KILOWATT-HOUR OF ENERGY FOR UNITED RAILWAYS OF ST. LOUIS, YEAR 1923

	Total Kilowatt-Hours	Cents per Kilowatt-Hour
Energy generated in company's steam plants	25,391,646	1.520
Steam-generated energy purchased	48,448,800	1.355
Hydro-electric energy purchased	108,894,302	0.697
Total for year	182,734,748	0.899
Average cost at direct-current switchboard	.....	1.189

one 1,200-kw. alternator was moved from there to Northern. Since the locations of the two operating power plants were advantageous for use as distributing points, two 2,000-kw. rotaries were put into Central station and two 1,000-kw. units were put into Northern station. Additional new transformer and rotary converter equipment was installed at various points on the system so as to make available the new 13,200-volt water power.

This was the condition of the power supply system of the property when it was recently decided to install additional substation capacity to carry the load created by the operation of the new cars. Five new automatic substations were recently put in service. These were described in detail in last week's issue of this paper. Although the voltage regulation had been satisfactory in the districts in which the new stations were located, their installation was required primarily to relieve



Daily Load Curve Shows Effect of United Railways' Steam Plants in Reducing Peak for Purchased Energy

overloaded adjacent stations. Their use has increased the voltage in the district to some extent. In addition the greater number of distributing points has permitted the release of approximately 125,000 lb. of copper feeder wire, which was taken down. This wire is being used in other districts to reduce line losses and improve voltage conditions where long direct-current transmission is required and where there is not enough load to justify the erection of additional stations in more advantageous locations. Furthermore, it is expensive to obtain a convenient source of alternating-current power for such stations.

The cost of energy from the two steam stations now operated by the railway company is considerably higher than that of purchased energy from steam, charging only operating and maintenance costs. It is believed, however, that in carrying a portion of the peak load and thereby improving the power factor for purchased energy, their use reduces the total cost of energy appreciably, by making it possible to take full advantage of low-priced water power. Their use as stand-by plants for emergencies also gives them an additional value.

The load which is carried by the three sources and the comparative costs of energy are given in the accompanying table for the year 1923.

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Planning Relief for the Pedestrian*

Traffic Relief Is Considered from the Standpoint that It Is the Pedestrian for Whom the Transportation Systems Are Made Necessary—Various Means of Increasing Street Capacity Such as Safety Islands, Loading Platforms, Two-Level Streets and Building Arcades Are Discussed

By Hugh E. Young
Consulting Engineer, Chicago, Ill.

PEDESTRIAN traffic should be analyzed and treated as an integral part of the complete traffic scheme. It is not a by-product of transportation, but is the enabling means whereby the transportation systems are made useful and practicable. It is therefore of vital interest to the transportation lines that the pedestrian has a convenient and safe access to the terminals at the beginning and end of his journey. Pedestrians, by virtue of prior right, have first claim on the right-of-way of our thoroughfares.

In most cities the authorities are more particularly concerned with the regulation and control of vehicles moving and meanwhile let the pedestrian traffic take care of itself.

The widespread use of the automobile has a sinister aspect in the 15,000 persons killed on the highways of this country last year and the 1,700,000 injured. Our thoroughfares have practically become the right-of-way of the motorist. The pedestrian is left to shift for himself at street crossings. In Chicago and environs 720 persons were killed last year, and in New York 1,000 were killed.

If the railroads had killed 720 persons in Chicago last year, they would have been forced to elevate their

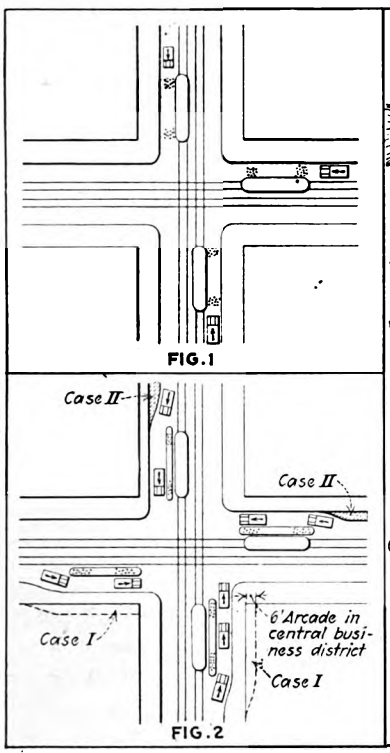

FIG. 1 FIG. 2

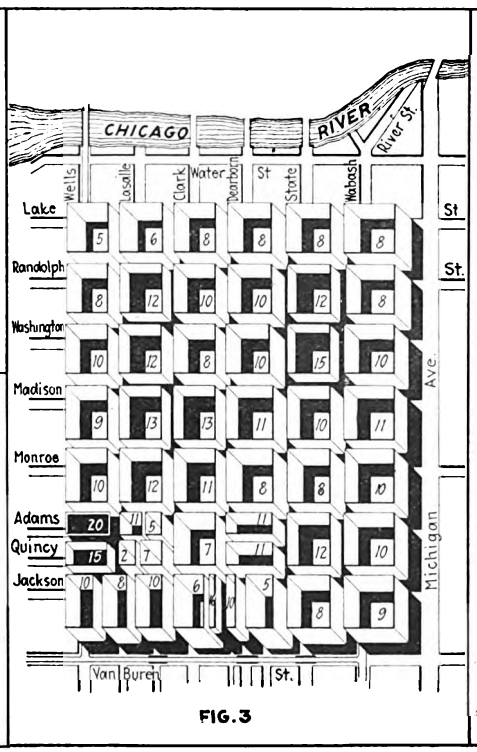

FIG. 3

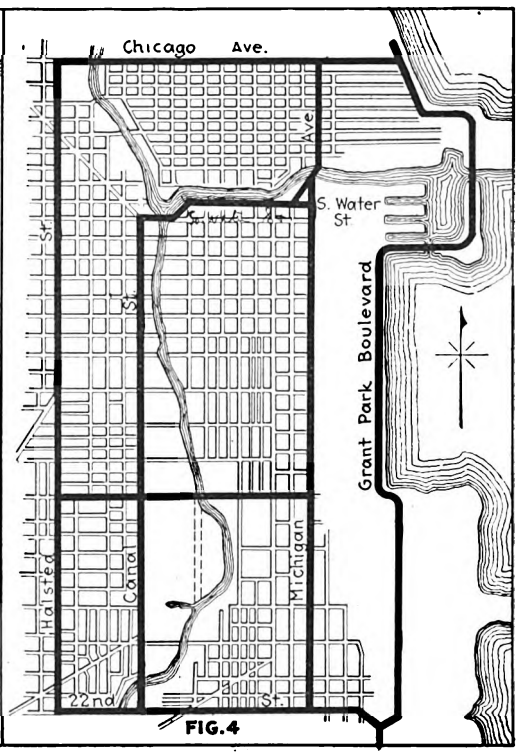

FIG. 4

The Increasing Intensity of Congestion Is Due Largely to Concentration of Buildings in a Small District

Fig. 1—Present conditions at street intersections, showing how traffic is blocked by loading street cars.

Fig. 2—Proposed widening of roadway at intersection to provide space for loading platform. (I) Maintaining full width of walk. (II) Utilizing space between walk and curb.

Fig. 3—The average height of buildings in the Loop at the present time compared with the height allowed by ordinance. The black outlines show the present average height by blocks, while the light outlines show the height limit, 264 ft. Figures indicate the present average number of stories.

Fig. 4—The Chicago Plan provides for wide quadrangle streets permitting through vehicle circulation outside the congested Loop District.

than with the rights and conveniences of the pedestrian. The 10 per cent of our population in vehicles has created our traffic congestion problem, as a result of which millions of people are inconvenienced and endangered every day on our streets and highways. The principle now followed is to keep the vehicle traffic tracks or be banished from the city. Already the city has caused the railroads to spend $100,000,000 in elevating their tracks in order to avoid grade crossings, but little attention is paid to the casualty list resulting from the 260,000 motor vehicles loosened on our streets without schedules, without right of way, without semaphore signals.

Figures for the casualties caused by automotive ve-

*Abstract of a paper presented at the convocation of the Western Society of Engineers, Chicago, Ill., Feb. 6-7, 1924.

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hicles of various kinds, in Chicago, have been published in various reports. Because the truck, bus and cab are used more intensively than the private automobile, a correction should be made, based on the hourly use and flexibility of each class of vehicle. Giving the cab a factor of 100, the bus 70, the truck 50, and the automobile 30, and applying these corrective factors, we derive the following results:

Type of Vehicle	Number of Cars	Number of Cars X Factor	Number of Vehicles per Death
Automobile	234,000	70,200	184
Truck	45,000	22,500	153
Taxicab	5,500	5,500	52
Bus	230	161	54

A daily pedestrian traffic movement of approximately 10,000,000 takes place in Chicago. Of these about 3,000,000 are to, from and in the central business district, and about 7,000,000 are to and from the manufacturing and industrial section outside the central business district, and between the home and local factory, store, mill, or other place of employment. The pedestrian usually finds it necessary on his trip to cross streets and perhaps a railroad right-of-way, and to dodge street cars and motor vehicles before boarding the vehicle in which he rides to his destination.

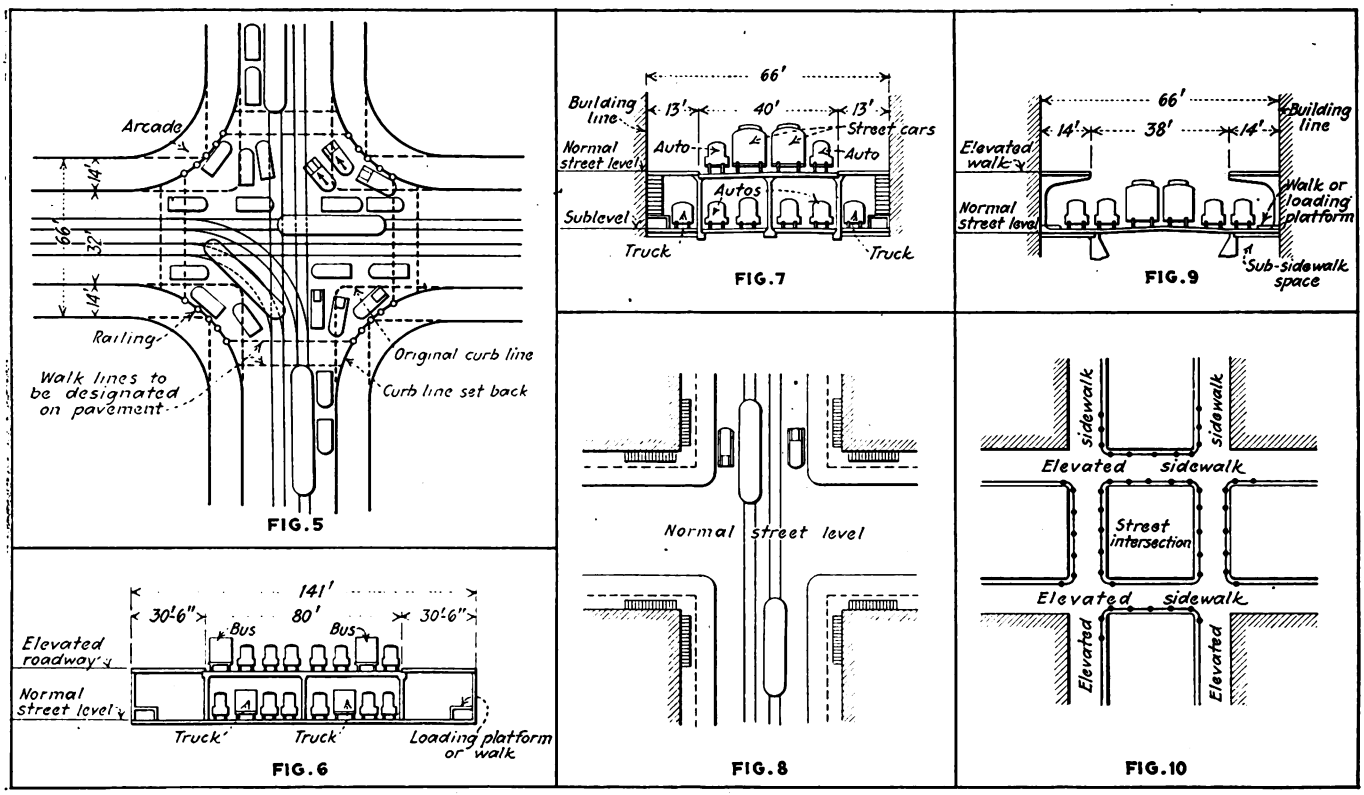
Adequate Safety Islands and Loading Platforms Practical

The most practical and economical means of protecting and directing pedestrians at loading and unloading points in business districts where subways or elevated passenger bridges are not practicable is adequate provision for loading platforms in the streets, supplemented by safety islands opposite such loading platforms. Such loading platforms and islands require lighting and maintenance, but this provision is as logical, consistent and important as the other items for which the taxpayers' money is expended.

Islands and platforms will require additional roadway space at these points. This can be obtained by using the sidewalk space when available, otherwise by condemning property opposite the area affected. This plan is shown in Figs. 1 and 2. The feature of loading platforms and safety islands is used quite extensively in many American cities, but in general provision is not made for maintaining the full width of roadway.

The main cause of congestion in the Loop District of Chicago is the concentration of enormous business in a small area, housed in a comparatively few blocks in buildings of great height and fed by all classes of transportation. We have an average of ten floors over the entire area. Fig. 3 shows the average height of buildings in each block in the most congested district in the Loop, also the height limit to which each block can be constructed in accordance with the building ordinance. This development, of course, would seem impracticable because it is doubtful that the means of transportation, now inadequate, could be doubled to meet the additional traffic that would be developed. The present average height of buildings in the Loop District is ten stories, and even with subways the present street facilities would be inadequate to handle the traffic.

Pedestrian traffic counts made in 1923 by Major R. F.



Some of the Plans for Separating Pedestrian and Vehicle Traffic

Fig. 5—This plan for relieving congestion at intersections provides for the setback of the curb and marked walkway lines for pedestrian crossings.

Fig. 6—A cross-section of the present two-level street on Michigan Avenue north of the Chicago River.

Fig. 7—Cross-section of a 66-ft. two-level street, with second roadway beneath the surface.

Fig. 8—Plan of the upper or surface level of the two-level street shown in Fig. 7.

Fig. 9—Cross-section showing arrangement of elevated sidewalks.

Fig. 10—Plan of elevated sidewalks shown in Fig. 9.

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Kelker, Jr., chief engineer for the committee on local transportation of the City Council, showed that there were forty-one buildings for each of which more than 4,000 people passed out in six hours. These counts showed an average movement of 22,100 persons every fifteen minutes, with a maximum of 38,140 persons for each fifteen-minute period during the rush hours.

The intensity of pedestrian traffic is confined largely to the central business district and densely built up sub-centers. In Chicago 1,000,000 people travel to the Loop and back again daily. Nearly three-quarters of a million people land on the downtown street systems in a space of about two hours in the morning and rush away again at the close of the working day in an even shorter time. Streets of the Loop, the great clearing house for more than 3,000,000 people, are jammed with pedestrians all day long—3,000,000 pedestrian trips are made every day into, away from and between the large buildings of the Loop.

Taking the street cars off the streets and putting them into subways would not entirely relieve the traffic hazard from the standpoint of the pedestrian. It would help, no doubt, but after all the street cars carry 74 per cent of the passengers and only form about 10 per cent of the number of vehicles in the Loop.

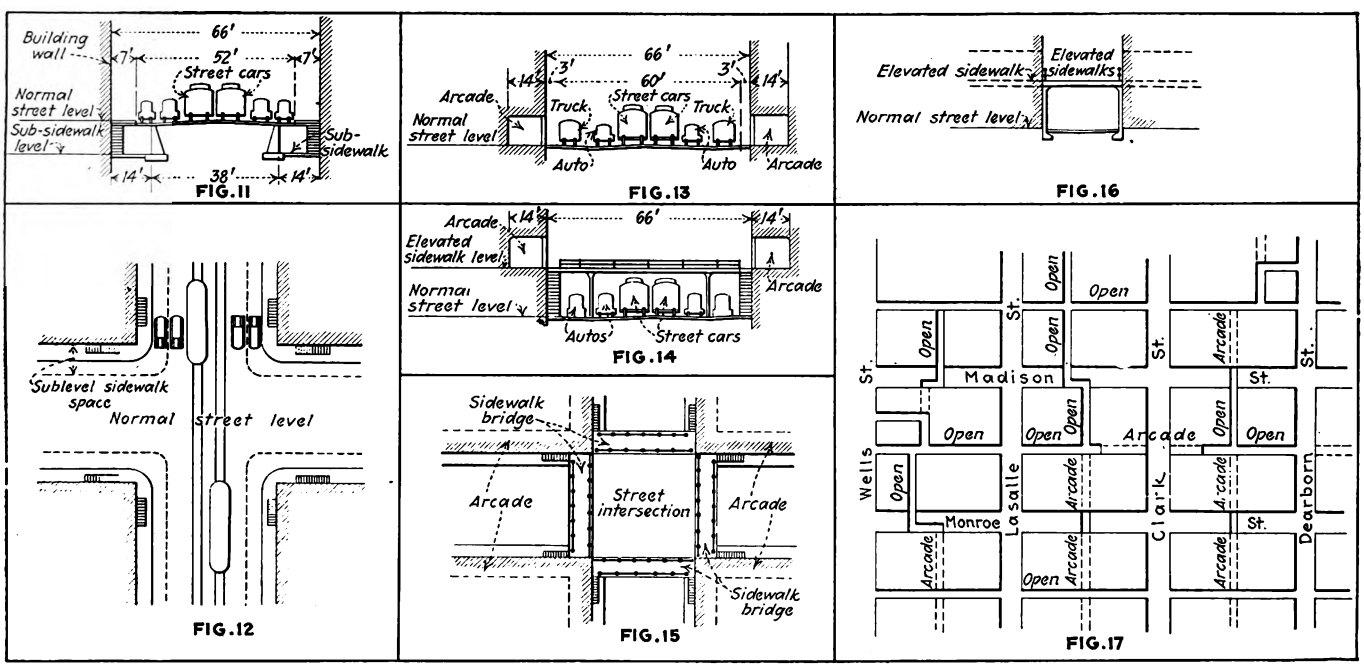
The various schemes to facilitate the movement of traffic and the reduction of danger to pedestrians may be divided into three groups. The first includes improvement in present traffic facilities; the second deals with general improvement to the city as a whole; the third covers special developments dealing with particular locations such as the Loop District, which represents only one-quarter of a square mile or only one eight-hundredth of the city's area.

Group No. 1 includes improvements which could be put into effect at once without waiting for the construction of major projects. These would relieve to a limited extent the rapidly increasing street congestion. Their success will depend upon the degree with which the traffic regulations are enforced. Among the temporary expedients which would give some measure of relief are:

1. Prohibiting parking of vehicles on car line streets.
2. Safety loading spaces at street car and bus stops.
3. Traffic in the Loop District should be governed by the movement of pedestrians instead of vehicles, even though this increases vehicular congestion.
4. Signals maintained and operated by the city should be provided at all important street crossings.
5. Through routing all classes of vehicular traffic as well as street cars. Cars and buses that cannot be through-routed should be turned back at the edge of the congested district.
6. The quadrangle streets of the Chicago Plan provide wide thoroughfares outside the Loop District to avoid excessive right and left-hand turns in the Loop (Fig. 4).
7. Streets should be marked with lanes for pedestrian traffic. A "Through Street" stop signal should be placed on all through street crossings to warn and direct the pedestrian.

The improvements possible in Group 2, comprising those applying to the city as a whole, includes the following:

1. Construction of loading platforms lighted and maintained by the city at all principal corners, such as those shown in Figs. 1 and 2 and referred to previously.
2. Safety islands, lighted and maintained by the city, at complicated street intersections, such as at a diagonal street.
3. Cutting back street corners to the lot line and arcading buildings at the corners for sidewalk pas-



Arcaded Sidewalks and Elevated Sidewalks in Alleys Are Means of Increasing Street Capacity

Fig. 11—Cross-section of street with sidewalks beneath the street level.
Fig. 12—Plan of street with normal and subway sidewalks.
Fig. 13—Cross-section of street showing building arcades on the normal street level.
Fig. 14—Cross-section of street showing arcades on elevated level.
Fig. 15—Plan showing arrangement of arcades on elevated level.
Fig. 16—Cross-section showing elevated sidewalk in alley.
Fig. 17—Plan showing location of alleys in one section of the Loop District, with elevated sidewalks partly in arcades.

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sages. A street crossing at some distance back from the corner would enable pedestrians to pass without interference from right and left-hand turning vehicles (Fig. 5).

4. Construction of two-level streets on important truck thoroughfares in the congested area (Fig. 6).

Group No. 3 includes various special developments for the relief of congestion within the Loop area. It comprises many schemes, each of which has certain advantages and disadvantages. Some of these plans are given briefly below.

System of Two-Level Streets

A comprehensive system of two-level streets throughout the entire Loop District has been proposed, with the lower level depressed beneath the present surface. This plan, shown in Figs. 7 and 8, has a number of advantages, chief among which are the following:

Local vehicle traffic could use the lower level, thus facilitating through automobile and street car traffic on the upper or normal street level. Business property would have frontage on both levels, so that all trucking to buildings in the Loop could be handled on the lower level, thus giving convenient access to railroad and boat freight terminals or delivery stations. Automobiles could be parked on the lower level along the building fronts, if desired. The street capacity, of course, would be doubled by having two levels.

The principal disadvantages are: The two-level development would require radical changes in existing building arrangements. The lower level streets would require an elaborate ventilating system to eliminate the carbon monoxide danger. Pedestrian traffic would not be materially improved. A rebuilding of the utilities in the streets probably would be required. The high cost naturally is a disadvantage.

Two Levels on Selected Streets

The corollary of the last plan would be the selection of certain north-and-south and east-and-west streets for the two-level plan, supplemented with elevated sidewalks on the remaining thoroughfares. By this means the automobile and pedestrian traffic could be separated on the two-level streets from commercial vehicle and street car traffic. The streets on which the two-level structures would be placed would have the advantages previously cited for two-level streets.

The objections would include all those mentioned for the more comprehensive plan, and also the two-level streets in connection with elevated sidewalks would lack accessibility unless side ramps were provided, which would take space and would require extensive condemnation of property.

Elevated Sidewalks

A comprehensive system of elevated sidewalks, as shown in Figs. 9 and 10, would give the pedestrian a free way for travel in the entire Loop District, and would permit the present sidewalk space on the normal street level to be used for roadway purposes. The traffic capacity of the street would thus be more than doubled.

The main objection to the elevated sidewalk is that it destroys the utility of the existing building arrangements. Stairways at frequent intervals, and bridges over the street intersections, would be required. The varying height of the floor lines of adjacent buildings makes it difficult to construct a sidewalk to fit the present buildings without the use of stairs. An objection of vital importance in Chicago is the obstruction offered to the construction of such a system of sidewalks by the present elevated railroad system.

Sub-Sidewalks

A somewhat similar arrangement could be had by placing the sidewalks beneath the present street level, as shown in Figs. 11 and 12. This would give a free sidewalk space for pedestrians independent of other traffic. The Loop buildings could have show windows on both floors, thus increasing the display space. Cutting down the width of the normal street-level sidewalk to 7 ft. would provide for an additional line of traffic in each direction. This would more than double the capacity of the street for vehicular traffic. Stairways at street intersections would give pedestrians access to the street level, as well as to the basement floors of all Loop buildings. The sub-sidewalks would provide protection from the elements, and would give convenient access to any proposed subway system.

On the other hand, the construction of passageways under the street intersections would be difficult and expensive on account of the present utilities in the street. There would be difficulty in the lighting and draining, and additional police protection would be required. The removal of the space now occupied by buildings beneath the sidewalk would be necessary.

Street Car Subways

Street car subways would increase the schedule speeds possible with the cars, would reduce traffic congestion to the extent that it is caused by the street cars on the surface of the street and would remove the hazard of loading passengers on the street; but it would still expose the pedestrian to the hazard of automotive surface vehicles.

Building Arcades

Arcades of the buildings on the present street level are shown in Fig. 13. This arrangement would allow the existing sidewalks to be used for roadway space, increasing the capacity of the street. Pedestrians would be protected from the elements, which would be of advantage with the additional window display that should be provided for the buildings. The area under the present sidewalks can be covered with reinforced concrete slabs to support the pavement, using the space on each side of the street for a public utility gallery.

This construction, however, presents a series of legal, financial and construction problems and it does not provide any improvement in traffic conditions at the street intersections.

Arcades on the second floor level, Fig. 14, should have all the advantages of the ground level arcades, and in addition should be made to serve as elevated sidewalks by the construction of bridges over the streets. They have the same disadvantages as arcades on the first floor, and in addition there is lack of accessibility. The variation in height of the second floors of the buildings presents a difficult construction problem. The legal and financial objections also hold.

Elevated Sidewalks in Alleys

In Chicago there is a quite extensive system of alleys, so that elevated sidewalks might be installed in some cases in them. This construction, shown in Fig. 16, would give all the advantages of elevated sidewalks on

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the street with respect to the movement of pedestrians. It would also reduce the number of extensive structural changes, as compared with second floor arcades and elevated sidewalks on the streets. It would create an independent means of pedestrian circulation at the second-floor level throughout the Loop.

There would be a number of disadvantages and limitations to this plan. It would require bridges over street and alley lines, as shown in Fig. 17. The blocks in the Loop District usually have alleys in one direction only, and these are not all in straight alignment. In blocks where alleys do not exist, it would be necessary to create arcades through the buildings. The roofing over the alleys would form a serious obstacle in the fighting of fires in adjacent buildings.

It is not the development of any one system of transportation alone that will best serve the pedestrian in his journey from home to place of employment and back again. It is the harmonious combination of the automobile bus, street car, elevated car and steam road transportation system which is necessary for the solution of the Chicago Loop traffic problem.

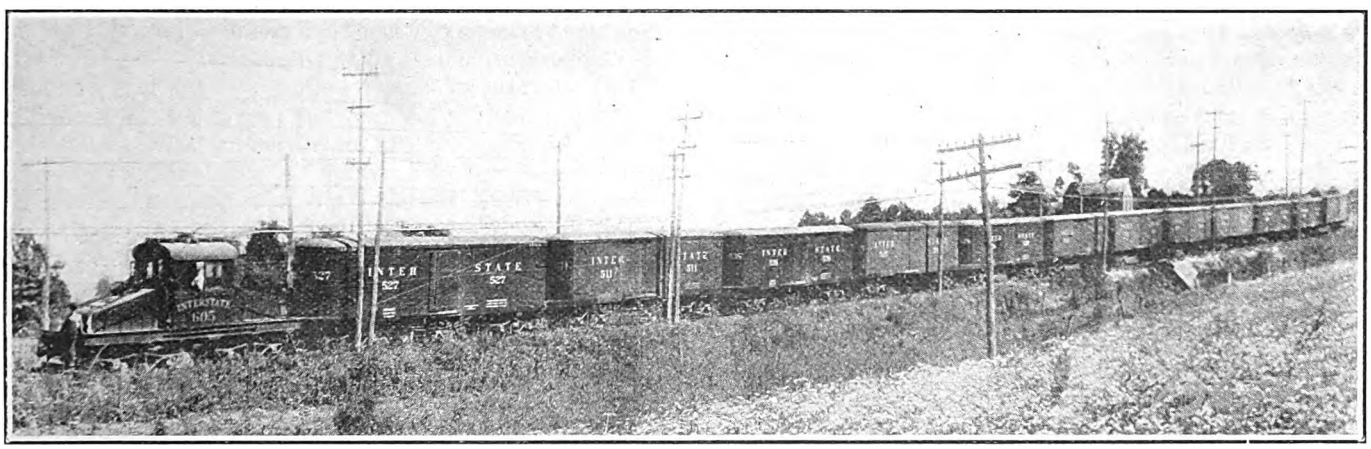
The problem of providing adequate means of transportation and safeguarding pedestrian traffic is acute. It is obvious that the problem in the Loop must be solved by the development of several traffic levels owing to the nature of the building development. It has been demonstrated by a very exhaustive study of local conditions and similar construction in other cities that a lasting street development in a vertical direction is practicable and is not an impossible engineering undertaking.

Progress in Interurban Freight in 1923

In Three Central States Material Additions to Net Revenues Have Been Made by Handling Freight—Over a Thousand Cars Now Used, and Daily Loadings Approximate 500 Carloads

By T. H. Stoffel

Railway Department, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.



A Twelve-Car Locomotive-Drawn Freight Train on the Interstate Public Service Company's Lines

THROUGH the handling of freight, the electric interurban railway is becoming an increasingly important factor in the life and prosperity of the communities and territory served. This is particularly true in the industrial section comprising the States of Indiana, Ohio and Michigan, which now boasts a network of interurbans aggregating more than 4,000 miles and serving practically every community of importance in that territory.

While the average interurban line was not designed physically for the handling of freight, it is readily adaptable to the transportation of certain classes of both carload and less-than-carload commodities, of which there is an enormous tonnage available in the territory mentioned.

For many years the freight service rendered by interurban lines was confined to the transportation of small packages, etc., which could be taken care of in the baggage compartments of passenger cars. This was undertaken more as an accommodation to shippers than for the revenue involved. The continual demands of the public, however, made it necessary gradually to provide and add special equipment and facilities to take care of freight tonnage, and the development of this phase of traffic almost automatically reached a common carrier basis.

It is only in recent years that electric railways have made any attempt to analyze their freight service from an income and cost standpoint. It is generally conceded that any allocation between freight and passenger business, made with a degree of fairness, indicates that the transportation of freight is highly profitable for electric lines. Investigation has invariably developed that the net returns from freight operation, when properly and economically conducted, are much greater than from passenger traffic, based on the additional investment required for this service, and which is comparatively small, inasmuch as the major facilities necessary to conduct a freight business, such as roadway, track, power plant, executive and operating organizations, etc., already exist. Of course this statement is predicated on the fact that the railway is already fully equipped

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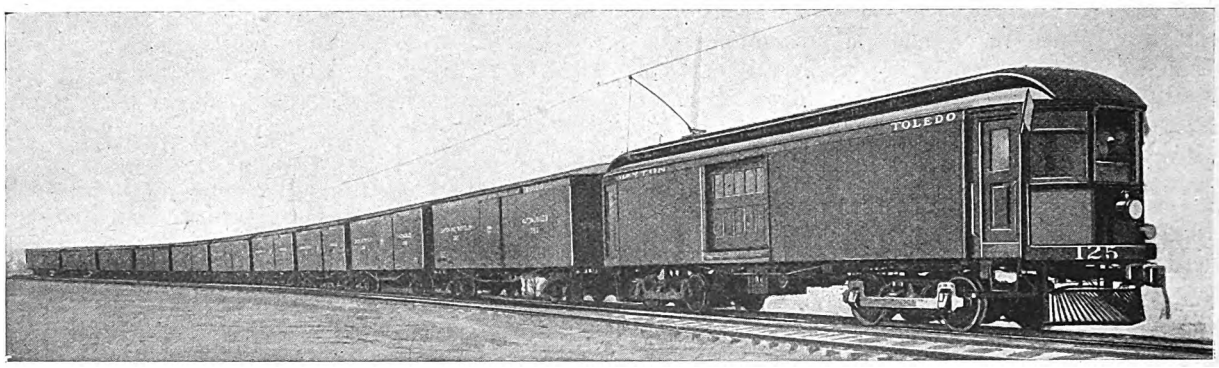


On the Dayton & Troy Line "Baggage Car" Locomotives Are Used in Freight Service

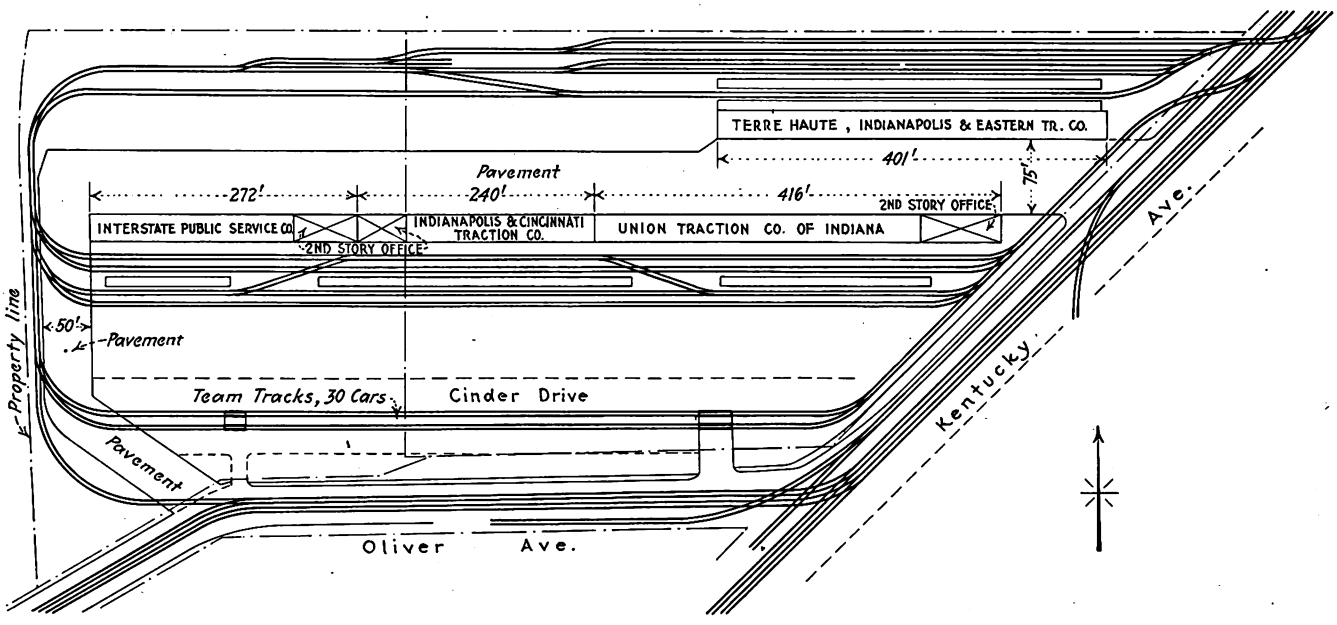
for passenger business and has a complete operating organization for that service.

Much progress has been made in the last year or two in the development of freight operation, until at the present time approximately 275 motor box or express cars, 700 trail box cars, a score of electric locomotives, 100 stock cars and many cars of other types are employed in freight service in the territory under discussion. The average daily loading aproximates 500 cars, most of which are moved at night, when pasenger service is curtailed or discontinued, thus making unnecessary any additional investment in power machinery, and at the same time increasing the load factor of existing power facilities and tracks. Power plants and rails which were previously practically idle between 10 p.m. and 6. a.m. are now kept busy twenty-four hours of the day in revenue producing service. Freight trains of from four to eight or ten cars are the rule rather than the exception, and on some roads, notably the Detroit United Lines and the Interstate Public Service Company, trains of from ten to twenty cars each are hauled with electric locomotives. Thus the added benefits are secured of lower train labor and power costs per car or per ton-mile resulting from the handling of heavier train units, and at the same time movement over the road is expedited, since freight and passenger trains do not conflict.

The development and handling of this great tonnage have brought up many problems new to interurban operation. Such, for example, are the making and publishing of through joint rates and divisions, and necessary rules and regulations governing them; the methods of auditing interline accounts; establishing of through operating routes; the interchange of equipment in joint service; standardization of rolling stock for through interline movement, etc. Much credit is due the traffic, auditing, and mechanical associations affiliated with the Central Electric Railway Association for the progress which has been made in arriving at satisfactory solutions of these problems.

Notwithstanding the large tonnage handled during the past year or two by electric lines in the central territory, the rolling stock, terminals and other freight facilities have been wholly inadequate to take care of more than a fraction of the business available, and the movement necessarily has been confined largely to less-than-carload or merchandise shipments.

This shortage of cars, together with the lack of team track facilities for loading, has prevented the securing of a vast amount of the more remunerative and desirable carload tonnage which is available. However, straight carload business has not been entirely neglected, as is attested by the hundreds of cars of such commodities as iron and steel articles, rubber tires, cement, building material, livestock, etc., that have been moved. While in most states the handling of livestock by interurban lines is prohibited by law, special legislation permits this in Indiana. As a result, the group of electric roads centering in Indianapolis handled 11,596 carloads of livestock to and from Indianapolis stock-



The New Union Freight Terminal at Indianapolis Will Have Warehouse and Track Capacity of 100 Cars

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yards during 1923, which was approximately 30 per cent of the total receipts at those yards.

Generally speaking, the character of the freight service to be had on interurban electric lines is far superior to that furnished by any other means of transportation. Trains for handling interline business have been so scheduled that shipments moving over from two to five or six different lines, and for destinations up to 300 or more miles, are available for delivery to consignees within forty-eight to sixty hours, which is frequently from two to ten days better than the service provided by steam roads, and in many cases is better than can be obtained from the American Railway Express at considerably higher rates.

The value of the service which can be rendered by electric interurban roads is emphasized by the fact that the Southeastern Express Company, operating over the steam roads of the South, has contracted with the Interstate Public Service Company for the handling of its express service into Indianapolis and for destinations beyond, via Louisville. This business formerly moved via other Ohio River crossings in connection with steam line service.

Many extensions in joint rate and traffic arrangements have recently been negotiated and put into effect among the Ohio-Indiana-Michigan electric lines, and through merchandise cars have been scheduled covering practically all important terminals in the territory. For example, overnight delivery of shipments is made between Canton, Akron, Cleveland, Ohio, and Toledo, Detroit, Lima and Fort Wayne; between Detroit and Grand Rapids, Kalamazoo and Jackson, Mich.; between Indianapolis and Louisville, Fort Wayne, South Bend, Dayton, Springfield and Terre Haute. Second-morning delivery is assured between Cleveland, Toledo, Detroit and Indianapolis, Springfield, Dayton, Columbus, Ohio, and between Louisville and South Bend, Ind. Third-morning delivery is given between Louisville and Detroit, Cleveland, Toledo, etc. These are merely a few of the joint operating schedules which have been put into effect and are maintained. Still further improvements are under way and will be made operative soon.

Undoubtedly more progress was made during the year 1923 than in any similar period. Several hundred cars have recently been added or are on order, and terminal warehouses and facilities have been enlarged and new ones constructed at important points. Probably the most notable terminal improvement in the country is that now under construction at Indianapolis at a cost of approximately $1,000,000. This terminal will be used jointly by the Terre Haute, Indianapolis & Eastern Traction Company, the Interstate Public Service Company, the Union Traction Company of Indiana and the Indianapolis & Cincinnati Traction Company. It is expected that the first units of this terminal as planned will be ready for service by April 1.

The immediate facilities at this terminal, as shown in the line drawing, will consist of the present T. H., I. & E. warehouse, which is about 400 ft. long and which will later be extended to double that length, and a warehouse 928 ft. long now nearing completion. To begin with, the terminal will have warehouse and transfer track capacity of approximately 100 cars at a single setting, and team track space for an additional fifty to sixty cars. Separate offices will be provided for each of the lines using the terminal. More space is available on the terminal property for another warehouse about 800 ft. long and also additional team tracks, which will be installed as the business develops. This new terminal will obviate delays to trucks and vehicles in delivering consignments for shipment, and will effect material economies and at the same time expedite movement in the interline transfer of freight.

With adequate terminal facilities and sufficient rolling stock to take care of the business, it is estimated that from three to four times the tonnage handled at present may be had by electric lines in the territory under discussion, with possibilities for still further development.

Telling the Railway Story to the Public in East St. Louis

BEING a firm believer in the value of newspaper space for winning public good will, W. H. Sawyer, president the East St. Louis Railway, has for several years been conducting a series of talks with his customers—the riding public—through this medium. The results accomplished have been so good that the company is now preparing a booklet for distribution to East St. Louis business men, local organizations and executives of other railways, illustrating samples of various types of newspaper advertising used during 1923. In a foreword Mr. Sawyer says: "I believe in newspaper advertising—hence this booklet to show by a few typical 'ads' how we used newspaper space in 1923.

"A few of our outstanding reasons for advertising are:

1. We believe it is our duty to our customers to keep them informed of what we have done, what we are doing, and what we are trying to do.
2. As a purely business proposition we should sell transportation, merchandise our wares, and the best way to do this is through the columns of the newspaper.
3. Our advertising has been most helpful in enlisting the loyalty and co-operation of my associates who have a just pride in both our endeavors and our accomplishments.

"Just one further thought—advertising is worse than useless unless backed up by actual performance. To inspire respect and confidence through advertising we must be wholly honest in our endeavors to give service—efficient, satisfactory service—to our customers."

The advertisements are run chiefly in the East St. Louis local daily paper. An insertion is made in each Sunday issue and several are run during the week. The contents of each insertion are made as simple and direct as possible. The company's policies, courtesy of trainmen, safety, desire for co-operation, cleanliness of cars and financial statements are the principal subjects. The space used is rarely very large and great care is taken to avoid anything spectacular.

An attempt is made to take part in all local events of general interest. Paid advertising space is frequently used for this purpose with the idea of identifying the company with local civic activities.

Among the terse comments made by Mr. Sawyer in the booklet are the following:

To promote public safety it is necessary to secure public co-operation—and the use of newspaper advertising is essential.

Courteous, helpful motormen and conductors plus good service properly advertised make appreciative satisfied customers.

Co-operating customers will commend courteous conductors—if you give them a chance.

Our customers are certainly entitled to complete financial data—also to honest explanations as to any delay in service.

These ads assist our customers in appreciating that a token dropped in the fare box pays for the service received and no more.

We believe that our customers should be kept posted on

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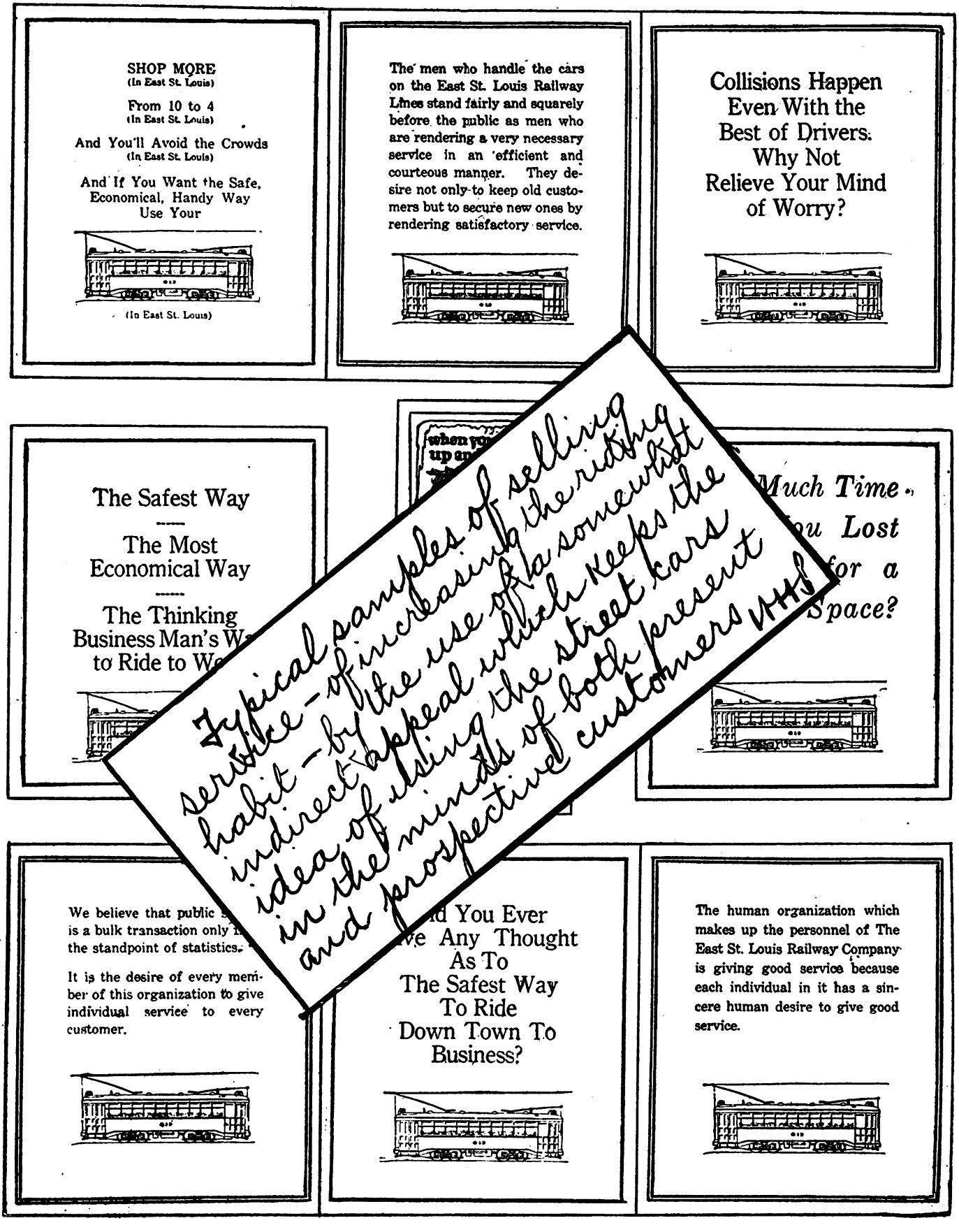
the facts concerning municipal ownership of transportation systems so they will not make the mistake other cities have made.

It is a part of our duty to give publicity to endeavors of a semi-public nature which are beneficial to our home community.

The interest of the company and the civic community are mutual and advertising that helps develop civic pride is mutually beneficial.

Holiday greetings give us an opportunity to tell our customers how we appreciate the way they have met our efforts to give good service.



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Association News & Discussions

Chicago Transportation Discussed by Western Society of Engineers

Relation of Various Elements in Traffic Problem Analyzed—Elevated and Subway Sidewalks, Elimination of Street Crossings for Pedestrians, Traffic Signals, the Motor Bus and Steam Suburban Traffic Discussed

LOCAL transportation in Chicago was the subject of the mid-winter convocation of the Western Society of Engineers, held in Chicago Feb. 6 and 7. The papers dealt with practically all phases that make up the traffic tangle in that city, including the private automobile, taxicab, pedestrian, street car, elevated lines, motor bus, and the steam suburban line.

Various suggested schemes were discussed for facilitating pedestrian traffic and safeguarding the pedestrian, both in the congested Loop area and the outlying business areas. Papers on design and construction costs for elevated sidewalks, by J. H. Sawyer, bridge designing engineer Bureau of Engineering, and T. A. Evans, designing engineer Board of Local Improvements, city of Chicago; private automobile traffic, by Z. C. Elkins, manager Chicago Motor Club; through streets, by E. S. Taylor, office manager Chicago Plan Commission; and synchronized signal control, by William G. Beard, safety director Yellow Cab Company, were abstracted in this paper, issue of Feb. 9. Various schemes for facilitating and protecting pedestrian movement were discussed in a paper by H. E. Young, consulting engineer, Chicago, abstracted elsewhere in this issue.

In the discussion it was stated that although the traffic control signals installed on Michigan Avenue had slightly slowed down the average time of a trip through the traffic controlled area in the non-rush period, it had materially expedited the movement of vehicles during the rush. It was also contended that the extension of this system to the remainder of the business area would be impracticable and would materially retard the movement of street cars even beyond the existing conditions.

Co-ordinating Bus and Trolley

Bus operation as a factor in local transportation was discussed by J. A. Emery of Ford, Bacon & Davis, consulting engineers. Mr. Emery spoke in place of John A. Ritchie, who was unable to be present. Mr. Emery stated that the American people were primarily interested in good service and were willing to pay for it. "The rate of fare," he said, "should be determined on the basis of the quality of service rendered, and the education of the public to this fact is the paramount issue in the solution of the transportation problem in all communities.

"The motor bus in the local transportation problem of large communities has a real opportunity for service. It can be operated where only very light traffic exists. Under general conditions the motor bus can be supported on a population of 250 per mile, whereas under present price conditions, a street railway would require at least 1,500 per mile for like conditions. Where it is operating over city boulevard and park systems, the double-deck bus creates a large proportion of its own business. Analysis of the business of the New York and Chicago coach lines has shown an estimated pleasure riding of 25 per cent of the total. For a totally motorized city service, however, it is not expected that the proportion of pleasure riding would be as large as this."

One phase of bus operation which has not received the attention which it warrants is the adaptability of the bus to a combination of local and express service on the same street, Mr. Emery stated. In addition, there was strong reason to believe that the bus could be combined with existing car service in some places, so as to give a combination of express and local service, the cars running express and the buses carrying passengers along the street between the express stops.

Still another important possibility of bus operation, Mr. Emery believed, is a graded service. Many people would be willing to pay a higher fare for an assured seat, more comfortable ride, or saving in time.

One problem connected with the operation of motor buses which Mr. Emery brought out, is that of determining the wear on pavements resulting from their operation. When the bus is required to pay this cost, a considerable advantage which it now enjoys over the street car will be eliminated.

Steam Railroad Suburban Transportation

The extent and scope of steam railroad suburban transportation in Chicago and its suburbs was treated in the report of a special committee of which F. E. Morrow, assistant chief engineer Chicago & Western Indiana Railroad, is chairman. This report traced the history of this form of transportation from its inception for the steam railroads handling suburban traffic in Chicago. After a review of the service furnished by each of these roads, the committee concludes that its greatest value is in those sections where the character and employment of the residents require rapid transit to the central part of the city, and that its growth depends largely on the growth of the communities which it serves. The service furnished is the truest type of rapid transit in the city. This is attained by having relatively few station stops along the line; motive power that is capable of high speed and roadbed that will sustain it; by providing tracks with few obstructions and no congestion, and by having at most only two downtown stations that are located within easy walking distance of the Loop.

Due to the competition from elevated and surface lines, which offer frequent service within the city moderately close to the Loop, combined with the growth of suburban communities, the steam railroad haul has constantly become longer. The steam suburban lines, except the Illinois Central, are not well suited to handle short-haul traffic, because such traffic would interfere with the speed at which the long-haul traffic could be handled, which would be a distinct loss to the suburban communities. In addition the districts of short-haul traffic are in most instances populated densely enough to support other forms of local transportation which afford more frequent service.

The Illinois Central, being favorably located and having a sufficient right-of-way to provide not only separate tracks for this service, but also local and express tracks, is enabled to provide both local and express service without interference with the two kinds of suburban service, and also without interference with its other railroad business.

C. H. Mottier, office engineer Illinois Central Railroad, outlined some of the details connected with the new Illinois Central suburban development. George W. Hand, assistant to the president Chicago & Northwestern Railroad, stated that suburban business should only utilize latent facilities available on a given property. The extent of this operation must, however, necessarily be limited and dictated by the primary consideration of providing adequate trunk-line service. Due to the high investment in terminals and right-of-way, and the extreme importance of providing for future expansion, he considered it highly impracticable to use steam railroad right-of-way for rapid transit service. Any permanent assignment of existing facilities to such purposes will usually be followed by the necessity of acquiring more right-of-way facilities to handle the pressing needs of increasing through business.

Extent of Chicago Transportation

A paper by Britton I. Budd, president Chicago Rapid Transit Company, making suggestions for future rapid transit development in Chicago, was read by E. J. Blair, assistant to the president. This paper is abstracted elsewhere in

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this issue. In the discussion, Mr. Blair said that the load factor of the elevated lines in Chicago is approximately 35 per cent, that is, the total number of passengers carried in twenty-four hours is 35 per cent of the number carried in one hour during the maximum peak, multiplied by 24.

C. V. Weston, consulting engineer Chicago Surface Lines, read a paper on the Surface Line traffic, which is abstracted elsewhere in this issue. R. F. Kelker, Jr., commented on this and some of the more important phases of the other papers which were read during the meeting. He illustrated the tremendous increase in riding habit and the demand for transportation in the United States, by pointing out that although the population had increased only 20 per cent in the twenty years 1900-1920, the ton-miles and passenger-miles on carriers had trebled. With a population increase rate of approximately 1 per cent per year, this vast increase in the demand for transportation had occurred.

Elimination of parking in the Loop area, he contended, would give a considerable measure of immediate relief from congestion. He commended Mr. Elkins for his broadminded stand on this subject, and approved the idea proposed by Mr. Elkins, of having a separate traffic commission with control of traffic throughout the city. Rigid traffic regulations must be instituted and enforced before any permanent improvement in the conditions in the business can be affected. Unless this is done, Mr. Kelker said, every improvement in the Loop will result in attracting an additional number of private cars into the business district, and the condition will thus again be aggravated.

Pedestrian accidents in the congested district, according to Mr. Kelker, are low in number compared with those in the outlying sections of the city.

Connections between the various lines of steam railroad suburban lines and a rapid transit system, at certain outlying points, was suggested as a means of relieving the congestion due to suburban traffic. A unified transportation system under unified management was held to be the only way successfully to settle Chicago's transportation requirements.

A tentative report including basic principles for solving the transportation problem was presented, so as to invite discussion. It is the intention to complete the report and include certain suggestions made at the meeting.

Difficulties Other than Physical in Transportation Relief

At the dinner Mayor Dever pointed out that the physical phases did not constitute the most important parts of the transportation problem, holding the financial and legal phases to be even more important and difficult of solution. Any plan must be submitted to a vote of the people. The difficulty in financing an extended system is that under existing law it is impossible to grant a franchise of sufficient duration to allow the development to be carried out with private funds. As the representative of the city's interests in the solution of the transportation problem, the Mayor said that there was no intention to confiscate the property of the existing security holders, but urged the advantage of an early solution, on the ground that if the situation were allowed to go unsettled until after the expiration of the franchises in 1927, securities of the traction lines would become seriously depreciated in value.

Rapid Transit and Interurban Development in Chicago*

By Britton I. Budd
President Chicago Rapid Transit Company

THE existing problem in the development of rapid transit and interurban transportation in Chicago and surrounding territory is largely comprised in the augmentation of present facilities. Rapid transit systems for the large cities of the world did not spring full-fledged into existence, but rather are the product or outgrowth of attempts to supply service along certain local routes which, having been later inter-related or joined, constitute the system.

Chicago alone comes nearest to providing the negative to this statement, in that its present system of rapid transit, consisting of elevated lines, was very largely constructed within a period of seven years. Between 1888 and 1895 there were built the South Side, the Chicago & Oak Park and the Metropolitan railways. Subsequently, in 1900, the Northwestern Elevated came into operation, with its Ravenswood branch as a later extension in 1907, while on the south side the Englewood, Stock Yards and Kenwood branches were built in 1906 and 1907. On the west side the Metropolitan Elevated has from time to time increased its length of operated routes on the Garfield Park branch and Douglas Park branch.

The problem in the development of interurban transportation for the larger territory within a radius of 50 to 100 miles from the center of Chicago is comprised in the addition of suitable terminal facilities, by means of which the operation can be brought to the highest degree of usefulness.

The history of those interurban lines in the Chicago territory, having only limited terminal facilities in the urban district, has not been one of large success from the standpoint of usefulness to the population served. The requirements are principally summed up in the outstanding necessity of adequate interconnection with the rapid transit lines of the urban district.

The value of interurban service radiating from Chicago has not been fully realized, nor has this valuable means of intercommunication been encouraged as it has in most cities in the United States.

Points of Congestion on Elevated

An understanding of the relative density of travel on the various divisions of the elevated systems can best be obtained by a comparison of the number of passengers carried per mile of track. The number of passengers carried per mile of single track is now approximately as follows: South Side, 1,102,000; Metropolitan, 864,000; Northwestern, 742,000, and Oak Park, 632,000. The Union Loop has an average of more than 11,000,000 passengers per mile of single track, while the system as a whole averages 1,106,000.

It is possible to state certainly that either subway or elevated lines are capable of average maximum speeds in express service of 20 to 21 miles per hour. The tendency in subway operation, where train movement must be controlled by a complete system of signals, is to increase the length of trains to ten or twelve cars. This has the effect of reducing the number of trains per hour, so that for a traffic loading of 35,000 to 45,000 passengers per mile of single track per hour the corresponding car movement is 360 to 380 cars per hour. This tendency makes itself manifest in the lengthening of the interval between trains.

In elevated movements, express service, the tendency has been to average about seven cars per train for maximum service under the operating conditions that prevail on the structure, where light and sight permit greater ease of movement. The result has been to obtain under maximum service conditions movement of 400 to 420 cars per hour.

Trend of Future Developments in Rapid Transit

So many plans have been put forward for the development of a comprehensive rapid transit system in Chicago that to present another here, giving exact location of streets, lines and routes, would be superfluous. Suffice it to say that rational extension of the system will undoubtedly be carried out by the building of additional lines, one at a time, as necessity and experience suggest and as financial limitations permit.

The general plan of the Chicago Traction and Subway Commission of 1916, or the plan of the All Chicago Council, both are general in character and cover extensive additions to the present system. It is not only difficult but impossible to plan all the actual routes now that may be required in this city within the next twenty or thirty years, but it is generally agreed that the initial step in Chicago should be the building of a rapid transit subway 4 miles in length on State Street, connecting with the South Side Elevated at Eighteenth Street and running thence north to Lincoln Park, thence west on North Avenue to a connection with the Northwestern Elevated Railroad. The extent of a two-track or four-track construction in this subway

*Abstract of paper presented before convocation of Western Society of Engineers, Feb. 6 and 7, 1924, Chicago. In addition to matter printed here, Mr. Budd's paper, intended primarily for local people, included a review of the extent of the present rapid transit system in Chicago, its relation to the present distribution of population, proportion of traffic handled by elevated and surface lines and comparison of traffic with that on Brooklyn railway lines.

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can be proportioned according to the general requirements of the situation. This will quickly relieve the existing congestion in the downtown district and prove as well a great benefit to the system as a whole and increase the rapid transit capacity during maximum hours 125 per cent. The initial subway could then be followed as soon as practicable with other short subways through the downtown district, located so as best to serve the situation as a whole.

It has been estimated that the population of Chicago in 1950 will be 5,000,000 people and the local passenger traffic not less than 2,000,000,000 annual rides. This is entirely within the range of probabilities, and it is almost certain that these traffic figures will be exceeded.

Relation of Subways to Rapid Transit

On account of the prohibitive cost of subway construction, comparatively little of Chicago's rapid transit system should be built as subway mileage. It is true that in the downtown district, where it is vital that the streets be left free for the use of pedestrians and for vehicular traffic and where the Chicago River acts as a barrier which must be passed on two sides of the district, subways for short distances are unavoidable.

It is equally true that with the application of the service-at-cost principle in determination of the future rates of fare on rapid transit lines in this city large additions and extensions to the existing system will have to be installed at a minimum cost. Otherwise, rapid transit in the future will not only be burdened with an excessive fare but the rate of extension of the system itself will be impeded.

The general function of the rapid transit lines should be the movement at maximum speed of mass traffic, especially over the longer transportation routes, where any other means will not suffice. All other means of local transportation within the city can be so related to the rapid transit system as to provide the maximum convenience to the traveling public, especially for distances of comparatively short haul and along routes wherein rapid transit lines may not be provided.

It is not necessary to dwell upon the importance of rapid transit and all other proper forms of local transportation for a city of this size, as that matter will be conceded without contention, but it is important to stress the fact that rapid transit is especially necessary to provide speedy communication not only between the business and residential districts of the city itself but between those districts and the suburban or more remote portions of the corporate area.

In a broader sense the extension of rapid transit to the metropolitan district of Chicago, within a radius of 50 to 100 miles, would mean the development of all suburban and interurban routes within the metropolitan area and the provision of adequate terminal facilities for their operation within the urban district, and especially the relation of those facilities to the rapid transit facilities of the urban district itself.

Development of Chicago Transportation*

Co-ordination of All Transportation Facilities Into Single Operating Unit Urged—North and South Subway for Street Cars Recommended, as Well as Two East and West Street Car Subways Planned Heretofore—Idea Given of Enormous Traffic Handled

By Charles V. Weston
Consulting Engineer Chicago Surface Lines

EVERY growing community has its transportation problem, which is never finally and permanently solved. It is a continuing problem and is always most acute in major communities where the normal increase in population and riding habit is so rapid that it frequently taxes the ability of the community and its public utility companies to keep abreast of the demands of service.

There are in many instances local conditions which have, in the development of a community, produced constricted, over-populated areas which naturally become transportation terminals or common centers into which a large proportion of all the traffic of the community flows. Ultimately there is created within those areas an intensified congestion which strangles the movement of all classes of vehicular traffic almost to the point of complete stagnation.

The effect of retardation of the movement of street cars, or any scheduled transportation within those over-congested areas, extends to the entire service rendered. Irrespective of however good the service may be as a whole, its effectiveness is generally measured by inconveniences to the public experienced at points where the service is unavoidably at its worst and where, in order to relieve the situation, heroic measures in the way of producing additional facilities must be taken. Undeniably that is the situation which exists in the city of Chicago today in respect to its local transportation.

What is the problem here under discussion? It is first of all a transportation problem in the broadest sense of the word, and it involves co-ordinating all the various transportation facilities, that are susceptible of co-ordination, into a single operating unit so that each element of the whole may perform its function in the most efficient and economical manner, to the end that the riding public may be transported at the lowest cost and in the shortest possible time.

In the long run there is nothing but grief for the public and every one else with two or three competing transportation systems in the same city. The underlying principle of the most effective and economical operation of urban transportation is the establishment of a limited number of long-haul trunk lines served by numerous short-haul collecting and distributing lateral lines provided by a single transportation agency.

The most acute situation in Chicago's transportation problem, requiring attention at the earliest moment possible, is the overcongestion of roadways within the Loop or downtown business district. This Loop District situation seems to be looked upon by the public generally and by many newspaper writers as being the all-important feature of the traction problem in this city, believing that after relief of some kind becomes effective there the rest will be easy. As a matter of fact, this Loop District problem, although knotty and urgent, constitutes only a relatively small part of the whole problem, because, speaking with particular reference to the Chicago Surface Lines, that utility is serving many important and widely separated business and industrial centers, each of which, having distinctive features, constitutes a special element of the whole problem.

Suggestions for Relief

The immediate relief of the Loop District situation will be simple enough if all the interested factors can be brought to work in harmony and an earnest effort is made to do the things that are obviously necessary—namely:

1. Build subways for surface cars to be used for multiple-unit operation when practicable. Two such subways are needed from the west side of the city extending eastward under the Loop District to and under Grant Park.

2. Build north and south subways for surface car operation. If one subway were built in State Street, that part of it from some point well north of the river to a point south of Roosevelt Road should have four tracks, two of which might be assigned to elevated railroad train operation which would afford a much needed opportunity to develop greater use of outlying main-line track capacity. To meet the near future demand for service east of State Street, which is inevitable and will be due to the development of business in the area between State Street and the lake, there should be constructed, for surface car operation, a subway extending from some point south of Roosevelt Road in Indiana Avenue, Michigan Avenue and under Grant Park—connecting with the proposed east and west subways to terminate under Grant Park—and ultimately to be extended northward under the Chicago River and as far north of the river as conditions may demand.

3. Open more through north and south streets by extending Clark Street, La Salle Street and Franklin Street southward as contemplated by the new steam railroad terminal plan.

4. So far as it is practicable to do so, through route north and southbound surface cars.

The surface line subways should extend a considerable distance beyond the present congested business area so that surface cars could be operated through them at high speed, and all surface line riders, to whom the subway service would be available, be given the benefit of rapid movement and saving of time.

If these Loop District suggestions were carried out, the street congestion

*Abstract of paper presented before convocation of Western Society of Engineers, Chicago, Feb. 6 and 7, 1924.

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in that district would be materially relieved and street car service would be greatly improved because through greater freedom of movement the available rush-hour capacity of the tracks would be more than doubled.

The most effective urban transportation in large communities may be produced through the development of a limited number of long-haul trunk lines served by numerous short-haul collecting and distributing lines. On the Chicago Surface Lines the universal transfer system in force operates automatically to produce such a trunk line and feeder line system, and if the natural surface trunk lines were provided with suitable facilities and traffic regulations in the congested districts of the city so that free movement of cars, operated where possible and desirable in multiple units, could be accomplished, a long step forward would be taken toward improving the speed, regularity, comfort and safety of street car service. Carrying out the logical ultimate of such a system involves the co-ordination with the surface lines of all present and future rapid transit elevated and subway lines.

Motor Bus Co-ordination

The question of extending street railway service into new and undeveloped territory is ever present. There is always a demand upon the street railway companies to project their lines into sparsely populated territory, and reluctance on the part of the companies to build and operate those expensive structures in such localities until they can supply sufficient traffic to provide at least enough revenue approximately to meet bare operating expenses.

It is obvious that the basic transportation service in any community is and will be furnished upon rails. In the development of transportation in outlying, thinly populated districts, it is becoming recognized that the use of trackless service can be as effectively and more economically operated in supplementing the electric railway until sufficient traffic has been developed to warrant the building and operation of a permanent rail structure. A suitable motor bus operated by street railway companies for the development of transportation in new territory is a logical step in the direction of accomplishing the desired result, without incurring the burden of carrying non-productive expenditures of capital by the electric railway system. The use of such a co-ordinated bus system for development of traffic in outlying districts should be authorized and encouraged.

Various plans for improvement of Chicago's transportation system have been made and reports submitted by engineers and commissions. Two notable reports in recent years, both of which give a comprehensive view of the local problem, are the one presented in 1916 by the Chicago Traction and Subway Commission, and another prepared last year by Major R. F. Kelker, Jr., for the local transportation committee of the Chicago City Council.* Any complete study of the local problem should necessitate careful consideration of such reports.

In any transportation study of Chicago the territory served must be considered with relation to the following facts: (1) A central business district approximately 1 mile in diameter; (2) an inner residential district extending out about 5 miles; (3) an outer residential district extending from 5 to 10 miles from the center of the city.

There are also many important outlying industrial districts.

Business centers are widely distributed in Chicago and therefore the riding, during the rush hours, must also be heavy in many districts. While the Loop is commonly discussed as the place in most serious need of relief, yet the zones of heaviest street car loading on lines entering the Loop are more than a mile from the Loop District. On the north side, points of heaviest loading are between Division Street and North Avenue; on the west side between Halsted and Paulina Streets; and on the south side south of Eighteenth Street.

The cars from the entire southern district from Ashland Avenue to the Lake enter the Loop over three streets —Clark Street, State Street and Wabash Avenue. This brings a maximum of 116 cars per hour on Wabash Avenue, 142 cars on State Street and ninety cars on Clark Street; and yet it is a noteworthy fact that at a given point on Western Avenue approximately the same number of passengers are carried as at Van Buren and Clark Streets.

Similar comparisons might be made with other outside lines to indicate that the transportation problem for the Surface Lines is not by any means confined to the Loop District. The total number of passengers carried by surface cars within the Loop area is less than 500,000 per day, while the total carried by the system is over 4,000,000.

The ratio between passengers carried in the middle of the day period and in the heaviest rush period for the various lines forms an interesting comparison of the demand for service. The rush periods, morning and evening, are of short duration; most of the extra cars being of value for one trip only in relieving each rush period.

PASSENGERS PER FIFTEEN-MINUTE PERIOD

Line	Middle of the Day Period	Maximum Evening Rush Period	Ratio of Passengers
Chicago Avenue.	110	1,919	1 to 18
Grand Avenue.	90	1,400	1 to 15
Van Buren Street ..	100	1,200	1 to 12
Cicero Avenue.	95	2,447	1 to 25
Milwaukee Avenue.	250	3,600	1 to 14
Elston Avenue.	45	800	1 to 18
Combined Loop entrances..	1,280	7,195	1 to 5.6

These conditions, of course, could be materially helped by co-operation on the part of employers to the extent of staggering their opening and closing hours, thus reducing the peak demand and enabling the street railway company to serve the people more adequately at all hours of the day.

If, as has been suggested, all the west side cars were brought through the Loop to turn at points north or south of the Loop area, and all of the north side cars were taken through to points south of the Loop before turning, while all of the south side cars were taken through to points north of the Loop before turning, the results would be to increase the cars passing over the tracks between Lake and Kinzie Streets from 296 cars in a maximum hour to 777 cars. Those passing over the south side streets south of Van Buren Street would increase from 402 cars per maximum hour to 604 cars. The added cars would be empty in the extra section of travel and would congest the streets to an impossible condition.

Under present conditions, several sections of the city are very serious points of delay and congestion. Grade crossings at many points throughout the city are continuing to disrupt street railway service. These delays from railway crossings create operating conditions that are more serious than the delays due to other street congestion. This will, of course, be improved in time by elevation of steam road tracks. One of the causes for Loop congestion and for congestion along some outside thoroughfares, such as Halsted Street, is due to the very poor condition of the paving outside of the track, and on all north and south streets just west of the Loop area.

There is at present no easy way of getting around the Loop if one wishes to travel from north to south by automobile. If some good traffic routes could be provided on non-railway streets part of the downtown congestion would be immediately relieved.

A great deal of money has been spent in street widening for through boulevards in providing routes for pleasure driving, but relatively little has been done for providing routes for heavy traffic or for providing by-pass routes immediately around the Loop; and less has been done in adjusting street conditions to expedite the movement of street cars in congested areas.

A very valuable form of research to prove what kind of relief for downtown congestion would provide the greatest comfort would be the investigation of the relative interference to traffic flow created by street cars, trucks, horse-drawn vehicles, pleasure cars and buses, in proportion to the number of passengers served. Such information as is now at hand would indicate that the present congestion is caused by a large number of vehicles, each serving a very few passengers, and that the street cars number 10 per cent of the total vehicles while handling 74 per cent of the people riding along the congested streets in the Loop District.

What Is a Billion?

"Millions" and "billions" are so easy to say and are used with such frequency in financial and industrial transactions that their real magnitude is not always appreciated. When attempting to get a vision of what the Surface Lines' yearly total rides of 1,461,000,000 really means consider this: Since the beginning of the Christian era old Father Time in ticking off the minutes from which the centuries have been built up has scored in 1,923 years a

*Both reports were published in the ELECTRIC RAILWAY JOURNAL at the time issued.

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total of 1,011,420,000 minutes—450,000,000 less than the number of Surface Lines' riders transported in one year. For the purpose of accentuating the significance of Surface Lines' figures consider the fact that the Chicago post office prides itself on the handling of 1,298,000,000 pieces of first-class mail last year—an enormous task well done. In that same period the Surface Lines transported 1,461,000,000 riders.

The Illinois Bell Telephone Company reports that nearly 4,000,000 telephone connections are made daily in Chicago. The Surface Lines provided an average of 4,331,000 rides for each day.

At the present time the Surface Lines carry on an average week day 4,331,000 riders, of whom 2,421,000 are cash passengers, 1,786,000 transfer and 124,000 free passengers. The average haul on an individual line varies from 1.5 to 3.5 miles, but with the use of transfers needed to complete the journey of many passengers, the average ride exceeds 4 miles, which is said to be the longest average haul of any surface system in the world.

Taking the total number of revenue passengers on the surface, elevated and bus systems of Chicago last year and adding the transfer and free passengers carried by the Surface Lines, we find a grand total of 1,687,000,000 riders. This gives an average daily travel of 4,622,000 passengers, which might easily approximate 5,000,000 as an average for a week day. This is an enormous figure when it is considered that it excludes the great number of people handled by taxicabs in Chicago, as well as those brought into the city by interurban electric roads and suburban steam roads. The total number of riders carried by the Surface Lines in the last calender year was 1,461,000,000, which was by far the highest figure in the company's history. The number of separate routes operated by the Surface Lines is 114. The average number of cars now in operation week days is 3,250.

The magnitude of the local street railway system may be judged from the fact that its single-track mileage would form a trunk line from Chicago to Boston, and its daily car mileage would go around the globe sixteen times.

While the other two transportation agencies serving the Chicago district undoubtedly cover an important part of the field, it is interesting to note that for the past year the Surface Lines carried 86.6 per cent of the total passengers and 78.4 per cent of the revenue riders using these facilities. Since the Settlement Ordinances of 1907 were passed, the surface companies have extended the system to 268 miles of single track—an increase of nearly 34 per cent.

The universal transfer system on the Surface Lines is said to be the most extensive in the world, reaching the very high figure of 73 per cent of those paying fare. On all the surface lines a transfer is allowed at practically every intersection, which results in an exchange of passengers at 591 points.

There has been a surprising growth in the riding habit in Chicago during the past year. All local transportation agencies have felt this. On the surface lines alone revenue passengers increased more than 8 per cent—the revenue rides per capita having jumped from 268 to 285 in 1923—the highest in the history of the city. A combination of revenue rides on the surface lines and the elevated roads showed a riding habit of 356 as against a peak of 329 ten years ago.

Saving the Small Road*

By John B. Crawford
Superintendent Concord Electric Railways, Concord, N. H.

ELECTRIC railway lines throughout the country have been suffering and very ill for a long time. Many have given up the ghost and more are threatened. Even in New England the companies that have ceased to function and the miles of track abandoned are appalling. Are all destined to follow the example of their forbears, the stage coach, the canal boat and the horse car? It is predicted that in five years there will be no street cars, except in the larger cities like Boston, New York, Baltimore and Cleveland.

It is not the motor bus but the private automobile that is causing the loss of patronage to the street railways of New England. In the smaller cities, where the cost of living is lower, where nearly every family owns an auto, where people are more generally acquainted and invite their friends to ride and where the parking of cars has not assumed the importance it has in the large city, this competition is real and a question for serious thought.

As a feeder the motor bus has its place and a number of bus manufacturers realize this and are beginning to work with electric railways instead of against them. The public is slowly awakening to the fact that buses and jitneys must be regulated and that it is not a square deal to the street railways to let these pirates come along and skim the cream. When it comes to handling mass transportation safely and expeditiously the motor bus is inadequate, costly and cannot supplant the modern electric car. In such cities as Newark, Des Moines, Bridgeport and others where an attempt has been made to substitute buses for trolleys it has been shown conclusively that the electric car was the most useful method of surface transportation yet devised, and the populace voted to restore the trolleys because the bus proved inadequate and costly.

More Aggressive Publicity Needed

Do we not in many cases sit by and let our more aggressive competitors take away the cream of our business? In my view both steam and electric railways are weak in this respect. We don't advertise enough. The manufacturer and the merchant sell their product largely by advertising. We have transportation to sell, but do we use modern selling methods? For instance, in the interior rack space of our street cars we have one of the best advertising mediums in the world, but many of us do not make use of this space for the purpose of telling our story to the public. Instead we lease it by the year to an advertising company which sublets it to national advertisers who appreciate its value as an advertising medium.

In quite a number of cities the weekly pass has been tried out and has met with instant success. And why? Because of the value of the advertising and publicity campaign which preceded its introduction. I hold no brief for the weekly pass, but I wish the members of this club might hear Walter Jackson give a talk on this subject. It may be that the same amount of thought, preparation and money spent in getting more riders at our present fare would produce more revenue than the weekly pass, but the fact remains that it is being successfully used in thirty-five cities.

Why not get your board of directors to give you an advertising appropriation for 1924? Make it a part of your budget. Offer a prize locally for the best slogan. Get your patrons interested. Give them something to think about while waiting for a car other than that dry curve or that bad joint, and incidentally don't forget to grease that curve and also tell them why you do it. It will soothe their feelings and make friends for your company.

What the public wants is service, and it is generally willing to pay for it if it has a clear understanding of the cost of service. To illustrate this, several years ago we laid out a program of rehabilitation. First, we obtained an increase in fares; then we proceeded to rebuild all cars and trucks one at a time, replacing worn out and obsolete equipment as we went along. We sold our scrap and bought shop tools. Now our cars are kept painted and clean and our train sheets show they are on time nearly 90 per cent of the time. When we first introduced one-man cars we had a public upheaval and the writer came in for a lot of abuse and unfair criticism. However, as soon as the car rider began to realize this was propaganda, and to understand the need for safety cars, the trouble died down as quickly as it had started and for the past two years we have had surprisingly few complaints.

Good public relations are today about the most discussed feature of public service companies. Whenever utility managers meet they will be found discussing ways and means of improving public relations. Such ways and means have two objects in view: First, constantly better service, more courteously rendered; second, constant efforts to get the public to understand the problems as well as the proper functions of the company, and the physical and financial facts of the company's existence. Confidence in the public's sense of fair play and justice when it knows all the facts can be relied upon. As the car riders come to know and understand the facts of the electric railway business, they cease to respond to the demagogue, and also to lose that instinctive antagonism which all of us

*Abstract of a paper before the New England Street Railway Club, Boston, Feb. 7, 1924.

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have for the things we do not understand.

The Boston Elevated Railway has adopted a new plan to secure the good will of the public, namely, the movie film—a wise move. Perhaps that progressive organization will before long establish a central broadcasting station in order that waiting throngs of passengers may be kept cheerful by being advised by radio of unexpected delays.

Consider the case of the small company whose property is slowly going into the discard for want of patronage and credit. In most cases the discontinuance of such service is not only a great loss to the bond and stockholders, but nearly every person in the community is affected. If an operation is needed why not face the facts and call in the surgeon before it is too late. A drastic reorganization has been the means of restoring a good many steam railroads in the past decade. If our trolley roads need help to continue service, let's go to it. Work out a real constructive plan. Arouse public interest. Appoint a small committee of bondholders, one of stockholders, one of car riders and a committee of employees. Get the chamber of commerce interested and also city officials.

Enlist Aid of Local Chamber of Commerce

Charles M. Bassett in a recent publication, "The Assets of an Ideal City," says: "No institution serves to efficiently in crystallizing public opinion in civic affairs as the modern well-organized chamber of commerce. Its program is based upon a consideration of public needs by a selective group of citizens who are voluntarily associated in the interest of civic progress. This group represents the best thought of the community, those who have ideals and are ready to give their time and money to bring about their realizations."

Here is the meat of the cocoanut. To crystallize public opinion in your favor is what you are trying to bring about, so don't forget your chamber of commerce. When we needed an increase of fare from 6 to 8 cents a few years ago we arranged for a meeting of our chamber of commerce. We laid our cards on the table and told them our troubles. At first opposition arose and many questions were asked, but when the meeting was over we had the good will and active co-operation of a large majority of the members present.

Above all, don't forget to include a committee from the central labor union. This body represents, in a large measure, the views of the car rider, and I have always found its members ready and willing to co-operate and help us when called upon. Having now prepared the ground, the next step is to get all these committees together and functioning.

Some of you may be saying, "It can't be done," "As far apart as the poles," "Too many factions," and so on. Just remember that each of these groups has a personal interest in the plan you are to present. Perhaps the bondholder will agree to scale down his bond or forego interest until earnings can be restored. Perhaps the stockholder will consent to an assessment for the purchase of some new equipment. Even the public in the communities served may be willing to buy some new stock on the installment plan for the purpose of repairing the track, rather than lose the welcome sound of that old flat wheel. In the Middle West "customer ownership" has been the keynote of the financial strength of the public utilities.

The best place to present your plan is in the dining room of your local hotel after a good dinner. Everyone is now in the proper frame of mind to sit back and listen in all fairness to your proposals, and if outlined by someone with a Matt Brush punch and a few good stories your committee is likely to become filled with enthusiasm and you may be agreeably surprised at the results accomplished.

There is no general panacea for properties that are in a bad way, with earnings constantly decreasing, but it does seem that a number of such lines have been abandoned and the franchises given up without making a last stand. If we don't wait too long some new money may be secured that will enable us to produce gratifying economies.

The growth of our country during the past twenty years has been due in a large measure to the electric railway and it is most important that this valuable industry be maintained and made self-sustaining. In many cases this can be done only by more liberal patronage, and a general campaign to increase this patronage should be planned and carried out during 1924.

Pedestrian Subways with Narrower Surface Sidewalks Would Speed Traffic*

By T. L. Condron and C. L. Post
The Condron Company, Engineers, Chicago, Ill.

At present the great sources of street congestion that can be relieved are the stopping of vehicles along the curb lines to load and unload and the confusion at the street intersections caused by pedestrians crossing the traffic lines. The stopping of vehicles along the curb, even though for brief intervals, immediately interrupts a possible lane of traffic and reduces the traffic width of the thoroughfare. In general, the width of the downtown streets in Chicago is such that there is space for two lines of street cars and four lines of other vehicles. When the latter stop alongside the curbs, as is the normal situation, the number of lines of moving vehicles becomes two instead of four. Consequently, if there is a way to afford additional space in which vehicles may stop to load and unload, the number of lines of moving vehicles can be increased to four. This desirable result can be attained by reducing the width of surface sidewalks and building subways for pedestrians.

Room for such sidewalk subways is already in existence in the downtown district on many streets, as the space beneath the surface sidewalks is utilized in connection with the abutting buildings. The streets have been dedicated to the public for highway purposes, and, therefore, the space beneath the sidewalks is at all times available for the use of the public, although in general revocable permission has been granted to the abutting property owners to use this sub-sidewalk space as extensions to their basements.

The block bounded by Jackson Boulevard, Van Buren Street, Dearborn Street and State Street has been selected as an example involving all the different conditions affecting the downtown streets. Supports for the elevated railway obstruct the sidewalk lines of Van Buren Street, street car tracks occupy State Street and Dearborn Street, while Jackson Boulevard is free from surface cars as well as elevated structures, and Plymouth Court is a non-continuous street. The surface sidewalks on the streets surrounding this block would be narrowed by setting back the curbs 7 ft. on each side, thus reducing the width of the sidewalks from approximately 15 ft. to 8 ft., except at street intersections, and giving room for vehicles to stop alongside of the curbs without interfering with the main traffic lines. This would increase the capacity of the streets for moving vehicles other than street cars 100 per cent. At the corners stairways would be provided leading to the sidewalk subways. Stairways might also be built from the subways to the loading zones for street cars.

The use of the surface sidewalks along each block would be restricted to those passing along that block to enter or leave the adjacent buildings, and for movements of pedestrians and packages from standing vehicles to the buildings. Pedestrians would not cross the street intersections at the ground level, but only in the subways and not be interfered with by vehicular traffic. The sidewalks in these subways would have practically the same width as the present surface sidewalks, thereby actually increasing the sidewalk capacity at least 50 per cent.

The principal feature of new construction involved would be the building of sections of this subway at the street intersections, and as these portions of the subway would have the same width as the subways under the sidewalks, the construction would be simple and relatively inexpensive. They would in no way interfere with any future traffic subways, as the traffic subways would of necessity be at a lower level at the street intersections, and such traffic subways would not be wider than the distance between the present curb lines except at the stations, which would readily be reached from the proposed sidewalk subways.

The sidewalk subways would be raised at intersections with general utilities such as sewers, water and gas mains, and electric conduits, in order to involve the minimum of interference, especially with the sewers, which of necessity are at considerable depth below the street level and should be maintained at or near their present depths.

*Abstract of a paper presented before annual convocation Western Society of Engineers, Chicago, Feb. 6 and 7.

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Maintenance of Equipment

Portable Stand Lamp for Car Repairs

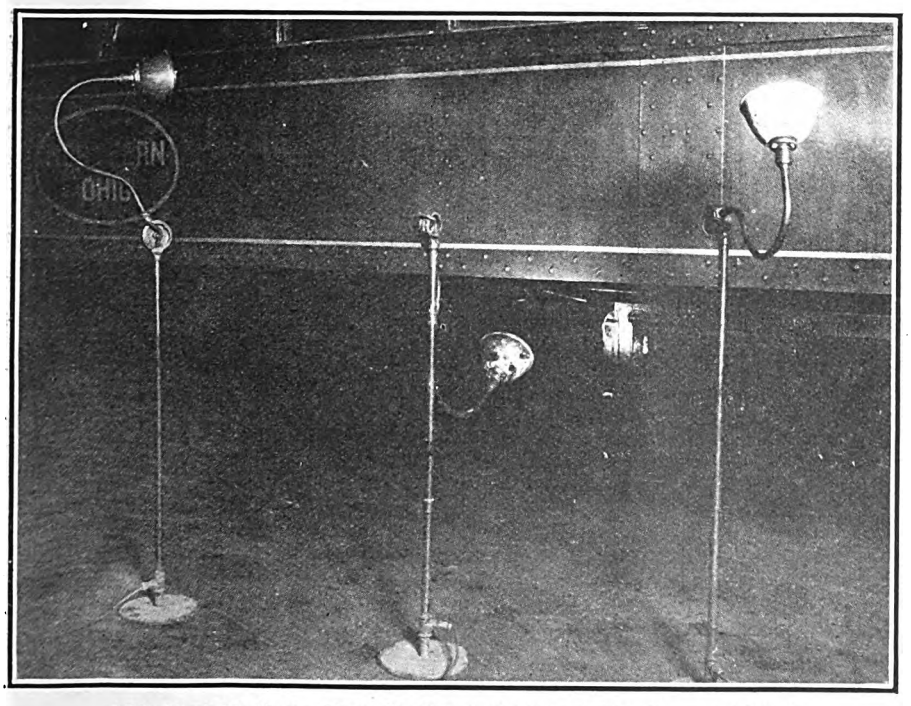
By P. V. C. See
Superintendent of Equipment, Northern Ohio Traction & Light Company, Akron.

A HOME-MADE type of adjustable lamp stand that has been found very useful for all kinds of work in the shops of the Northern Ohio Traction & Light Company is shown in the accompanying illustration.

In the position at the right the light may be used in connection with the painting of car ceilings or any overhead work. In the center position light is thrown on the work, either at benches or on trucks, while in the position at the left it is thrown on the side of the car for any carpenter body work that requires attention.

This device is made with a base casting somewhat resembling an ordinary traffic signal stand, threaded for 1-in. pipe. At a distance of 4 ft. from the ground, a round condulet box is screwed on the end of the pipe. A curved piece of pipe is fitted into another round condulet, the two being fastened back to back by a screw with a wing nut. The wires are run through the pipe and into a socket to which a reflector is fastened, thus making a neat finished job.

Lamps of this type are found much more convenient than the usual form of drop light.

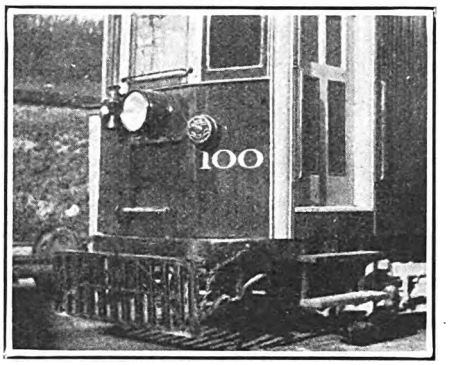


This Portable Lamp Stand Is Adjustable for a Wide Range of Work

Line Car Built to Carry Long Poles

THE Valley Railways, Lemoyne, Pa., has recently completed the rebuilding of a line car. This car was built in 1908 and was equipped for two-motor operation. In December, 1923, it was remodeled for four-motor operation and airbrake equipment was installed.

An interesting feature of the car is an arrangement of openings in the dashboards, to permit long poles carried on the floor of the car to project at both ends. The openings are 24 in. square and underneath a roller has been constructed by means of simple brackets and iron pipe. The pole is rolled into position on this roller and carried by the car to wherever it is needed and then easily rolled off again. The car itself is 35 ft. long and carries 50-ft. poles without difficulty. On account of the fact that much of the line of the Valley Railways is on private right of way this method of carrying poles has been a great convenience.



Hole in Line Car Dash Permits of Carrying Pole

Feeder Wires Reinsulated at Small Cost

AN EXPERIMENT recently made by the Union Street Railway, New Bedford, Mass., with the use of rubber tape to reinsulate feeder wires has proved so successful that it is planned to extend the practice. Three feeder cables, one of 500,000 circ.mil and two of 300,000 circ.mil, which had been installed about twenty years ago had become almost bare of insulation in places. This was a rather dangerous condition because the feeders were carried on iron poles with iron cross arms.

It was found upon investigation that the copper in these feeders was as good as ever and on account of the high price of wire the railway wished to avoid buying entirely new cables. The old wires therefore were recovered with one layer of 2-in. rubber tape and two layers of 2-in. cotton tape. This was done during the summer months and the heat of the sun soon melted the wrappings into a homogeneous mass.

The job was done by the line crew during spare time and it is estimated by the company that the cost of reinsulating the old feeders was less than 10 per cent of what new feeders would have cost. It is felt that they are now in almost as good condition as when they were new.

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Simple Wheel Stops Are Effective

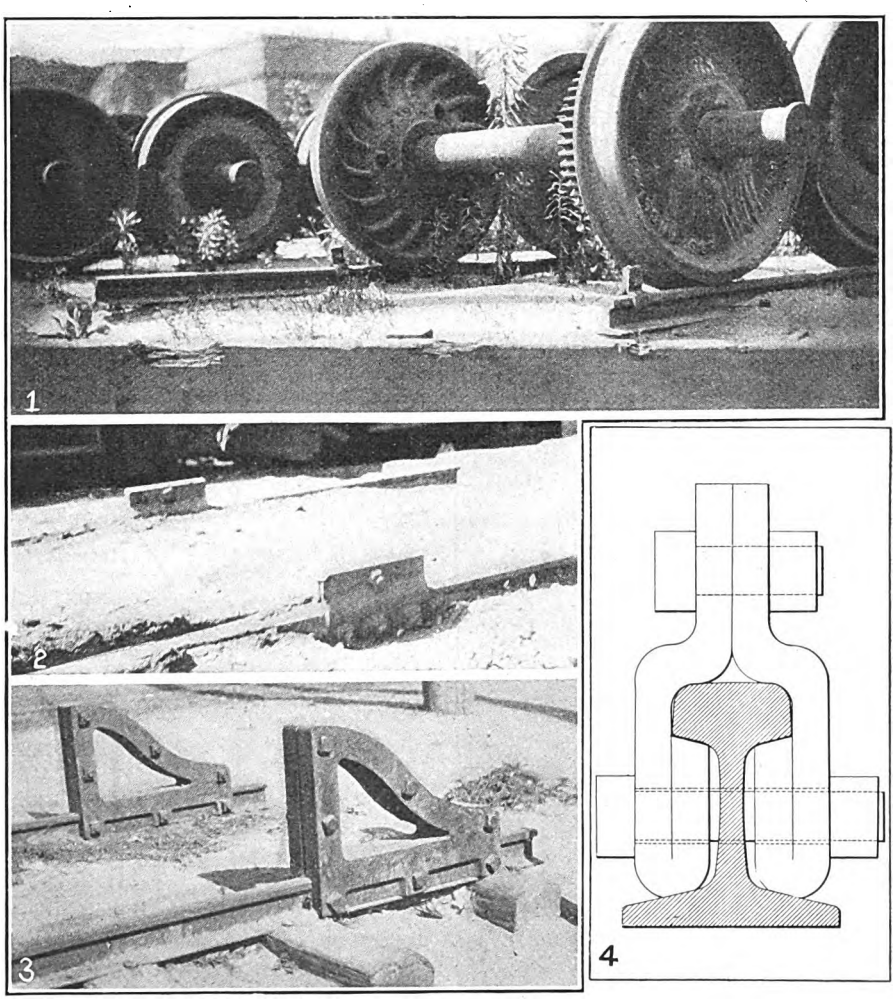
THE Pacific Electric Railway, Los Angeles, has standardized in three classes of wheel stops. The simplest type is for wheel storage tracks at the company's shops. For this purpose a bumper made of two cast-iron plates bolted together above the rail has proved satisfactory. The stop extends about 5 in. above the head of the rail, and since it is not bolted through the web it may easily be adjusted and fastened in any desired location.

In yards where passenger cars are stored at the various terminals, a slightly larger wheel stop is used. This consists of two plates fastened together above the rail with a single bolt and through the web of the rail with three bolts, as shown in the accompanying illustration and sketch No. 4.

A still larger wheel stop has been adopted for use on industrial spurs and public team tracks. Two iron castings, each roughly triangular in shape and weighing about 70 lb., are bolted together with one side of the triangle vertical and one side along the rail.

The length along the rail is 27 in., and the height is 19¾ in. Including the time spent in drilling the rail and adjusting the location of the castings, it requires two laborers a full nine-hour working day to install a set of these bumpers in position.

All of these wheel stops possess the advantages that they are very inexpensive to install, occupy a minimum of space in the storage yard, and serve their intended purpose satisfactorily.

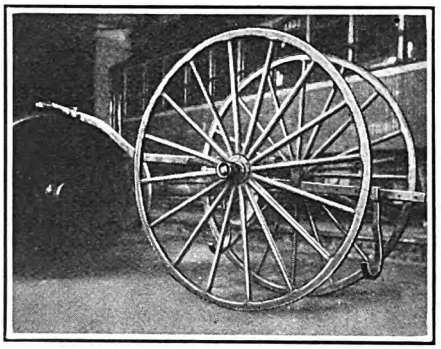


Simple Wheel Stops Used by the Pacific Electric Railway

No. 1. Adjustable clamp for wheel storage tracks. No. 2. A larger clamp is used in pasenger terminal yards. No. 3. This bumper is useful on industrial spur track. No. 4. Three bolts pass through the web of the rail and one bolt holds the upper parts of the two steel plates firmly together.

Carriage for Moving Armatures

ON PROPERTIES where the armatures are removed from the motors in the carhouse, and must be transported to the shop armature room for repairs, a carriage of simple construction, such as is used by the Chicago & Joliet Electric Railway, is convenient. In this device a frame is mounted on an axle between two wooden carriage wheels of 4 ft. diameter set to 24-in. gage. The principal member of the frame is a steel bar 5 ft. long, of ½-in. x 1½-in. section, fastened directly to the axle and braced by diagonal members. One end of the bar is bent up to form a handle for moving the carriage. The other projects about 6 in. beyond the axle. From this a yoke bar is carried by a permanently fastened 3-in. link of 1½-in. x ½-in. material, which supports the yoke at its center below the axle, so that the yoke is free to swing vertically about the point of support. A second link on the opposite side of the axle with a removable pin also connects the yoke to the main bar above. This prevents the armature from swinging while the carriage is being moved. This link can be disconnected and the yoke dropped for picking up an armature. Two hooks held in position by removable pins are mounted on the yoke for engaging an armature shaft. Adjustment for various lengths of armatures is made possible by a number of holes in the yoke.



This Narrow-Gage High-Wheeled Armature Carriage Is Used in Shops at Joliet

In operation, the carriage is tilted up so as to engage one end of an armature shaft with the forward hook; then, after removing the pin in the rear link, the other end of the shaft is engaged with the second hook.

The handle of the carriage is then lowered to a point where the pin may again be inserted in the link. Lifting the handle raises the armature free from the ground. The narrow gage and the large wheels are employed in order that the carriage may be moved easily between the cars as they are berthed in the carhouse.

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The News of the Industry

Akron's Mayor Loses

Still Says City Shall Ride on Rubber, but Council Votes Down Bus Operating Grant

Mayor D. C. Rybolt of Akron, on Feb. 19, had his first real defeat since electric railway service was discontinued on Feb. 1, for the Council refused, by one vote, to pass the pending bus franchise as an emergency measure. Eight votes were required. The franchise received only seven.

Not only this, but following the efforts of the Mayor to foist upon the city a ten-year bus franchise embodying practically the same provisions as the emergency measure, the Council in special session on the afternoon of Feb. 20 killed the proposal. The action followed an address by Councilman E. L. Martin, who tore the legislation to pieces and drove the administration to abandon the franchise. Hundreds filled the Council chamber and cheered the speaker. A plea by Councilman Rose for the return of the street cars won applause from the gallery.

Buses Operate With Difficulty

The bus franchise that was proposed is a broad one, providing fares ranging from 5 to 10 cents. For a single ride without transfer privilege there was to be a straight fare of 5 cents. By purchasing tickets at the rate of five for 30 cents, the rider could obtain a free transfer. In addition, "Limited" buses are provided from one section of the city to another at a 10-cent fare, with free transfer. And a 5-cent fare patron on a local bus was to have the privilege of transferring to a limited bus by paying another nickel.

The franchise—or rather franchises, for there were two, one a temporary and the other a permanent franchise—provided that the Akron Transportation Company, a newly organized bus company of which little is known regarding its real backers, should invest not less than $100,000 in "modern motor buses" and that it should be "unencumbered," but in case it was not "unencumbered" the company should file a liability insurance policy for $100,000 "to protect the interests of the public." The streets upon which the company was to operate were named. These streets included thoroughfares upon which independent motor buses and jitneys have been operating for years. Under the temporary franchise, which it was intended should be in effect until May 1, 1924, the present operators were given until the close of the present year to retire from the field, but could continue for a short period longer at the option of the Mayor.

While the permanent franchise was to run for ten years, there was to be a fare adjustment at the end of the first year, by arbitration, if necessary and at the end of each two-year period thereafter in a like manner. The third arbitrator was to be named by the probate judge of Summit County in case a company arbitrator and a city arbitrator could not agree.

When the members of the Council were presented copies of the franchise on Tuesday afternoon, and an effort made to "railroad" the grant through, four members entered vigorous protest. They pointed out that an attempt was being made to "rubberize" Akron by "ramming a franchise down the throats of the people for a 10-cent fare." The Mayor made a long plea for the passage of the franchise, urging immediate action so that "motorization of the city may become real." He admitted that the present service and equipment were wholly inadequate to care for the people, but insisted that if the franchise was granted it would result in Akron securing "the finest transportation system in the world within a short time." The Mayor refused to say who was behind the new bus company, asserting that the "men were responsible." Councilman Rose said he had been given to understand that Mr. Firestone and others were behind the project. During the last ten days Mr. Firestone has said repeatedly that he "would have nothing to do with the financing of a bus company." Another meeting of the Council was called for Wednesday afternoon. It was at this meeting, as previously related, that the proposed grant was defeated.

Relief Being Sought

Transportation in Akron during the week commencing Feb. 16 has been worse than at any time since the street cars ceased running. Wednesday night, following a sleet storm during the afternoon, the situation was particularly bad and the seventy-two buses which have been brought from the outside were wholly inadequate to care for the crowds. Councilman Rose declared it took more than an hour to get the workers away from the Goodyear plant and that thousands walked. Similar conditions prevailed at the other rubber plants with the exception of the Firestone, where more than thirty buses were sent to care for the workers.

Many persons are still appealing to the city for relief, but the Mayor announces that "the inconveniences now suffered will be more than offset by the service that will be supplied later." "Akron must, and shall," he declares, "ride on rubber."

Business conditions are still bad. Merchants openly complain that women shoppers are not coming downtown. The usual sales for February have been abandoned.

Home Rule Hearing Set

Discussion of Measure to Help New York City Administration Will Include Referendum Rights

The final public hearing, before introduction in the Legislature, on the home rule enabling act will be held in the city of New York, at the City Hall, on Feb. 25. The hearing held at Albany on Jan. 30 brought forth a request for a more specific enumeration in the enabling act of just what the local legislative body of a city might do and what it might not do under the provisions of the home rule amendment to the Constitution approved by the people last November, and also a clear statement of the class and kind of questions which must be submitted to the people for their approval by the board of aldermen or local legislative body.

The first draft of the enabling act gave certain regulatory powers to cities over public service corporations and implied that a city having the right under its charter or by existing law to own and operate a public utility might do so and might create a debt of the city for such purpose without referendum to the people.

Popular Referendum Provided

In the revised draft this same authority remains, but under a new section fifteen added to the enabling act on "Mandatory Referendums," it is provided that any local law which changes a provision of law relating to public utility franchises must be submitted to the people for approval by them.

Subdivision five of Sec. 12 of the enabling act, under supplemental powers of cities, reads:

"5. To adopt a local law repealing a local law or state statute, which, pursuant to this chapter, it is authorized to adopt or amend."

This language appears to afford an avenue through which the question of jurisdiction of regulation of public utilities by the State, through the Public Service Commission, and by the various cities, each after its own manner and method by means of local ordinance, might become very much mixed. Aside from this the mandatory submission of ordinances changing a local franchise condition of a public utility corporation to a referendum of the people threatens to make such bodies the football of local politics, commentators say.

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Injunction Secured Against Dayton's One-Man Car Order

Protected by a temporary injunction which prohibits the city from ordering them off the streets, one-man street cars still are operating in Dayton, Ohio. Four companies have entered the fight to keep the one-man cars in operation. Arguments on the case will be heard in the near future. Meanwhile the one-man cars will be permitted to continue. The cars were ordered off the streets by a referendum of Dayton voters last fall after protest had been made against them. The ordinance passed by the City Commission in conformity with the referendum was to have become effective on Jan. 1.

Members of the local street railway men's union at Springfield, Ohio, in a letter to Mayor William Argabright are protesting the adoption by the City Commission there of any measure providing for the use of one-man cars. The men protested the adoption of the one-man car on the theory that it is difficult to operate them and that they constitute a menace to the public.

Resolution to Abrogate Phoenix Franchise Tabled

In deference to the opinion expressed by the spokesmen for several city organizations the City Commission of Phoenix, Ariz., has tabled its resolution directing the city attorney to take steps to abrogate the franchise of the Phoenix Railway for alleged failure to comply with the terms of the franchise. Mayor Whitney voiced the sentiments of the Commission as being in favor of procuring an engineer to examine the situation and report as to the best means of rehabilitating the system, this report to be digested by the city officials and a committee of citizens named from the various civic organizations from which it is hoped some definite plan for improving the railway situation may be worked out.

Some time ago a committee of citizens appointed by the Mayor to investigate the matter recommended municipal ownership with private operation.

The whole matter arose over the question of paving. The company contends that it has no money to do this work. S. H. Mitchell, manager, says that the system is not paying and has in fact never paid any dividends to its owners. The company operates at a 5-cent fare.

New York City Administration Measure Appears in Legislature

A second Democratic transit bill was introduced in the New York State Legislature on Feb. 20 by Senator Walker and Assemblyman Bloch, administration leaders in their respective houses. It gives cities the right to own, establish, construct, acquire and operate municipal bus and trackless trolley lines at a statutory 5-cent fare. The new measure follows the terms and provisions of the "city home rule transit" bill introduced on Feb. 19, the second piece of Hylan legislation. The Democrats introduced the bill chiefly to take care of the existing bus and trackless trolley lines to the best advantage from the Hylan municipal ownership standpoint. The city home rule transportation bill, the bus bill and any other transit measures that may be introduced by the Democrats are expected to pass the Senate. When they reach the Assembly, however, it seems likely they will be referred to a committee, where they will stay until a compromise is reached.

Detroit's Articulated Unit in Service

Detroit's three-unit articulated train arrived in that city on Wednesday night. It had been run on its own power overland from Cincinnati and carried sixty railway men interested in its operation.

On the trip it encountered rain, sleet and snow. The test to which it was put was very severe, but the vestibules proved to be weathertight. The riding qualities of the unit were excellent. It took perfectly the severe breaks in grade and the curves. There were no mishaps. The train was put into service in Detroit on Thursday morning.

Franchise in Niagara Falls, Ont., Approved

After hearings covering a period of almost three weeks, the City Council of Niagara Falls, Ont., has approved the franchise to be granted the Canadian National Railways, the Canadian government-owned system, for the operation of local lines in Niagara Falls, Ont.

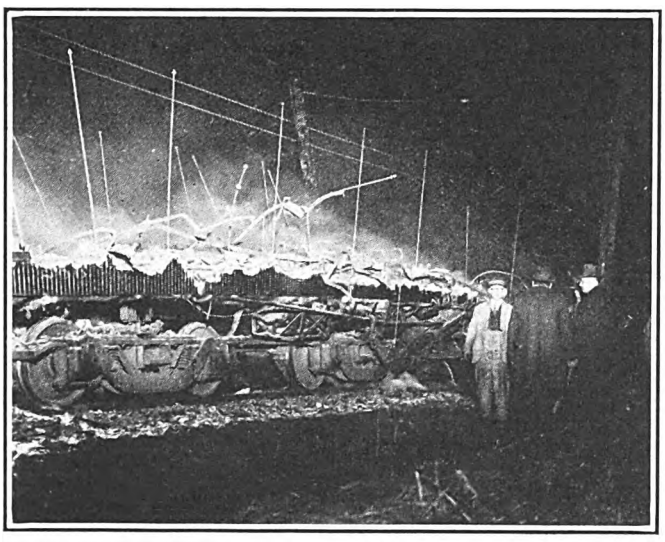
The only point over which there had been a prolonged debate was the exemption from local taxation asked by the Canadian National Railways. It was agreed that the company would pay a fixed rate of $20,000 annually for fifteen years, the period of the franchise. The franchise now must go before the Provincial Legislature of Ontario and also must be ratified by a vote of the taxpayers. The special election to vote on the matter will be held late in March.

It was agreed that the Canadian National should charge an initial fare of 7 cents. All future rates of fare will be based upon the service-at-cost provision in the franchise. The City Council wanted a 6-cent fare at the start.

Arbitration in Des Moines

Failure to reach an agreement between the officials of the Des Moines City Railway, Des Moines, Iowa, and its trainmen over the question of the men's demand for an increase in wage scales and working conditions has resulted in each party to the controversy appointing arbiters to settle the disagreement. During the past week the company announced that W. C. Harbach would represent it in the arbitration proceedings and the men named Rev. F. W. Mutchler. Mr. Harbach has been a prominent manufacturer and capitalist in Des Moines for many years. Rev. Mutchler is at present pastor of Union Park Church of Christ in Des Moines. They will name the third arbiter shortly. In the past it has been the custom of the company to name its attorney, while the men chose their business agent.

Unfortunate Wreck on Indiana Union Traction Company's Line on Feb. 2



Flashlight of Anderson-Bound Car, Showing Car Destroyed Except for Trucks

Time Exposure Taken by Light from Burning Indianapolis-Bound Car

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Operation Under Loss Not Compulsory

A railroad corporation cannot be compelled to continue operations at a loss under a permissive charter and cannot be prevented from selling its tracks and other physical assets as salvage, the United States Supreme Court held Feb. 18 in sustaining the ruling of the lower courts in the suit of the State of Texas against the Eastern Texas Railroad Company, a steam property. The company, operating a short line built primarily to serve lumber mills, gave notice of suspension and of intention to abandon its line and sell its assets when revenue fell off heavily due to closing of the mills because of exhaustion of the timber supply, nearly all of its traffic being lumber. Permission was granted by the Interstate Commerce Commission. The State of Texas resisted, the line being wholly intrastate.

Tentative Stockton Franchise Expected to Be Ready Soon

Progress is reported in the preparation of the blanket franchise application to be submitted to the City Council by the Stockton Electric Railway, Stockton, Cal.

Frank W. Webster, general manager of the company, has submitted a tentative draft to the legal department of the company and this document is in course of preparation for final submission.

The situation in Stockton is said to be similar to that with which Fresno was confronted until recently. Fresno has granted the Fresno Traction Company a blanket franchise covering a long term and under this franchise several extensions have been made. Stockton residents have urged extensions, but these have been declared impossible under the existing franchises.

The Stockton Electric Railway now holds several franchises, each expiring at different times, the longest term expiring seventeen years hence. The company hopes to secure a blanket franchise covering all its lines for a uniform period.

The railway systems in both Fresno and Stockton are controlled by the same interests.

Hearing on Philadelphia Subway Proposals on Feb. 29

The Public Service Commission of Pennsylvania has fixed Feb. 29 for the hearings on the petitions of the city of Philadelphia for certificates of public convenience for the proposed high-speed lines under step No. 1 of the transit plans. The system with which the hearing will concern itself will consist of subways under Broad Street, Ridge Avenue, Walnut Street, Chestnut and Forty-second Street; and elevated railway from Forty-second Street to the City Line on Woodland Avenue, and a bridge over the Schuylkill River to connect with the Chestnut-Walnut Street subway. There will also be considered the surface car subway on Chestnut Street between the two rivers and to Franklin Square by way of Sixth or Seventh Street, which the Philadelphia Rapid Transit Company interests require the city to build.

International Employees' Trial Postponed

The trial of other striking platform employees of the International Railway, Buffalo, and local officials of the Amalgamated Association on charges of conspiracy in connection with the dynamiting of the Buffalo-Niagara Falls high-speed line at Ellwood Station in August, 1922, when more than sixty tourists were injured, has been postponed by United States District Attorney William J. Donovan until after the United States Circuit Court of Appeals hands down its decision on the appeal of the four strikers who already have been convicted and sentenced in Federal court.

It may take at least three months for the United States Circuit Court of Appeals to pass upon the appeal of Francis Reilley, Healey Breeze, William H. Smith and William L. Vandell. Writs of error were obtained by counsel for the prisoners so an appeal could be taken. Maximum sentences under the law for conspiracy were imposed on these strikers.

Another Boston Subway Station Suggested

It is proposed to build one more station in the Boston subway system, at a cost of about $600,000. This is to be located in the Cambridge tunnel at the point where it passes Charles Street, which is a populous center of the West End, close to the Massachusetts General Hospital and other institutions. It is generally agreed that this section has not been adequately connected with the Boston rapid transit system. The proposition is now before the Massachusetts Legislature. The trustees of the Boston Elevated want the $20,000 to $30,000 a year cost of operating the station assessed against taxpayers.

News Notes

United Railways Pays by Check.—The pay car of the United Railways, St. Louis, has been sidetracked. In the future employees of the company will be paid by check instead of in cash. It is said that the new plan lightens the work of the paymaster's department. In addition it removes the hazard always inherent in the transportation of considerable sums of money.

No Construction While in Receiver's Hands.—Although there may be great need for extension of various branches of the United Railways, St. Louis, due to the increase in the city's population, Judge Faris of the United States Court for the Eastern District of Missouri has held that the court has no authority to order the construction of extensions while the system is in the hands of a receiver appointed by the court. This ruling, an oral one, was handed down by Judge Faris in passing on the application of the city of St. Louis, the North St. Louis Business Men's Association and the Natural Bridge Industrial District Association for leave to intervene in the United Railways litigation and ask the court to order construction of the needed construction.

Agreement Reached.—The Tiffin & Fostoria Railway has accepted the offer of the city of Tiffin, Ohio, which provides that the company remove its tracks from Washington Street and relinquish its franchise rights on the street. In return the company is to be freed of all paving costs.

Veterans in Dallas Honored.—Fifty-four veteran employees of the Dallas, Tex. Railway were honor guests at the Chamber of Commerce honor banquet to the "twenty-year men" in Dallas. This banquet given by the Dallas Chamber of Commerce was planned to honor those employees in Dallas who had remained in the service of one company for twenty years or longer, and several hundred veteran employees of various commercial enterprises, business houses, etc., were guests at this banquet. The Dallas Railway led the list of employers having the greatest number of twenty-year men to attend the banquet. D. L. Wilson, now retired on a pension, topped the list with a continuous record of service dating from April 29, 1887. Before going to the banquet the veterans posed for a group picture. At the banquet, held at the Oriental Hotel, Joe Cook, a veteran operator from the days of the mule cars in Dallas, wore clothes typical of the mule-car days, and around his neck was looped a big black snake whip, such as drivers of the old mule cars used.

Attorney Chosen.—The Tennessee Railroad & Public Utilities Commission recently named Horace B. Stout as its permanent attorney to succeed Roberts & Copper. The latter firm is retained in an advisory capacity.

Women's Committee Formed. — A women's committee on public utility information has been organized in Wisconsin to assist companies in forming its women into study classes and in providing general lectures dealing with the problems of the utility business. In addition the committee will suggest general plans whereby the women can make themselves more useful in connection with the efforts of the companies to provide courteous and efficient service to the public. The work of the committee will be carried on under the auspices of the Wisconsin Utilities Association.

Very Active in 1923.—In the year 1923 the Ontario Safety League distributed among manufacturers, motorists, railway men and other groups seeking co-operation in the reduction of accidents, 66,600 industrial bulletins, 225,000 motorists' cards and many circulars, reports, calendars and safety buttons, all in the interest of safety first. In addition the league distributed a little more than $600 in cash prizes in cartoon and essay contests.

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Foreign News

Holland Uses One-Man Cars

During the past year several cities in Holland have adopted the one-man system on all or some of their cars. Arnhem included all its lines in the system and Utrecht began with one of its lines. Amsterdam has two lines with one-man cars. The object in each case was to economize.

In Amsterdam the result has been sufficiently satisfactory to cause preparations for the extension of the system. This will be effected by gradually changing the cars now in use, at an average cost of 115,000 francs ($2,000) per car. Experience with the one-man system in Amsterdam indicates that the saving in labor costs will more than pay for changing the cars. The payment of the personnel is 80 per cent of the maintenance and operation cost.

So far as one-man cars have already been substituted for two-men cars, no reduction in the number of passengers is reported. In fact, there is apparently an increase, though probably due to the public curiosity. Entrance is at the front and departure at the back of the car—the latter through a turnstile to prevent crowding and pushing against the door. A distinct improvement is that the doors are opened and closed only when the cars are standing, thus avoiding the many accidents, sometimes fatal, caused by people jumping on or off the two-man cars while they are in motion. In one respect the new cars are sometimes inconvenient, as no change is given by the driver-conductor and the exact fare (10 Dutch cents, 4 American) must be produced in a silver coin before a passenger is admitted.

It is hoped that the economy effected by the one-man plan will restore the street car system to its former profit-earning condition. There was a loss equivalent to about $30,000 in the year 1922, caused by reducing the fare from 15 to 10 Dutch cents (6 to 4 American).

Trackless Trolley Versus Tramway

The comparative costs of reconstructing the tramway tracks in that city and of substituting the trackless trolley are given in a report by R. H. Wilkinson, general manager Bradford Corporation Tramways. Mr. Wilkinson favors the change on certain routes, because of present high cost of reconstruction of wornout track. He, however, refers to the liability of buses skidding on steep gradients, and says that experience alone can convince him that railless vehicles can be as safely worked in such places as tramway cars.

The expenditure for converting the Bradford tramways to the trackless system would be about £603,000. This comprises return feeders for 51 route-miles, £128,000; overhead line for same distance, £93,000; reinstatement of roads, £382,000. Nothing is included for cars. The cost would be spread over fifteen years. If tramways are continued the cost of maintaining and renewing the permanent way would be £70,000 a year, or £1,050,000 in fifteen years. Against this, on the railless side, an annual tax would have to be paid for road maintenance amounting to £70 per vehicle, which for 270 buses amounts to £18,900. On this heading there would thus be an annual saving of £51,100.

No comparison was given of the costs of operation with the two systems.

Trolley Cars on the Vienna Stadtbahn

The Vienna Municipal Tramways will equip with trolley wires the Stadt and Ring Bahn of that city and operate it with trolley cars. This line forms two belts around the city and was originally part of the government steam railroad line, but owing to the high cost of fuel its service was abandoned following the war. The length to be equipped is 16½ miles, with twenty-five stations. As the formerly used steam railroad cars were 3 m. wide and the street cars only 2.2 m. wide, the station platforms will have to be extended and they will be raised in height at the same time to be flush with the car entrances. The standard type of surface motor car with one or two trailers will be used. The overhead line will be of catenary construction at 600 volts, but insulated for a possible increase in voltage later to 2,000 volts. Five substations equipped with mercury arc electrifiers will be built to supply direct current.

Automatic Substation in London.—One of the first automatic substations in England is being installed by the London Electric Railway for the extension of the Charing Cross & Hampstead line from Golder's Green to Edgware, now under construction. This station, located at a point called Burnt Oak, will have two 1,200-kw. transformers and synchronous converters for changing the incoming 11,000-volt three-phase current from the Chelsea power house to 600-volt direct current for the conductor rails. The converters will be started or stopped by a switch at the Golder's Green depot, some 3 miles away, and there also will be the instruments showing the load on each section of line fed from the substation.

American Locomotives Arrive at Bordeaux.—The French press has hailed with enthusiasm the arrival at Bordeaux of the first of the gearless electric locomotives built at Schenectady by the General Electric Company for the Paris-Orleans Railway. The trials held at Erie, which gave a high speed of something like 170 km. an hour, have made a most optimistic impression as to the possibilities of improving the service on this one of the most important of the seven great French trunk lines. The first trials in France will be over a portion of the line with but 600 volts on the contact line. The final trials will be held between Paris and Vierzon, where the line carries 1,500 volts. It is stated that if the model is adopted others will be constructed in France by the consortium of firms which makes up the Société d'Études pour l'Electrification des Chemins de Fer Français.

End of the Glasgow Subway Company.—The directors of the Glasgow Subway Railway have issued their final statement of accounts as of Aug. 1, 1923. On that date, as previously reported, the undertaking passed by purchase into the hands of Glasgow Town Council. With the exception of the secretary, all the staff have been taken over by the Council, and the directors propose to pay the secretary £3,500 as compensation for loss of office. The company's assets permit of a payment to the preference shareholders of 16s. 1d. per share and to the ordinary shareholders of 10s. 8d. per share.

Tickets Reduce Revenue.—It was intimated at a recent meeting of the Halifax, England, tramways committee that by the use of books of fourteen penny tickets for 1s. about £70 a week was being lost. When the concession was made last October it was hoped that it would lead to increased travel. A large number of books had been sold, but these apparently had been purchased by regular users of the cars.

Tram and Bus Insurance Rates Discussed.—At a town meeting to consider the promotion of a Parliamentary bill by the town council of Hull, England, authorizing tramway extensions among other things, the chairman of the tramways committee said that tramcars were safer than buses. To insure a bus carrying fifty-five passengers against accident cost £40, while to insure a tramcar carrying eighty passengers cost £4.

Light Signals on Edgware Extension.—The extension of the Charing Cross & Hampstead line of the London Electric Railway from Golder's Green to Edgware is being equipped with two-position color light signals, though little of the line is in tunnels. Semaphore arms are dispensed with, as the lights have a range of about 2,000 ft. even in bright sunshine. The lamps are fitted with lenses of 8 in. diameter, which project bright colored beams of light. The signaling is done automatically by means of track circuits in the same way as on the underground railways. Signals of this kind have been in successful use on the part of the railway from Golder's Green to Hendon which was opened for traffic last November. An all-electric system of point control and of train stops is being installed. Instead of detonators for foggy weather, fog repeaters are being fixed about 300 ft. in front of each colored light signal. The repeater is fixed on a post and throws out a powerful light on a level with the motorman's eye.

Metropolitan Railway Dividend.—The directors of the Metropolitan Railway, London, England, have declared a dividend at the rate of 5 per cent per annum for the second half of last year, making 4 per cent for the year, as compared with 3½ per cent for the previous year. £15,000 is placed to reserve and £35,000 carried forward.

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Financial and Corporate

Revenue Passengers Decreasing

Washington Property Confronted with Curtailment of Governmental Work and Increased Use of Automobile

The balance of income for 1923 credited to profit and loss by the Washington Railway & Electric Company, Washington, D. C., was $151,327. To this there were added miscellaneous items of $136,578, largely profit from the sale of real estate, so that the total credit to profit and loss for the year was $287,906.

William F. Ham, president of the company, explained at the recent annual meeting of the stockholders that aside from dividends from the Potomac Electric Power Company included in the operating statement of the company, no income was received by the company on its investment in stocks of subsidiary companies. The regular dividend on the preferred stock, at the rate of 5 per cent per annum, was continued throughout the year, and on June 1, after a lapse of four years, payment of dividends on the common stock was resumed, three dividends of 1¾ per cent each having been paid during the year.

CONDENSED STATEMENT OF WASHINGTON RAILWAY & ELECTRIC COMPANY FOR YEAR 1923

Gross earnings from operation	$4,957,214	
Miscellaneous income (including dividends from Potomac Electric Power Company)	707,758	
Gross income		$5,664,972
Operating expenses (including depreciation), taxes and miscellaneous charges	$4,089,016	
Interest on funded and unfunded debt	755,878	
Payment of dividend on 5 per cent preferred stock	425,000	
Payment of dividend on common stock (3¾ per cent)	243,750	
		5,513,644
Balance of income for year 1923, credited to profit and loss		$151,328
Miscellaneous items (largely profit resulting from sale of real estate) credited to profit and loss during the year 1923		136,578
Total credited to profit and loss during the year 1823		$287,906

Mr. Ham explained that due primarily to the reduction of governmental activities since the war and to the greatly increased number of automobiles in use travel has been falling off almost constantly since the spring of 1920. Comparative figures follow:

	Revenue Passengers Carried	Number of Automobiles
1919	91,488,735	44,631
1920	87,782,784	56,148
1921	85,481,656	63,610
1922	82,716,756	79,546
1923	81,518,607	101,543

Thus the decrease in pay passengers in 1923, as compared with 1919, is 10.9 per cent. So large a decrease in traffic has made it impossible, with existing rate of fare of 8 cents cash or 6 tokens for 40 cents, to earn a reasonable return upon the value of the railway property as fixed by the Public Utilities Commission.

With respect to the bills introduced in Congress requiring the restitution of the 5-cent fare with six tickets for a quarter, Mr. Ham says it is impossible to return to a pre-war rate of fare until other conditions, over which the company has virtually no control, are again upon a pre-war basis.

The company placed in operation during the year thirty cars of the pay-within type for two-man operation and ten cars of the pay-within type for one-man operation. It also added seven buses, making the total number now in operation fifteen.

Bus operations have been substituted during the non-rush periods for street cars from Seventeenth and H Streets, N. W., around the Potomac Park Loop, continuing the street car operations in the morning and evening rush periods. Just prior to the close of the year the company extended the operation of this bus line to the Lincoln Memorial. Bus operation now furnishes service on two important lines of the company during the early morning hours when traffic is extremely light. On Aug. 1, a Southwest crosstown bus line was established by the Capital Traction Company for the joint account of that company and the Washington Railway & Electric Company, with an exchange of transfers between lines of both companies.

Mr. Ham says that while the introduction of buses was intended primarily to afford greater convenience to the public and has, in fact, greatly increased these facilities, the operation has been without profit.

Chicago "L" Reorganization Formally Declared Operative

The plan for the reorganization of the elevated railways in Chicago has been declared operative as to all classes of securities and claims entitled to participate therein. It is contemplated that the new securities deliverable by the committee to holders of certificates of deposit will be ready within a short time.

Charles E. Mitchell, chairman; George M. Reynolds, John H. Mason and R. Floyd Clinch, committee acting in the reorganization, say approximately 97 per cent of the secured gold notes and more than 90 per cent of ten-year 6 per cent debentures have been deposited under the plan of reorganization dated July 14, 1923; and in pursuance to the plan, the collaterals pledged for security of the notes have been acquired and the new company under the name of Chicago Rapid Transit Company has been organized. As has been announced previously in the ELECTRIC RAILWAY JOURNAL the new company is now operating the properties.

Increase in Columbus Surplus

Ohio Company Shows a Big Gain in Amount Left Over Charges, Taxes, Interest and Dividends

The Columbus Railway, Power & Light Company, Columbus, Ohio, reports good progress made in its affairs during the year ended Dec. 31, 1923. There was an increase over the previous year in the number of passengers carried, in transfer passengers, in revenue and in surplus derived. There was also an increase in surplus over all charges, including taxes, interest and dividends.

C. L. Kurtz, president of the company, says that it should be gratifying to the public, as well as to stockholders, to realize that the company, operating under rates of fare about 40 per cent lower than is the average rate of fare in all other cities of the country, has been able to attain surplus earnings necessary to the strengthening and continued upbuilding of the service.

Mr. Kurtz said in the pamphlet report of the company that the requirements of the company for the construction program of 1924 have not yet been arranged, but he did repeat the need of the company for fifty new cars.

During the year the dividend rate on Series "B" preferred stock was increased from 5 to 6 per cent, and a dividend rate of 6 per cent was declared on the common stock, thus putting all three classes of the company's stock on a 6 per cent basis. Mr. Kurtz further said that the growing interest and confidence of the public and of investors in the securities of the company is helping to produce satisfactory results to both the investors and the community served.

At this annual meeting the Columbus, New Albany & Johnstown Traction Company was completely purchased. This was a short interurban line the stock of which has been slowly acquired by the Columbus Railway, Power & Light Company, by which it has been operated the last two years.

STATEMENT OF EARNINGS OF COLUMBUS RAILWAY, POWER & LIGHT COMPANY FOR YEARS ENDED DEC. 31

	1922	1923
Railway operating revenues	$3,611,590	$3,702,221
Power, light and heat operating revenues	3,880,440	4,749,233
Non-operating revenues	7,312	11,268
Total gross revenues	$7,499,342	$8,462,724
Operating expenses	$4,531,604	$4,955,526
Taxes	765,684	839,461
Gross Income	$2,202,054	$2,667,735
Deductions from Gross Income.		
Interest on funded debt	$818,554	$806,733
Interest on unfunded debt	12,341	13,354
Other deductions	77,628	62,042
Total deductions	$908,524	$882,130
Net income available for sinking fund, dividends and other financial requirements	$1,293,529	$1,785,604
Deductions from Net Income.		
Sinking fund	$245,845	$233,650
Dividends:		
Series A preferred stock	91,227	121,636
Series B preferred stock	188,014	300,998
Common stock	.....	360,354
Balance (credit to profit and loss account)	$768,441	$768,96[illegible]

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Pay-as-You-Go Purchase Plan Suggested for San Francisco

The special committee, composed of supervisors and city officials of San Francisco, appointed a year ago to consider the purchase of the Market Street Railway by the city has blocked out a tentative "pay-as-you-go" proposition as a basis for conference with the railway.

The plan outlined contemplates submission of the purchase proposed to the people, but not as a bond issue proposition. The plan now contemplated to be put into effect would not involve the city in a bonded debt, and could be carried by a majority vote. On the basis of the gross receipts of the company's lines, deductions are to be subtracted for the increase of wages, amounting to $1,800,000 a year under the municipal pay schedule; for the operating expenses; for depreciation, and for interest upon whatever "price" is finally agreed upon. The committee stated that the nub of the whole matter would be this figure.

On the basis of the present showing it is estimated that it would take between twenty-five and forty years, according to the valuation finally agreed upon, to pay for the system. These figures are based on the present 5-cent fare.

Hearings Under Way Looking Toward Kansas City Foreclosure

Powell C. Croner, attorney for the committee representing the holders of the first mortgage bonds of the Kansas City Railways, urged before Judge Stone in the federal court at Kansas City recently that the valuation of the property be determined at once, after which a concrete plan for reorganization will be submitted to the court. Mr. Groner said the revaluation would be necessary eventually, and urged that it be made now so that complications in the future could be avoided. He said the plan of the first mortgage bondholders to foreclose then would be carried out.

Stockholders in the company asked permission to present a supplementary answer, containing a statement of their interests in the reorganization. Judge Stone took the application under advisement. Richard J. Higgins, attorney for the first mortgage bondholders, said the stockholders have waited too long to advance their claims. He contended both the bondholders and the stockholders were "in the same boat."

William Bostian, attorney, and Frank J. Peterson attended as representatives of the traveling public. To their plea for consideration Judge Stone replied that no definite plan of reorganization had been placed before him, but that when such a plan was presented, he would be glad to hear the opinions of patrons and others before taking final action.

Refunding Issue Authorized by California Commission

The Market Street Railway Company, San Francisco, has been authorized by the Railroad Commission to issue and sell for cash at not less than 93 per cent of their face value, and accrued interest, $13,000,000 of first mortgage 7 per cent sinking fund gold bonds to be dated April 1, 1924, and to mature April 1, 1940, and to use the proceeds obtained therefrom for the purpose of refunding its 6 per cent collateral trust notes due April 1, 1934, and its first mortgage bonds due Sept. 1, 1924.

The company agrees to provide a quarterly sinking fund at the rate of $500,000 per annum from Jan. 1, 1925, through 1932. The sinking fund payments are to be invested in the company's bonds, which are to be purchased in the open market at not to exceed their redemption prices, or if not so obtainable, are to be called at that price. All bonds purchased are to be kept alive in the sinking fund until Jan. 1, 1933, and the interest on such bonds is to be used to acquire additional bonds. On Jan. 1, 1933, all bonds then in the sinking fund shall be cancelled and thereafter the company agrees to provide a quarterly sinking fund of $300,000 per annum until the maturity of the bonds.

The commission in its decision points out that were it not for the fact that some of applicant's important franchises expire on or before Jan. 1, 1933, existing municipal competition, and the uncertainty of what the attitude of the city will be at the time the franchises terminate, the commission would not authorize the sale of the bonds at 93 and accrued interest.

It is estimated by the applicant that the operation of the sinking funds, assuming bonds purchased at the redempton prices, will reduce the bonded debt from $13,000,000 to $8,071,500, on Jan. 1, 1933, and to $5,460,500 on Jan. 1, 1940. The amount of bonds outstanding may be further reduced through the purchase of bonds at less than the call price, and through the sale of mortgaged property. The proceeds from the sale of any such property must be added to fixed sinking fund payment.

The bonds were recently offered for public subscription at 100 and accrued interest, subject to the approval of the commission.

Columbus, Newark & Zanesville Elect Officers and Directors

The stockholders of the Columbus, Newark & Zanesville Electric Railway, Springfield, Ohio, held their annual meeting Feb. 12 at Columbus. The following directors were named: Charles Day, Philadelphia, Pa.; John S. Bleecker, Springfield, Ohio; F. A. Healy, Springfield, Ohio; R. Z. Zimmermann, Zanesville, Ohio, and Edward H. Meyer, Zanesville, Ohio. The directors elected the following officers: Charles Day, president; R. Z. Zimmermann, vice-president; F. A. Healy, secretary and treasurer; J. M. Pogue, assistant secretary and treasurer; E. A. McClure, assistant secretary, and Melward Oliver, assistant treasurer.

Suit Brought to Set Aside Oakland Consolidation

A suit to set aside the reorganization of the San Francisco-Oakland Terminal Railways into the Key System Transit has been filed in the Superior Court of Alameda County by Joseph Bien, representing minority holders of the common stock of the old organization. The court is asked to rule the entire reorganization proceeding null and void and to restore the old company to solvency, basing this demand on the allegation that the company's properties are worth $50,000,000. Mr. Bien further declares that the common stockholders held $48,175,000 of stock and that their rights were not properly recognized in the resale of the property.

Conspectus of Indexes for February, 1924

Compiled for Publication in this Paper by

Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Street Railway Fares* 1913 = 4.84	Feb. 1924 **6.93**	Jan. 1924 **6.91**	Feb. 1923 **6.94**	May 1921 **7.24**	May 1923 **6.88**
Street Railway Materials* 1913 = 100	Jan. 1924 **159**	Dec. 1923 **156**	Jan. 1923 **175**	Sept. 1920 **247**	Sept. 1921 **156**
Street Railway Wages* 1913 = 100	Feb. 1924 **219**	Jan. 1924 **219**	Feb. 1923 **207**	Sept. 1920 **232**	Apr. 1923 **207**
Steel—Unfilled Orders (Million Tons) 1913 = 5.91	Jan. 31 1924 **4.80**	Dec. 31 1923 **4.45**	Jan. 31 1923 **6.91**	July 31 1920 **11.12**	Feb. 28 1922 **4.14**
U.S. Bank Clearings Outside N. Y. City (Billions)	Jan. 1924 **16.14**	Dec. 1923 **15.90**	Jan. 1923 **16.00**	Mar. 1920 **18.54**	Feb 1922 **10.65**
Business Failures Number	Jan. 1924 **2,258**	Dec 1923 **1,862**	Jan. 1923 **2,203**	Jan. 1924 **2,258**	Sept. 1923 **1,280**
Liabilities (millions)	**109.1**	**80.37**	**53.60**	**109.1**	**27.50**

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Eng. News-Record Construction costs 1913 = 100	Feb. 1924 **220.3**	Jan 1924 **217.9**	Feb. 1923 **197.4**	June 1920 **273.8**	Mar. 1922 **162.0**
U.S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Jan. 1924 **151**	Dec. 1923 **151**	Jan. 1923 **156**	May 1920 **247**	Jan. 1922 **138**
Bradstreet's Wholesale Commodities 1913=9.21	Feb. 1 1924 **13.20**	Jan. 1 1924 **13.27**	Feb. 1 1923 **13.72**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
Dun's Wholesale Commodities 1913 = 120 9	Feb. 1 1924 **191.1**	Jan 1 1924 **189.9**	Feb. 1 1923 **186.2**	May 1 1920 **263.3**	July 1 1921 **159.8**
U.S. Bur. Lab. Stat. Retail food 1913 = 100	Jan. 1924 **149**	Dec. 1923 **150**	Jan. 1923 **144**	June 1920 **219**	Mar. 1922 **139**
Nat. Ind. Conf. Bd. Cost of living 1914 = 100	Jan. 1924 **164.6**	Dec. 1923 **165.0**	Jan. 1923 **158.1**	July 1920 **204.5**	Aug. 1922 **154.5**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials.

Wages index is relative average maximum hourly wage of motormen and conductors on 105 street and interurban railways in the United States, operating more than 100 passenger cars each, and weighted according to number of cars.

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Interborough Rapid Transit Will Appeal Dividend Decision

Justice Ford of the New York Supreme Court on Feb. 13 sustained the demand of Nina M. Peabody, holder of shares of Manhattan Railway stock, who sought to recover payment of 7 per cent on the par value of her holdings from Jan. 1, 1922. The action was brought against the Interborough Rapid Transit Company.

Justice Ford held that the Interborough Rapid Transit when it took a lease of the Manhattan Railway for 999 years guaranteed to pay 7 per cent dvidends to Manhattan Railway stockholders for all times unless all "holders of record should join in consenting to a modification." The defendant contended that the earnings of the elevated lines no longer warranted the 7 per cent payment and after negotiations the majority of the Manhattan holders agreed to a modification of the terms of the payments under the lease.

The decision will be appealed to the Appellate Division of the State court. It is pointed out by Interborough interests that the decision is just the opposite of that handed down by Justice Lehman of the same court some time ago on the same question, action having been brought by another stockholder. In other words, due to a technicality, contrary opinions have been handed down on the same question, according to the attorneys. Both cases will be decided by the higher court.

Net Income Increases in Detroit

The Department of Street Railways, city of Detroit, for the month of December, 1923, reported a total operating revenue of $1,876,514, against $1,650,927 for December, 1922. These figures included respectively $1,828,908 and $1,560,663 for total revenue from transportation. Total operating expenses showed an increase, being $1,213,884 in December, 1922, and $1,375,141 in December, 1923.

The net revenue from railway operations amounted to $501,373 in December, 1923, against $437,043 in December, 1922. The net income increased from $47,271 to $65,254. There were 39,504,361 passengers carried in December, 1923, and 38,258,194 in December, 1922.

Foreclosure Sale at Birmingham Set for March 15

Announcement is made of the proposed sale of the property of the Birmingham Railway, Light & Power Company, Birmingham, Ala., under foreclosure on March 15.

The Tidewater line, which runs from East Lake to Ensley, a distance of about 14 miles, will not be included in the sale, it is stated. Some weeks ago the receivers of the company asked permission of the City Commissioners to abandon certain portions of the Tidewater track, saying that this line did not pay and that it was a burden to the other lines. This request was refused. It is stated that if the receivers and the City Commissioners are unable to agree on the disposition of the Tidewater line the Alabama Commission will be asked to settle the matter.

Auction Sales in New York.—At the public auction rooms of A. H. Muller & Sons there were no sales of electric railway securities this week.

Public Service Reports Deficit.—A deficit of $319,654 in the net income of the Public Service Railway, Newark, N. J., is indicated in the company's financial statement for 1923. This is in contrast to a net income of $543,905 for 1922 and is attributed largely to the strike of the employees last fall. The operating revenue for the past year was $20,878,799, compared with $26,116,405 in 1922. Operating revenue deductions were $17,223,886 in 1923 and $20,492,478 in 1922, while the operating income for each of the two years was $3,668,616 and $5,647,209 respectively.

Will Redeem Coupon.—Coupons No. 22, dated Sept. 1, 1917, of the general consolidated first mortgage fifty-year 5 per cent gold bonds of the Mexico Tramways will be redeemed on and after March 1.

Lighting Property Purchased.—The Marion & Bluffton Traction Company, Bluffton, Ind., already engaged in the power and light business, has bought the property of the Linn Grove Light & Power Company, consisting of 50 miles of line and city equipment.

Boston "L" Bond Issue Approved.—The Massachusetts Department of Public Utilities has approved issuance by the Boston Elevated Railway of $2,098,000 of thirty-year 6½ per cent bonds. They will be callable after ten years at 105. Of them $1,500,000 will be used for refunding. The application of the company was referred to previously in the ELECTRIC RAILWAY JOURNAL.

$1,836,712 Net Income.—For the six months ended Dec. 31, 1923, the Brooklyn-Manhattan Transit System, Brooklyn, N. Y., and its affiliated companies reported a total operating revenue of $19,576,898. The expenses were $13,001,474. These two figures are compared with $18,110,247 and $11,954,375 for the same period ended Dec. 31, 1922. The net income in 1923 for the six months amounted to $1,836,712. There is no figure to be compared with this 1923 net income on account of the receivership and reorganization.

Tax Not Discriminatory.—The Washington State tax upon street railways is not discriminatory nor confiscatory, the United States Supreme Court declared Feb. 18 in a decision adverse to the Puget Sound Power & Light Company and the city of Seattle in their suit against the County of King, and others. The company sold its street railway lines to the city in 1919. Prior to the sale state and county taxes had been assessed. The city joined the company in resisting the tax on the ground it was assessed on a higher basis than other property. The Supreme Court found nothing illegal in the method of assessment.

Ohio Road to Be Sold Under Hammer.—The property of the Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, will be sold at auction at Elyria on March 14, an order for the foreclosure sale of the property having been issued by Federal Judge D. C. Westernhaven, on application of bondholders and creditors. The company has outstanding $4,236,000 of common stock and $2,413,000 of cumulative 5 per cent preferred. It was put into receivership on Jan. 20, 1922, on an insolvency petition filed by the General Electric Company.

Officers and Directors Elected.—At the annual meeting of the Columbus Interurban Terminal Company, held on Feb. 12, in Columbus, Ohio, the following officers were elected: A. V. Bland, Columbus, Ohio, president; A. T. Van Denise, Marion, Ohio, vice-president; F. A. Healy, Springfield, Ohio, secretary and treasurer. The following directors were also named: A. V. Bland, Columbus, Ohio; J. M. Pogue, Springfield, Ohio; R. Z. Zimmermann, Zanesville, Ohio; J. S. Bleecker, Philadelphia, Pa.; A. T. Van Denise and W. P. Maloney, both of Marion, Ohio.

New Director Elected.—Morton J. Jourdan, attorney, who has represented the North American Company in the receivership litigation in connection with the affairs of the United Railways, St. Louis, was elected a director of the company at the annual election held on Feb. 11. He succeeds R. L. Warner.

Increase in Passengers Carried.—The net income of the Philadelphia Rapid Transit Company, Philadelphia, Pa., for January, 1924, was $250,317, against $250,100 for the same month a year ago. The passenger revenue amounted to $3,748,596, an increase over 1923, when it was $3,625,768. The number of passengers carried increased from 74,857,899 in January, 1923, to 78,297,258 in the same month of the current year.

Strike Cost $1,027,238.—The International Railway, Buffalo, N. Y., reports a deficit of $1,027,238 for the year 1923, which represents the company's strike cost. In 1922 the deficit was $4,171,847 and in 1921 the company reported a net income of $99,110. The operation and taxes showed a falling off, the 1923 figure being $9,293,963, against $10,044,655 for the year 1922.

Maine Property Fails to Earn Enough.—For the year ended Dec. 31, 1923, the Cumberland County Power & Light Company, Portland, Me., had a surplus of $283,480, against a surplus of $352,881 for the same period a year ago. The Portland Railroad, which is leased by the Cumberland County Power & Light Company, reports a deficit for the year ended Dec. 31, 1923, amounting to $40,897, against a deficit of $4,913 for the year previous. The report to the stockholders says that the operations of the Portland Railroad property resulted in its failure to earn the guaranteed 5 per cent dividend upon the railway stock by nearly $41,000.

Part of Line Near New London Abandoned.—Service on the Shore Line Electric Railway from Keeney's Corner, town of Waterford, to Bank Street and Montauk Avenue, New London, has been discontinued following an order issued by the New London County Superior Court on Jan. 18. Transportation service between the two points will be maintained by a bus line. The railway is in the hands of a receiver.

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Traffic and Transportation

Fare Changes Suggested

Oklahoma City Committee Against Trustees' Operation—Use of Pass With Ten-Cent Fare Suggested

A report adverse to the proposal has been presented by the committee of the Chamber of Commerce at Oklahoma City appointed to consider among other things the suggestion that a committee from local civic organizations take over the Oklahoma Railway as trustees and operate the property for one or two years.

The committee recommends an increase in fare and revision of traffic ordinances in the interest of continued service in Oklahoma City and favors the operation of the property by its present executives.

The committee asks the Chamber of Commerce to request the State Corporation Commission to authorize new rates as a temporary relief measure, subject to further change in a permanent order following a complete investigation of conditions. The increase recommended includes the adoption of the weekly pass plan at $1.25 and an increase of single fares from 7 cents to 10 cents, with three tickets for 25 cents in place of four.

The committee also requests the Chamber of Commerce to ask the City Commissioners to revise the traffic ordinances. This revision would restrict parking in the business center of the city and otherwise restrict the use of street car tracks for automobile traffic to the end that fewer interruptions and greater speed of street cars be permitted.

The committee reports against suspension or abolishment of service on lines now serving certain outlying districts where operating costs are clearly not justified by traffic.

Charges Discriminatory Rates Against Clayton, Mo.

In a decision handed down on Feb. 13 the Missouri Public Service Commission held that the difference between the Clayton and Maplewood rates charged by the United Railways was discriminatory against Clayton. The distance from the downtown section of St. Louis to Clayton is 9 miles, while the distance from the same section to the Maplewood loop is 8¼ miles. The United Railways was instructed to file a new rate to be effective right away. The Claytonians asked for a 7-cent rate between the Clayton Court House and points in St. Louis.

Col. Albert T. Perkins, general manager for Receiver Rolla Wells, denied the discrimination and said that the company would ask for a rehearing. If such rehearing is not granted, he stated it would be necessary, in order to comply with the order of the commission and not carry passengers at a loss, to change the fare zone limit on the Manchester line to the city limits loop instead of at the Sutton Avenue loop as at present. This will result in the fare advance from points in the city of St. Louis to Sutton Avenue in Maplewood from 7 cents to 14 cents.

Traffic Survey in Madison

In response to a complaint the Wisconsin Railroad Commission will undertake an investigation into the service of the Madison Railways. W. H. Damon, engineer of the commission, will be in charge. A traffic count will be made on every line during the rush hours to determine whether or not the company is furnishing sufficient service to handle peak loads. Heating conditions in cold weather will also be covered by the investigation.

Joint Steam and Electric Service in Texas Popularized

The Texas Interurban Railway, operating from Dallas to Terrell, Tex., has effected a working agreement with the Texas Midland Railway, a steam line operating from Ennis, Tex., to Paris, Tex., and passing through Terrell, by which through tickets are sold on either line to points on the other at short-line rates. Close connection is also made at Terrell between the interurban cars from Dallas and the trains on the Texas Midland, so that passengers purchasing through tickets will not have a long wait. Both lines use the same depot, which adds greatly to the convenience of those purchasing through tickets.

Arrangements have also been completed whereby patrons of the Texas Interurban Railway or of the Texas Midland Railway may use the facilities of either or both companies for making Pullman reservations in Dallas, for reserving theater tickets, making appointments in Dallas, etc. This unusual service rendered by the Texas Interurban Railway is proving very popular, and patrons of the electric line residing in Terrell or along the line of the Texas Midland frequently make such reservations or appointments in Dallas. The service is rendered through agents of the lines in the various stations, the dispatcher's phone lines of the companies being used. It has done much to popularize the joint service rendered by the two lines.

The union of an electric line with a steam railroad is regarded as unusual, but it is known that negotiations have been under way for some time looking to the electrification of the Texas Midland by the interests who own the Texas Interurban Railway, and the close affiliation of the two lines now is regarded as an indication of an early electrification of the Texas Midland. Officials of the Texas Interurban Railway, however, are not ready to make public any details of the proposed electrification.

Muncie Jitney Operators Defended

Arguments have been heard by Judge Robert F. Murray in the Superior Court on the motion to dissolve the temporary restraining orders covering fifteen defendants in the suit brought by the Union Traction Company of Indiana against twenty-five Muncie jitney operators.

William A. Thompson, former judge of the Circuit Court, appeared for thirteen of the defendants. He attacked the restraining order on the grounds that the information in the complaint was not properly verified. Other defendants attacked the restraining order on other grounds, chiefly that the city ordinance pertaining to jitneys was illegal.

Suggests Commission Dispose of Philadelphia Ordinance

Mayor Kendrick of Philadelphia, Pa., recently suggested that the entire bus ordinance controversy should be turned over to the Transit Commission for settlement. Further, that that body should be urged to work out an agreement favorable to both the city and the Philadelphia Rapid Transit Company. The bus ordinance calls for the granting of franchises for four bus lines to the Philadelphia Rural Transit Company, which is controlled by the Philadelphia Rapid Transit Company.

The day previous to the Mayor's suggestion the Council had returned the ordinance to the transportation committee for further hearing. Simon Walter, chairman of the committee, said that the return of the bill was based solely on objections which have been raised to the clause providing for a financial return to the city for the use of the streets and fixing the date of expiration of the lease as 1957. Opponents have stood for a short-term lease.

More Passengers Ride the Cars in Elmira in 1923

The Elmira Water, Light & Railroad Company, Elmira, N. Y., carried 8,237,480 passengers on its city lines in 1923, compared with 8,137,518 in 1922 and 7,447,068 in 1921. All these passengers were carried without a single serious accident to any passenger. These facts were disclosed in the brief report about the accomplishments of the company in 1923, recently submitted to the stockholders.

The company states that this is the least prosperous of the departments, due to the large and increasing number of automobiles, the habit many automobile drivers have of "picking up" friends or even strangers who are waiting for street cars and the congestion in the downtown streets. With the brief report was attached an editorial reprinted from the ELECTRIC RAILWAY JOURNAL on "A Basis for Getting the Merchants to Accept Traffic Regulation."

These things were all emphasized particularly for the benefit of the local stockholders.

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Talks to Northeastern "Civils."—Edward Dana, general manager of the Boston Elevated Railway, addressed the Northeastern Section of the American Society of Civil Engineers at the Boston City Club recently upon "The Elevated as You Should Know It." The talk comprehensively outlined the Boston transit problem as it is being solved by the company.

Save the Children.—Mayor Kendrick of Philadelphia, Pa., recently designated Feb. 21 as Public Safety Day, to reduce the growing number of accidents to children in the city. Safety rules have been laid down for children in streets and all have been urged to do their part in reducing the death rate.

Applies for Ten-Cent Rate.—A net operating loss of more than $70,000 in 1923 is responsible for the application of the Androscoggin & Kennebec Railway, Lewiston, for permission of the Maine Public Utilities Commission to install a 10-cent zone rate on all lines of the system. It is expected an increase in revenue to the amount of $130,000 would result from the 10-cent rate. The zone rate has been 9 cents.

Bus Operation Ordered Discontinued.—The Board of Public Utility Commissioners of New Jersey has ordered George Zellers, Sr., George Zellers, Jr., Louis Kessler and Frank Sidone to cease the operation of any bus upon any street in the city of Millville, in the Borough of Vineland or between these places upon which the Millville Traction Company operates a railway line effective Feb. 20, 1924.

By Their Badges Ye Shall Know Them.—A neat coat lapel badge of blue enamel and white metal has been supplied to Los Angeles Railway trainmen and will be the official insignia of the company. It has the initials "L. A. Ry. Co." and must be worn on the left coat lapel. Recently brass buttons for trainmen's uniforms were discarded and plain black buttons substituted so that employees might get greater use from their uniforms as civilian suits. The brass button had the official insignia of the company, but with the change to the use of the lapel badges, the insignia of service is required to be worn only while a man is in service on the cars. A charge of $1 is placed against the record of each man to whom a badge is issued, but this sum is returned on the surrender of the badge when the man leaves the service.

Protests Bus Certificates.—The Lima Street Railway, Lima, Ohio, filed protests with the State Public Utilities Commission on Feb. 15 against the granting of certificates to many former employees of the company to operate bus lines in Lima.

Invites Motorists to Use Tracks.—Motorists of Muskegon, Mich., have been invited by George Steinwedell, president and manager of the Muskegon Traction & Lighting Company, to use the car tracks for travel since 4 ft. of snow make going impossible otherwise in certain sections of the city. At the same time Mr. Steinwedell announced that railway employees had been requested to show every courtesy to motorists and incidentally asked for the co-operation of the driving public in limiting delays due to automobiles and trucks. The statement created a friendly spirit between motorists and the company and won many friends for the company. Motorists had been using the tracks because of the snowdrifts and so Mr. Steinwedell decided that there should be co-operation.

Planning Opening of New Line.—Officials of the Des Moines City Railway, Des Moines, Iowa, are making more or less elaborate plans for the formal opening of the new Crocker Street line. The line now ready has been in prospect for many years as it was one of the proposals incident to the 1915 franchise election, but its construction was delayed by the war period and later by the receivership. Eight of the new passenger cars ordered by the company several months ago are ready for service and the initial trip over the new line will be made by one of these new cars carrying city officials, newspaper editors and representatives of various civic and improvement organizations.

Seeks to Reduce Fares.—The Detroit United Railway, Detroit, Mich., has applied to the Public Utilities Commission for permission to reduce fares between Detroit and Pontiac from 52 to 26 cents, effective March 1. The reduction would apply only to commutation fares.

Ticket Privilege Extended.—It was decided at a recent meeting of the board of directors of the Montreal Tramways, Montreal, Que., to extend the privilege of using children's tickets to school children under the age of eighteen years, while children or students between the ages of fifteen and eighteen are to be obliged to carry identification cards with their portraits thereon. The hours during which these tickets will be valid extend from 7 a.m. to 7 p.m. on every day of the week. This change will go into effect immediately.

Bus Line to Accommodate Students.—The Portland Railway, Light & Power Company, Portland, Ore., has announced that a new crosstown bus line will be established to provide transportation for students of the U. S. Grant High School. This is the first bus line announced by the company and was decided upon when investigation showed that the cost of laying new car tracks and overhead line had quadrupled since 1914.

No More Letter Boxes on Street Cars.—Light motor trucks have superseded the cars of the Twin City Rapid Transit Company in the carriage of letter mail between Minneapolis and St. Paul. In daylight hours each through street car operating over the shortest route between the two cities carried a letter box on the rear platform outside. Letters could be mailed anywhere on the route and bundles of letters were put on the cars at both postoffices. This service had been in operation twenty-four years. The trucks leave either city every half hour at the rush time and every hour the rest of the day. They carry more classes of mail and stop at substations en route and may be stopped along the road to receive mail. The trucks are operated by the postoffice department.

Bus Company Seeks to Operate.—The Ohio Utilities Commission has forbidden the Red Star Bus Company to operate between Columbus and Chillicothe. The decision was based on the statement that the Scioto Valley Traction Company, operating between the two points, was furnishing adequate service. The Red Star Bus Company has declared, in a brief filed in the Supreme Court recently, that motor bus transportation in Ohio is "doomed" if the ruling of the commission is to stand as a precedent.

Wants No Speed Restrictions.—The Birmingham Railway, Light & Power Company, Birmingham, Ala., has requested the City Commission to take off all restrictions on the speed limit of its cars or place them on the same running basis as automobiles. The ordinance under which the cars now operate fixes the maximum speed at 8 m.p.h. at crossings, with 12 m.p.h. between intersections. The automobile limit is 15 m.p.h. at crossings and 25 m.p.h. between intersections.

Safety Example Followed.—Following the example of the Wisconsin division of the Chicago & North Western Railroad, which is carrying on a safety campaign for the elimination of grade crossing accidents by requesting employees of the company having automobiles to come to a stop upon approaching such crossings, the safety committees of the Eastern Wisconsin Electric Company, Sheboygan, Wis., plans to follow the same idea. All employees of the company will be requested to follow the same procedure when approaching crossings whether steam or electric railway.

Denver Tramway Wins.—The winners of the electric railway prizes in a recent essay contest were all employees of the Denver Tramway, Denver, Colo. The Rocky Mountain Committee on Public Utility Information offered prizes to the various employees of the different cities over which its jurisdiction extended. The competition was that of knowing the "why and the how" of the public utility that employed them, so that seekers after information would receive the necessary assistance. The public utilities services covered were tramway, electric light and power, gas and the telephone. In all there were ninety contestants.

Six Cents in Shreveport.—The fare now in effect in Shreveport, La., is 6 cents. The three-year controversy, court fights and counter-suits were terminated some weeks ago by the dropping of the 7-cent rate and the restoration of the 6-cent fare, which is the amount the citizens allowed in the election of 1920. When the courts decided that the election was illegal the fare went to 5 cents. The Shreveport Railways then raised the fare to 7 cents, which was contested by the Public Service Commission. The Industrial Bureau of the Shreveport Chamber of Commerce intervened and through its efforts a settlement was brought about by which the rate of fare of 6 cents was restored. The various developments in the controversy have been covered from time to time in these columns.

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Personal Items

Accountant Becomes Manager

J. M. Pogue, Long Connected with Ohio Interurbans, Will Conduct Indianapolis, Columbus & Eastern Traction Line

J. M. Pogue, recently appointed general manager of the Indianapolis, Columbus & Eastern Traction Company, has literally grown up with the business and has done little else but work on railroads since he was old enough to work. Still in his middle thirties, Mr. Pogue has been connected with Ohio interurban properties since 1907. He began as an accountant in the office of the comptroller of the Cincinnati Traction Company and later became chief accountant of the Cincinnati Northern Traction Company.

When the general offices of the

J. M. Pogue

Ohio Electric Railway system were moved to Springeld, in 1914, Mr. Pogue was appointed assistant secretary and treasurer and remained on that job until 1917, when he was promoted to the office of general purchasing agent for the entire system. When the property went into a receiver's hands in 1921, he was retained as general purchasing agent of the various leased properties which had been welded into the system, including the Indiana, Columbus & Eastern Traction Company, the Columbus, Newark & Zanesville Electric Railway, the Lima & Toledo Railroad and the Lima City Street Railway.

In his new position as general manager for the Indianapolis, Columbus & Eastern Traction Company he will have charge of the operation of the interurban lines from Dayton to Columbus and from Springeld to Lima, two of the busiest in the State of Ohio.

M. L. Campbell, Buffalo, has been appointed superintendent of the Lockport and Olcott interurban division of the International Railway, Buffalo. This appointment has been announced by R. C. Larkin, Niagara Falls, general superintendent of the interurban divisions of the International. Mr. Campbell succeeds John Duerr of North Tonawanda.

W. S. Jenkins has been appointed division superintendent of the Market Street Railway, San Francisco, Cal. He will be in charge of the Twenty-fourth, Utah and Third Street divisions.

H. C. Mackay, who has been treasurer of the Wisconsin Railway, Light & Power Company, Winona, Minn., for many years, will assume the joint duties of secretary and treasurer, as William M. Chester, for many years secretary, has resigned.

Grant Bergsland, connected with the Wisconsin Railway, Light & Power Company, Winona, since July, 1923, has been appointed master mechanic in charge at La Crosse.

A. C. Ward has replaced S. W. Willers as chief engineer of the power station of the Fort Smith Light & Traction Company, Fort Smith, Ark.

R. B. Keating has been elected treasurer of the Monongahela-West Penn Public Service Company, Fairmont, W. Va., to succeed the late Walton Miller. Mr. Miller was also secretary of the company and in that capacity he has been succeeded by S. E. Miller, who was assistant secretary.

John E. Zimmermann, of Day & Zimmermann, was elected president of the York Railways, York, Pa., at the meeting of the board of directors on Jan. 22.

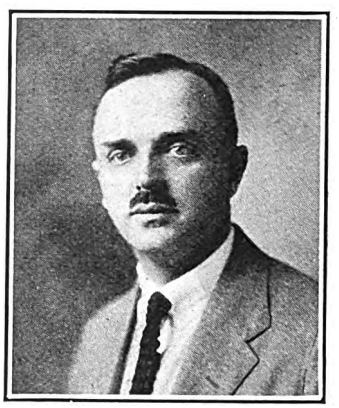
C. T. Wingate, conductor on the Market Street line of the Louisville Railway, was elected employee-director of the company by a vote of the employees on Feb. 14. He succeeds D. L. Kehl, who had served two one-year terms on the board of directors, as employees' representative. Mr. Kehl came from the maintenance of ways department and was runner up for a third-term election.

Otto H. Adams, in the employ of the Indiana Service Corporation, Fort Wayne, Ind., since 1908 and for some time chief clerk to J. A. Greenland, has been made district freight and passenger agent, succeeding John W. Lowry. J. F. Beber, ticket agent, in the employ of the company for sixteen years, will succeed Mr. Adams as chief clerk to the superintendent. William Zimmerman, ticket agent at Lafayette, will assume the former duties of Mr. Beber as ticket agent in Fort Wayne. Leonard Nipple, assistant agent at Logansport, has been promoted to ticket agent, succeeding Mr. Zimmerman at Lafayette.

Henry Grant, recently appointed superintendent of the Tacoma lines of the Puget Sound Electric Railway, entered the service of the Stone & Webster interests in 1912 as electrical engineer and roadmaster for the Pacific Northwest Traction Company in Bellingham. He remained in this position until 1917, when he entered the U. S. Army, serving until 1919. From 1919 to Dec. 31, 1923, Mr. Grant served as superintendent of the interurban and city lines of the Puget Sound Railway in Everett, when he was advanced to his present position. He was graduated from Cornell University in 1912 as a mechanical engineer.

J. E. Wayne Vice-President and General Manager at York

Joseph Edward Wayne, formerly vice-president and assistant general manager of the York Railways and subsidiary companies, has been made vice-president and general manager at York, Pa. Mr. Wayne has been associated with several large electric railway properties in various sections of the country. He served for three years in the repair shops and power house of the Public Service Corporation of New Jersey, and later became identified with the transportation department of the United Railroads of San Francisco. Still later he became superintendent of the Chambersburg, Greencastle & Waynesboro



J. E. Wayne

Street Railway. He resigned from this company and entered the services of the Edison Light & Power Company in York and in 1909 was appointed superintendent of transportation of the York Railways. Following this, he was advanced to the position of vice-president and general manager. Mr. Wayne was born in Philadelphia.

Martin Juhl, for many years district superintendent of the Lake Superior District Power Company, Ashland, Wis., has been selected to take charge of the electric distribution plant of the Washburn Electric Light & Power Company, which the Lake Superior District Power Company recently took over.

George Teague has been promoted to the position of assistant railway superintendent of the Pacific Northwest Traction Company and Puget Sound International Railway & Power Company in Everett, Wash., to replace C. C. Coates, who has been advanced to the position of superintendent. Mr. Teague has been connected with the company for the past five years in the operating department.

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Obituary

Dr. Henry Jameson

Dr. Henry Jameson, prominent in the medical, business and civic life of Indianapolis for nearly half a century, died on Feb. 13 at his home in that city, after a brief illness, of pneumonia.

Dr. Jameson was chairman of the board of directors of the Indianapolis Street Railway and the chairman of the general plan committee of the Butler College board of trustees, in charge of developing the project for removing Butler College to its new site in Fairview Park. For a number of years he was a member of the Board of Park Commissioners, his labors with that body causing him to become known as the father of the city's boulevard system.

Dr. Jameson was one of the leading physicians of the city and was active in teaching at medical schools during the latter part of the nineteenth century and the early part of this. He had not been active in the practice of medicine for about ten years, although he still retained an office and was called into consultation at times.

B. L. Knowles, manager of the publicity department of the Worthington Pump Corporation, died on Feb. 14. Mr. Knowles was forty-five years old. He had been in the employ of the Worthington company for twenty-eight years.

John Mahoney, superintendent of the Hudson Valley Railway, Glens Falls, N. Y., died recently. He had been associated with the Glens Falls property from the time it was under construction. When the work was completed and the route covered the entire distance from Warrensburg to Troy Mr. Mahoney assumed the duties of superintendent.

Edward Heydon, age fifty-four, superintendent of overhead of the Indianapolis Street Railway, died Feb. 7 in Indianapolis, after an illness of one day. He had been employed by the present Indianapolis company and its predecessors twenty-five years.

John Graham, Philadelphia, who, with Percy Warner of Nashville, was one of the receivers of the railway system included in the Chattanooga Railway & Light Company, died at his home in Philadelphia on Feb. 7. Mr. Graham was a consulting engineer with a national reputation. He was graduated as civil engineer from Lehigh University and first engaged in steam railroad work. After many years in this and allied lines he established himself as a consulting engineer, dealing largely with public service corporation problems.

William Flinn, former state Senator of Pennsylvania, died in St. Petersburg, Fla., on Feb. 19 following an attack of pneumonia. The firm of Booth & Flinn, of which he was the head, built a large part of the New York subways and at the present time holds the contract for the new vehicular tube which is being built under the Hudson River.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Outlook in East Promising

General Tripp, Just Returned from Orient, Says Foreign Customers Need America's Help

American manufacturers must be prepared to help in the financing of foreign power developments and to co-operate in the expanding of electric service, if we are to develop our foreign trade on an extensive scale. This opinion was firmly expressed by General Guy E. Tripp, chairman of the board of the Westinghouse Electric & Manufacturing Company, who has just returned from a trip around the world, in which he visited Japan, the Philippines, China, India and Europe. It was during his stay in Japan that General Tripp consummated the arrangements whereby the Westinghouse Electric & Manufacturing Company, together with the Westinghouse International Company, joined in co-operative agreements with the Mitsubishi interests and Takata & Company to bring about more rapid developments in electrical manufacture in Japan.

The Japanese people, General Tripp said, are re-establishing themselves from an electrical standpoint very rapidly. Only one of the large power properties was seriously damaged by the earthquake, although the destruction of transmission and distribution lines was considerable in the devastated district. A very large volume of installation work will be required in the rebuilding of Tokio, Yokohama and other communities within the zone of destruction. The great bulk of Japanese activity in the electrical field, however, is concerned with the expansion of the superpower system, which is rapidly being extended through the building of new hydro-electric stations and interconnection of existing plants.

In the Philippines, China, India and other Asiatic countries there are prospects for extensive industrial developments, but the American business man must not be deceived by the idea that Asia is industrially comparable with Europe or with America, General Tripp said.

General Tripp devoted most of his time to the Far East and made no extended investigation of conditions in Europe. He stressed the importance of recognition on the part of American manufacturers that they owe a responsibility to their foreign customers to extend practical co-operation, assisting them in the generation and utilization of electrical power, both through aid in financing their projects and through guidance in their commercial pursuits.

To Finance Industrial Buildings

A new plan to put the purchase of industrial buildings on a "pay for them as they earn for you" basis has been announced by the Blaw-Knox Company, Pittsburgh. Factories, machine shops, commercial garages, etc., may be bought in this way.

"The need for such a plan has been evident for some time," says A. C. Lehman, president of the company.

"Expansion of a business puts pressure on all available funds. To develop new markets, finance increased production and sales effort, as well as meet current liabilities, frequently requires so much more money than is available that the contemplated progress is impossible. Our plan has been developed after many months of careful study by some of the most capable financial experts in this country. And it is big enough to provide for the financing of industrial buildings of every sort."

Long Bell Extends Operations

The Long Bell Lumber Company, after many years of manufacturing in the pine districts of the South, is transferring its operation to the Pacific Northwest. At Longview, Wash., this company is erecting what is planned to be the largest lumber manufacturing plant in the world. It will be ready to operate in the summer of 1924. This will place the Long Bell company for the first time in the forty-eight years of its history definitely in the Douglas fir market.

Heretofore this company has put all of its efforts into products that had a well defined and somewhat limited territory. With the addition of the fir lumber the scope of its activities will be greatly increased. It is planned to undertake the manufacture of ties on a large scale.

By the latter half of this year it is hoped to develop a new market as large as that now handled by its present Southern mills. With the opening of the fir operations it will be the largest lumber manufacturing company in the world.

Metal, Coal and Material Prices

Metals—New York	Feb. 21, 1924
Copper, electrolytic, cents per lb.	13.375
Copper wire base, cents per lb.	15.50
Lead, cents per lb.	8.70
Zinc, cents per lb.	7.25
Tin, Straits, cents per lb.	54.00
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.75
Somerset mine run, Boston, net tons	2.25
Pittsburgh mine run, Pittsburgh, net tons	2.125
Franklin, Ill., screenings, Chicago, net tons	1.95
Central, Ill., screenings, Chicago, net tons	1.50
Kansas screenings, Kansas City, net tons	2.25
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.60
Weatherproof wire base, N.Y., cents per lb	17.75
Cement, Chicago net prices, without bags.	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal.	$0.96
White lead, in oil (100-lb. keg), N.Y., cents per lb., carload lots	11 75
Turpentine, (bbl. lots), N. Y., per gal.	$1.03

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Railways Buying Safety Coaches

That electic railways are rapidly increasing their motor bus equipment is shown by the report of a single bus manufacturing concern relative to the sale of buses to railways since Jan. 1, 1924. Fageol equipment has been placed in this field during that time as follows: Milwaukee Electric Railway & Light Company, Milwaukee, Wis., five observation parlor safety coaches; Pacific Electric Railway, Los Angeles, Cal., sixteen safety coaches; Los Angeles Railway, Los Angeles, Cal., eleven safety coaches; San Diego Electric Railway, San Diego, Cal., ten safety coaches; Westmoreland County Railway, Pittsburgh, Pa. (Chestnut Ridge Transportation Company), two safety coaches.

Rolling Stock

London Street Railway, London, Ont., during 1923 increased its equipment by the addition of five one-man safety cars and three all-steel, double-truck cars of the Peter Witt type.

York Railways, York, Pa., it is reported, will buy new cars.

Track and Line

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., will repair its tracks on Madison Street, from North Street east to Broadway and on Broadway from Madison Street to the intersection of Wisconsin Avenue. This is in accordance with the recent approval by the City Council of the resolution providing for this improvement with concrete. A controversy had existed between the railway and the city with respect to the paving program, which was to be completed within one year.

Pacific Electric Railway, Los Angeles, Cal., has been granted permission by the Railroad Commission to construct a double track in Lake Avenue at grade across Washington, Rio Grande, Curtis, Denver, Howard Place, Elizabeth, Topeka and Atchinson Streets and a portion of Woodbury Road, and also to construct two turn-outs across portions of Lake and Washington Streets in the city of Pasadena. The company has been ordered to lower its tracks to specific grade level on American Avenue between Anaheim Street and North Long Beach. The company must eliminate curbs and pave the avenue full width from curb to curb.

San Diego & Arizona Railway, San Diego, Cal., has received permission to construct a spur track at grade across Eighth, Seventh, Sixth, Fourth and Second Streets and Fourth and Fifth Avenues in National City, San Diego County.

Duluth Street Railway, Duluth, Minn., is favorable to the extension of its Woodland Avenue line to Calvary cemetery, which is being urged by the Homecroft Community Club.

Ottawa Electric Railway, Ottawa, Ont., has plans looking toward building a double-track extension on Fairmont Avenue from Wellington.

Wisconsin-Minnesota Light & Power Company, Eau Claire, Wis., is being asked to extend its railway line to Fall Creek. The distance between Eau Claire and Fall Creek is 18 miles.

London Street Railway, London, Ont., did considerable track improvement work in 1923. The pavement on Stanley Street for a distance of 1,500 ft. was completed, the track being renewed with new rail, ties and concrete foundation. The track on Briscoe Street, for a distance of 2,000 ft., was constructed with new ties on concrete foundation and paved. The double tracks on Richmond Street, from Oxford to Dufferin Avenue, approximately 1¼ miles of single track, were entirely rebuilt and paved, new rail, ties and concrete foundation being used. In addition, the rail on Oxford Street, on Wellington Street south and on Horton Street, totaling 1⅛ miles, was replaced with new rail.

York Railways, York, Pa., has announced improvements to be made at a cost of $100,000. It will extend its Richland Avenue line to Mill Road; the track on Overbrook Avenue from Market to King Street will be reconstructed. A new siding will be placed at Eagle Park, a rural resort, and a siding constructed at North York.

San Diego Electric Railway, San Diego, Cal., has been authorized to construct an over-grade crossing of the track of the Atchison, Topeka & Santa Fé Railway in the city of San Diego and to construct track across Witherby Street conditional upon construction of new highway.

Power Houses, Shops and Buildings

Los Angeles Railway will build the sixth automatic substation of its system at Sixth Street and Central Avenue, on the edge of the downtown business district, within a few weeks. A 1,000-kw. rotary converter, made by the General Electric Company, will be installed. The fifth automatic substation was put in service at Fifty-fourth Street and Second Avenue Feb. 1. This station has a 1,000-kw. rotary converter of General Electric type. During the year the capacity of one of the ten manually operated substations will be increased by the installation of a new converter.

Wheeling Traction Company, Wheeling, W. Va., has given a contract to the R. R. Kitchen Company for the construction of a new operating carhouse at Norwood.

Trade Notes

Kent Engineering Company, district representatives of the Conveyors Corporation of America, Chicago, has changed its address from 504 First National Bank Building to 1110 Farnam Street, Omaha. This engineering firm handles the sale of American steam jet ash conveyors and American air-tight doors, as well as other power plant equipment in Nebraska and western Iowa.

Crescent Belt Fastener Company, New York, N. Y., has issued a new, concisely arranged service chart covering belt joining. This chart is in card form and covers completely and specifically the means and methods to insure best results under all conditions of work. This service chart, known as Form N. Y. 298, will be sent on request to the company at 247 Park Avenue, New York.

J. B. Engineering Sales Company, Connecticut sales representative of the Conveyors Corporation of America, Chicago, has moved its office from Hartford to Chamber of Commerce Building, New Haven. This firm handles the sales of American steam jet ash conveyors and other power plant and engineering specialties.

General Electric Company, Schenectady, N. Y., has recently given new geographic designations to its district office sales territories. The new designations more accurately describe the geographic territory covered by the districts in question. The old Atlanta district is now known as the Southeastern district, Boston district as New England district, etc.

Woeber Car & Manufacturing Company, Denver, Col., suffered by fire Feb. 7 damages amounting to about $12,000. The loss is covered by insurance. The Woeber concern was the maker of most of the tramway cars traversing the streets of Denver, but of late years the Denver Tramway, having decided to make its own cars, the Woeber concern has turned its attention largely to the making of automobile bodies.

Charles N. Pittenger, former superintendent of the Steubenville, East Liverpool & Beaver Valley Traction Company, East Liverpool, Ohio, is now connected with the G. C. Kuhlman Car Company, Cleveland. Mr. Pittenger went to Pittsburgh about two months ago, but shortly afterward became identified with the Kuhlman concern, a subsidiary of the J. G. Brill Company of Philadelphia. He has supervision over wiring and equipping of all cars constructed in the Cleveland plant.

Heine Boiler Company, St. Louis, Mo., announces that the Tennant Company, with offices in the Union National Bank Building, Houston, will represent it in a new territorial division comprising the entire southern half of Texas. J. A. Tennant is in charge of this office. Messrs. Smith and Whitney of Dallas will continue as the Heine Boiler Company representatives in the northern half of Texas.

New Advertising Literature

Herbert Morris, Inc., Buffalo, N. Y., has issued book 5060, entitled "Thrift in Lifting." The booklet contains some thirty pages, illustrated, describing unusual features found in Morris cranes, information on platform hoists and slings of various types, triple-gear chain-blocks and overhead monorail tracks. The book was planned to give the information in the most concise form possible on material handling machinery.

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New York, March 1, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 63
Number 9

Akron's 5-Cent Rubber Bubble Bursts

THE cars are running again in Akron—at a higher rate of fare. Of course it was tempting, and it did appeal to the imagination, to set out to make Akron the first motorized city. But it takes more than a supply of rubber close at hand to make a satisfactory transportation system. It takes equipment, organization and experience. This the people of Akron now know. They also know that while it might have seemed to point to greater prosperity for Akron to start the movement toward motorizing its local transportation system, inasmuch as its prosperity is so largely bound up in the market for rubber tires, actually it was disastrous to the prosperity of the city to be without local railway service.

This is not to say that the contest waged in Akron proved that buses could not supply the local transportation. There was no test of the bus. There has never been a real test of the bus in any of the cities where there has been a cessation of railway operation. The thing that has been demonstrated in Akron, as in these other instances, is that no responsible party can be found who will sign up to motorize the city at a 5-cent fare, or at a fare as low as the offer of the railway. Only those poor innocents with ample ambition but little knowledge of the transportation business and no financial capacity have been available as ready signatories to a 5-cent or near 5-cent contract.

Enough such examples have now been afforded so that it would seem that in the future public officials and public, if willing to be guided by the experience of other cities, will realize that motorization, so far as it is economic and practicable, must come as an orderly, gradual process. It cannot come overnight by kicking the traction company out of the community, even though there be the disposition to ignore the contribution of the railway in building up the city. It cannot come by setting out to destroy the capital in the railway which was invested in good faith to provide a public service.

Motorization can best come, in so far as it truly adds in a sound way to the transit facilities of a city, by permitting this development to take place in the hands of the one organization experienced in transportation work—the local railway company, and by urging such development. That is what had been started by the Northern Ohio Traction & Light Company in Akron. And as soon as the company is given a definite and fair basis on which to work, it plans to extend materially its use of buses. Thus, the quickest way for Akron to realize its ambition, as far as motors can do the job, is to leave the matter in the hands of the N. O. T. & L. and give that company a square deal.

So it comes about that Akron's rubber bubble has burst.

Outlook for Settlement at Phoenix Improved

PHOENIX, ARIZ., has now decided to go slow. Disgruntled at its local street railway, the first thought was to abrogate the franchise and try to arrange for municipal ownership with private operation. In fact, a committee of citizens appointed by the Mayor recommended this procedure. Now the measure to instruct the City Attorney to proceed to abrogate the company's franchise has been tabled and if the Mayor has his way an independent engineer will be engaged to study the situation and report upon the facts.

A very wise decision is this of Phoenix. In the present state of public opinion over the dispute of the city with the railway about paving, it would probably be difficult to convince the city that it has been enjoying a good thing, but it has. In fact, as to its railway service, Phoenix has been subsidized for years. The owners of the property have never received any dividends. At their expense the residents of Phoenix have continued to ride on a 5-cent fare in a city of only 30,000 inhabitants with 40 miles of paved streets, and in a county where there are 275 miles of paved highway, with a registration of 14,000 private automobiles and 365 days of fine weather every year. These are all facts, except that the 365 days of fine weather is Phoenix's boast. However, even an approximation of this boast adds to the railway's dilemma. The peculiar thing about this situation and others similar to it is that the very persons who in the mass continue indefinitely to accept without a blush a service for which the producer does not receive even the cost would be the first to resent the imputation of charity behind a subsidy handed to them individually.

More Evidence that Salaries Need Adjustment in Electric Railway Field

IT IS difficult to get a true comparison between the salaries paid college men in the electric railway field and those in other industries. Figures of this sort, being personal and confidential in their nature, are not ordinarily available. Recently, however, an organization composed solely of those men who attained the highest rank in college in the electrical courses conducted an investigation of the salaries paid its members in different branches of the electrical industry.

The figures published show the salary range for men out of college two, five and ten years, divided into fourteen classifications of work. The average of salaries for the electric railway men with two years of experience was seventh in the list. Thus it was just an average figure for the whole field. The six classifications paying better salaries at this period, in their order are jobbing, government work, miscella-

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neous, telephone manufacturing, small electric manufacturing and telephone operating.

But when the graduate has been out five years the electric railway men have fallen to the bottom of the list, being passed by those engaged in large central station work, large and medium sized electric manufacturing, small central station work, miscellaneous manufacturing, contracting, and even teaching. At the end of ten years there could be no further drop in rank, since the bottom had been reached five years before, but the discrepancy between salaries increased, there being a considerably lower average salary for the electric railway man than for the teacher.

The salary for the railway man, in other words, increases less rapidly on the average than that of any of the other groups. From an average of $2,100 at two years out of college, it grows only to $2,450 after five years and $3,050 after ten years—an increase of about $100 a year. The teacher, on the other hand, averages $1,850 at two years, $2,550 at five years and $3,350 at ten years, or nearly $190 a year increase. At the other end of the scale are the jobbers, who average $2,850 with two years of experience, $3,700 with five years and $4,750 with ten years—not quite $240 a year advance. So the teacher whose salary is generally looked on as exceptionally low, actually gets a salary 10 per cent higher after ten years experience than the electric railway man does.

When cold statistics of this sort are published it does not make a pleasant picture for the railway industry to contemplate. While the figures apply specifically to electrical men only, it is believed that it is typical of the groups of trained men in various lines of electric railway work. What inducement is there, then, for the man with a good technical training to spend the best, the most productive years of his life for a pittance, while his classmates in all other lines of the business forge ahead of him?

If the industry is to progress it must attract to its support men who can supply the needed knowledge and virility demanded by the extremely difficult problems of modern transportation. And to do that these trained men must be paid salaries commensurate with the importance and exacting nature of the work. They must have an opportunity to progress at least on a par with those who have picked other lines of endeavor. Until this is made true the electric railway field cannot hope to get its share of the best talent, particularly when such definite information as that quoted is being circulated in college circles.

And the industry suffers accordingly.

A Change in Feeling in Regard to Snow

TEN years, even five years ago, a snow storm meant to most electric railway companies only additional expense and often loss of traffic. Not only did the snow have to be removed, but teams would find the tracks the only part of the street that was cleared, and their slow progress delayed car movements. Owing to the tediousness of travel, shoppers and others not obliged to take the cars would remain at home.

The present extensive use of private automobiles has changed all this. Following a snow storm many automobile owners leave their cars in the garage because the snow in the streets makes automobile driving difficult and disagreeable, and the snow piles at the sides of the streets limit parking space. The effect on street railway travel is noticeable; in fact, the net gain from additional passengers in many cases undoubtedly far exceeds the cost of snow removal. Railway men in the New England States say they have had substantially less riding this winter than last on account of the open winter.

This again is an illustration of the essential character of the railway transportation in any community. Whenever other means of travel fell down, the people turn to the trolley. Not only is the street car, with its comparatively powerful motors, well fitted to make its way through the streets when conditions are bad, but the organization behind it stands ready to fight the elements in a way that individuals acting singly cannot attempt. This is one of the points that should be given consideration when an attempt is made to evaluate electric railway transportation in comparison with its competitors.

Judas Had the Decency to Hang Himself

A YEAR ago last August, during the strike of the employees of the International Railway, a train on that company's Niagara Falls high-speed line ran into a section of track destroyed by dynamite. One car of the three-car train left the track and turned over on its side. Fifty persons were injured. Suspicion fell on members of the Amalgamated Association. Now, more than a year and a half later, convictions have been secured before a Federal judge on the technical charge of transporting dynamite in interstate commerce, and sentences of one year in jail and a nominal fine have been imposed on each of four of the men alleged to have been connected with the case. The case was brought in the Federal court under the technical charge of violation of an interstate commerce provision because it was the judgment of those charged with the prosecution that a jury in the local courts could not be depended upon to render a verdict in accord with the evidence. On the same basis, shortly, more of the men alleged to have had a hand in the Buffalo dynamiting will go to trial on the same basis.

This very briefly is an outline of the news facts connected with the case. They will bear careful consideration. Entirely aside from the merits of the controversy between the railway and its men, it represents another sad chapter in the history of trade unionism that places Buffalo beside the outrage at Herrin and the dynamiting of the Los Angeles *Times*. If ever men "sold out" their union associates these men at Buffalo did so. If there is such a thing as trust in unionism then these men betrayed it. They were no less offending in their way than was Judas Iscariot, who sold his Saviour for thirty pieces of silver. Judas had the decency to go hang himself. But the Buffalo criminals who have so far been convicted have appealed their cases to a higher court in an effort to stay their absurdly mild penalty. In passing sentence, of course, the court was confined in the degree of severity of punishment which it could impose by the limitations of the technical charge on which the men were arraigned. It is impossible to fathom the feeling of the court, but it does not seem unreasonable to think that perhaps the judge had in mind the classic lines:

> O pardon me, thou bleeding piece of earth,
> That I am meek and gentle with these butchers.

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Semi-Automatic Substation at Concord

The 500-Kw. Unit Needs Only to Be Started in the Morning—It Operates Without Attention and Shuts Itself Down Automatically at Night—The Installation Is an Improvement Over an Earlier One of Smaller Capacity Destroyed by Fire

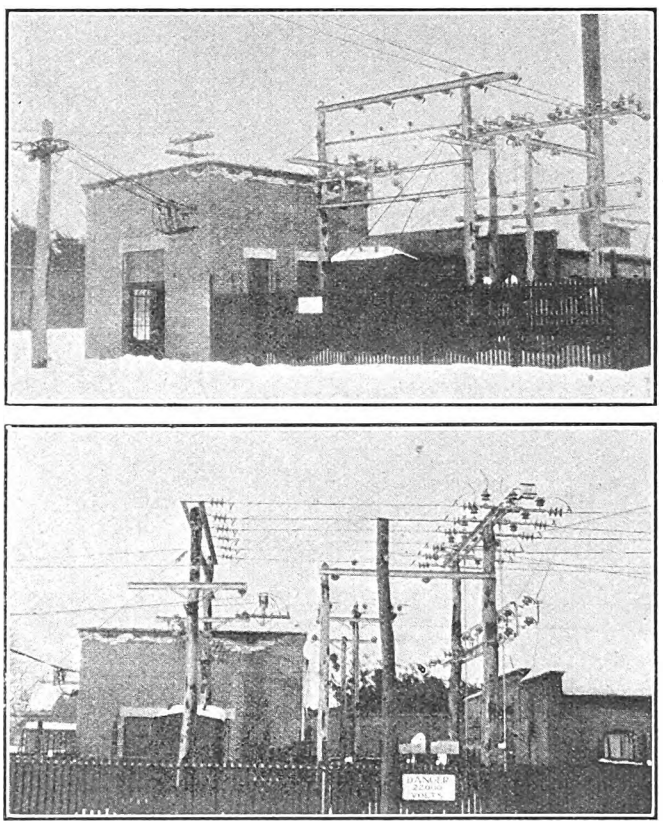
A NEW type of semi-automatic substation has been installed by the Concord Electric Railways, Concord, N. H. This station has been worked out to obtain all possible automatic features that could be obtained at a minimum cost, without going to the expense of installing full automatic equipment.

In the ELECTRIC RAILWAY JOURNAL of Feb. 4, 1922, page 184, an account was given of the automatic substation equipment at that time recently installed by the railway, emphasis being laid upon the labor-saving features of the two substation layouts then completed. On Dec. 4, 1922, the West Concord automatic substation was destroyed by fire, and the company at once began to study the question of replacement. J. B. Crawford, superintendent, was convinced that any new installation should be designed as such from the ground up, housed in a fireproof structure with as much outdoor equipment as good practice would allow, and possessing the more important features which experience with the South Main Street substation and the one destroyed had shown to be desirable. As a result an entirely new substation has been built at West Concord, and provision made there for suitable interconnection with the lines of the Concord Electric Company, the local central-station organization, as well as for semi-automatic service in the supply of energy to the railway.

The new substation, shown in the illustrations, has a rating of 500 kw. instead of the 300 kw. of the former installation. It is adjacent to an old steam plant which housed the earlier equipment, the steam installation still being held in reserve in case of a serious power shortage at the Franklin hydro-electric plant of the railway, or inability to secure adequate power from the local central station. All the high-tension equipment is located outdoors. The substation building, which is only 24 ft. by 22 ft. in plan, is of brick, with a concrete floor and wireglass windows. The windows are also provided with heavy screening to protect them from missiles, the substation being in a semi-rural location. One of the pictures shows a side view of the property, with incoming transmission lines, and another shows the lightning arrester equipment, which is of the oxide film type and was furnished by the General Electric Company.

The company's facilities for operation and maintenance supervision, coupled with lower first cost, led to the choice of a semi-automatic equipment for West Concord. The building houses a 500-kw. Westinghouse rotary converter and switchboard. The automatic apparatus was supplied by the Automatic Reclosing Circuit-Breaker Company, Columbus, Ohio. The converter delivers 600-volt direct current to the trolley system, and the unit runs at 1,200 r.p.m. The cost of the new substation, exclusive of the transformer bank and interconnection with the Concord Electric Company, was about $40,000.

The scheme of connections at West Concord is indicated in the single-line connection drawing. As outlined in the previous article, the major source of energy supply is at Franklin, 19 miles north of the city of Concord. Two 22,000-volt, three-phase lines pass the West Concord substation, and from each of these a tap is taken through disconnecting knife switches to an outdoor bus structure in the substation yard. A tap to the lightning arresters is taken off each branch circuit, and after passing through choke coils the two branch lines are brought together into a common overhead bus with disconnecting switches in each phase between the coils and the bus. One three-phase connection is then made through disconnecting switches to the railway equipment and one to the Concord Electric Company interconnection apparatus.



Front and Side of New Semi-Automatic Substation at Concord, N. H.

The railway service equipment includes a 22,000-volt oil circuit-breaker mounted in an inclosure on a concrete foundation, just outside the substation building, and a bank of three 167-kva. transformers which reduce the potential to 432 volts. The secondaries of these transformers are connected by a three-phase underground line with the switchboard and rotary converter inside the building. The detailed scheme of wiring is indicated in the larger line diagram.

The switchboard for railway service consists of five panels. From left to right these are assigned to the following uses: Starting, alternating-current side of

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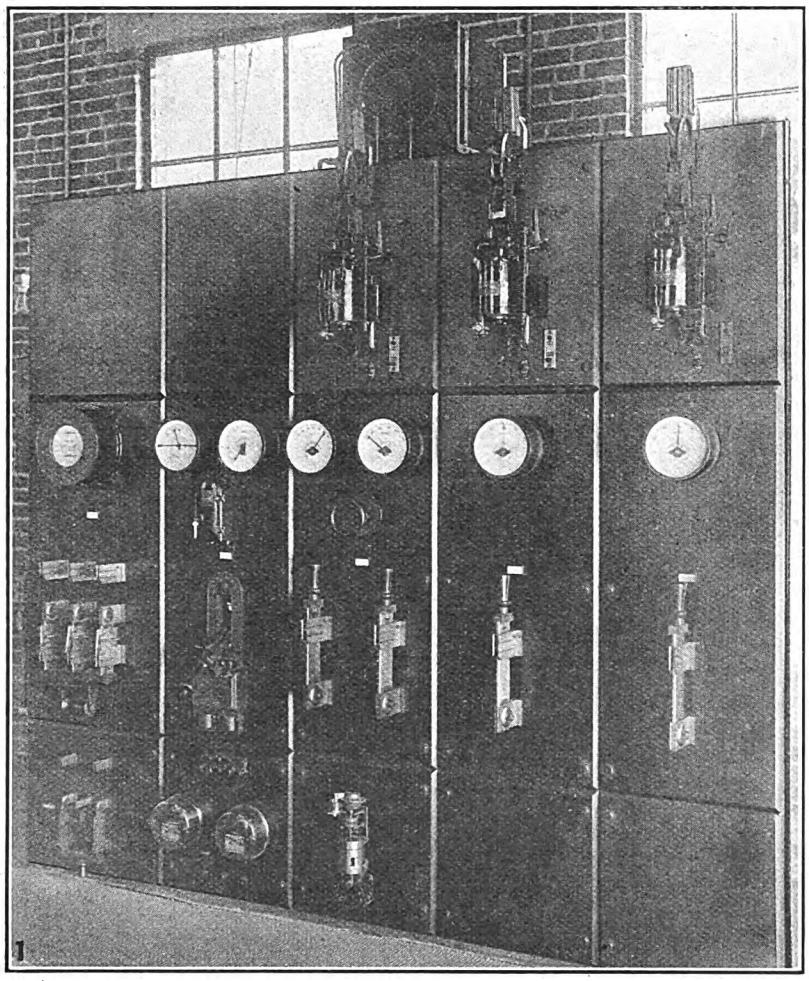
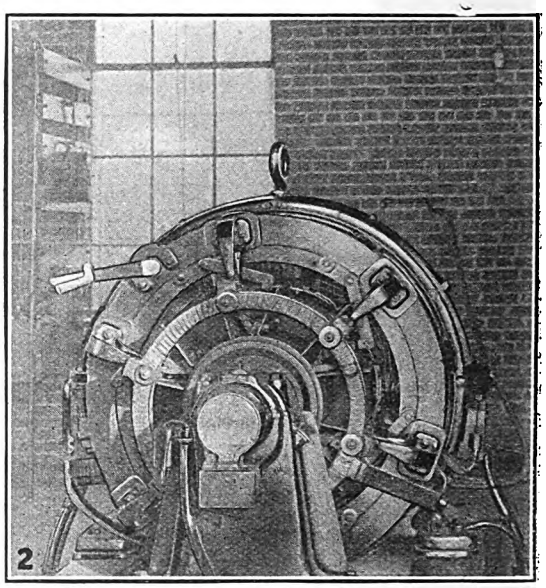
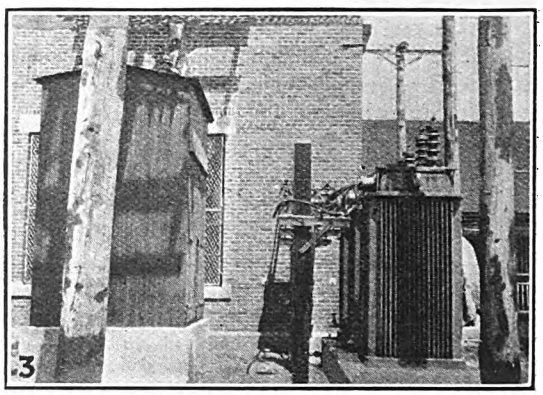


No. 1. The automatic switching equipment is shown at the tops of the switchboard panels.



No. 2. The dimensions of this 500-kw. converter are smaller than those of the 300-kw. unit it replaced.



No. 3. The transformer bank is shown at the right; at the left is a housing for the high-tension circuit breakers.

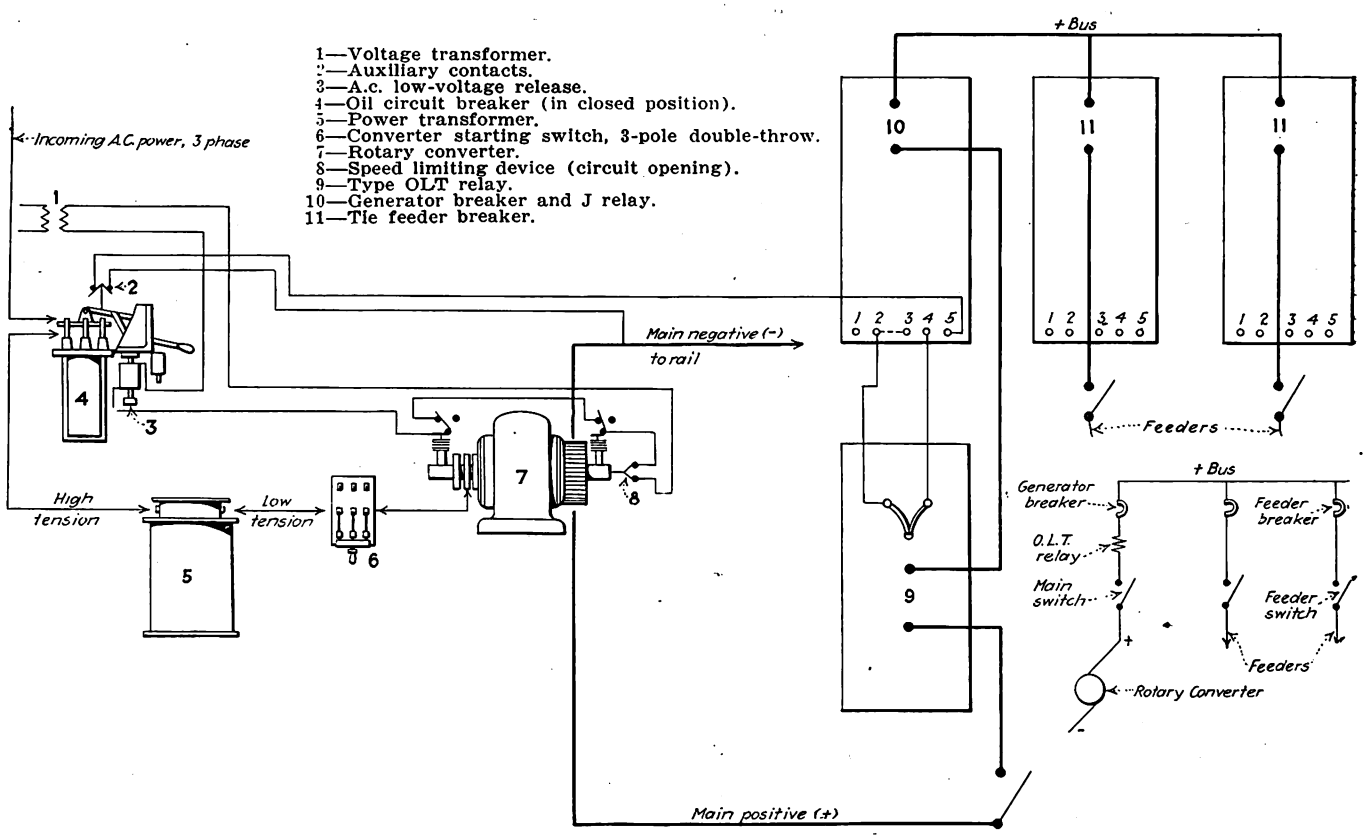


Diagram of Connections of the West Concord Substation. A Schematic Diagram of the D.C. Connections Is Shown in the Insert at Lower Right

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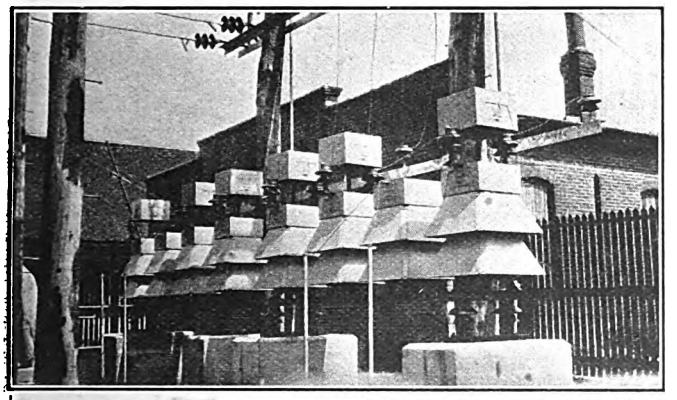


The Lightning Arresters Are Connected to the 22,000-Volt Lines

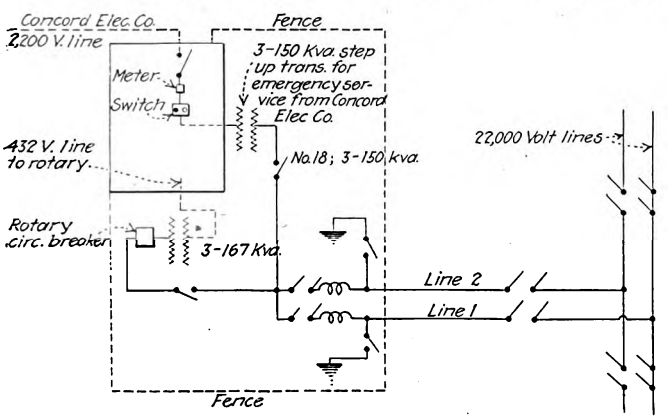
rotary, direct-current side of rotary, and two feeders. The starting panel carries a watt-hour meter, starting and running switch, and reversing switch for changing the polarity of the rotary. The alternating-current rotary panel carries a reactive-factor meter, ammeter, Anderson time switch for cutting off the substation at a predetermined hour of night after the day's run, a handle for manual working of the 22,000-volt circuit-breaker when necessary (with bell-crank lever running outdoors) and two time-element overload relays which close the circuit through the 22,000-volt breaker trip coil in case of protracted overload. The breaker is of the solenoid-operated type.

Automatic Relays Control Breaker

The direct-current panel for the rotary contains a volt-meter, ammeter, positive and negative knife switches, field rheostat handle and an automatic reclosing circuit breaker. This breaker is equipped with an automatic reset reverse-current relay and a type OLT long time interval overload relay, whose function is to allow a high setting of the breaker for instantaneous overload, while at the same time it protects the generating unit against prolonged excessive overload. The reverse-current relay protects the generator unit against reversal of current and allows the unit to be connected automatically to the bus when the correct polarity has been restored.

This breaker is also interlocked with the a.c. side through auxiliary contacts on the a.c. oil circuit breaker so that in case this is tripped, due to excessive overload, phase failure, no voltage, operation of the time clock, overspeed, or operation of the bearing thermostat, the d.c. side will be disconnected from the bus.

Each feeder panel contains a single-pole knife switch, ammeter and automatic reclosing circuit breaker. In case of outside short circuit the feeder breakers remain open until a definite time cycle has elapsed and will not again close until the excessive overload or short circuit has been removed.



One-Line Circuit Diagram, Showing Interconnection of Railway and Central Station Power Supply Systems

Operating Cost Low

The only attention required is starting the substation in the morning and regular inspection of the equipment. One maintainer starts the unit at 4.45 a.m., and the installation operates until midnight, when the Anderson time switch cuts it off. The total cost of inspection and operation is about $800 per year. The substation was placed in service in June, 1923, and has given entire satisfaction since.

The substation is wired for direct-current series lighting and for emergency lighting from a.c. multiple service. A bank of three 150-kva. transformers stepping up from 2,300 to 22,000 volts is provided outside the substation building for the interconnection between the Concord Electric Company and the Franklin-Concord transmission lines, with a General Electric oil circuit breaker, watt-hour meter and disconnecting switch mounted inside the building. A 500,000-circ.mil 600-volt direct-current railway feeder passes through the substation, and a knife switch mounted outdoors provides means of by-passing this substation if it is desired to work upon the interior equipment. It is of interest to note that the new rotary converter is only about one-third the size of the former 300-kw. unit, and will withstand a 50 per cent overload for two hours.

Trolley Guides in Portland, Ore.

A GREAT many cities indicate their different routes by letters or numerals carried on the dashboard, hood or other conspicuous place. The Portland Railway, Light & Power Company, Portland, Ore., goes a step further and publishes a twelve-page pocket folder showing the routes taken by the different lines, so marked, with a statement of the times that the first car and the last car of that route leave the terminals. The form in which the information about a single line is published is reproduced below.

A very brief reference to this guide was published in the issue of this paper for Feb. 2, but by a typographical error the name of the city was given as Portland, Me., instead of Portland, Ore. The Portland Railway, Light & Power Company gives these guides to passengers on request and they are supplied from ticket offices, agencies, information bureaus, hotels, etc. The guide has been found to be a business getter.

RC ROSE CITY—*Outbound*—From Fifth and Washington Streets via Washington Street, Second Street, Burnside Street, Burnside Bridge, East Burnside Street, East 10th Street, East Davis Street, Sandy Boulevard to East 82nd Street. *Inbound*—Return same route to Burnside Street to Fifth Street to Washington Street.

First car leaves—	Fifth and Washington	5:59 A.M.
	82nd and Sandy Blvd	5:30 A.M.
Last car leaves—	Fifth and Washington	12:30 A.M.
	82nd and Sandy Blvd	12:01 A.M.
Owl car leaves—	Fifth and Washington	1:30 A.M. and hourly
	82nd and Sandy Blvd	2:01 A.M. and hourly

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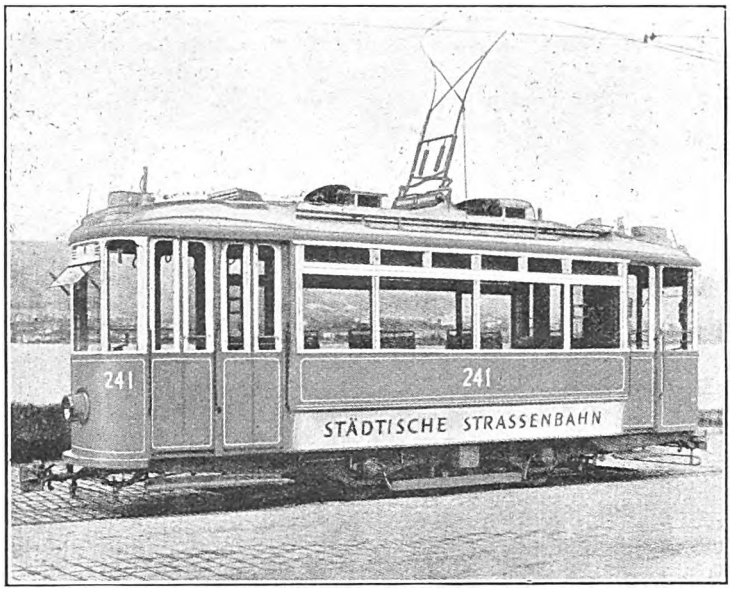
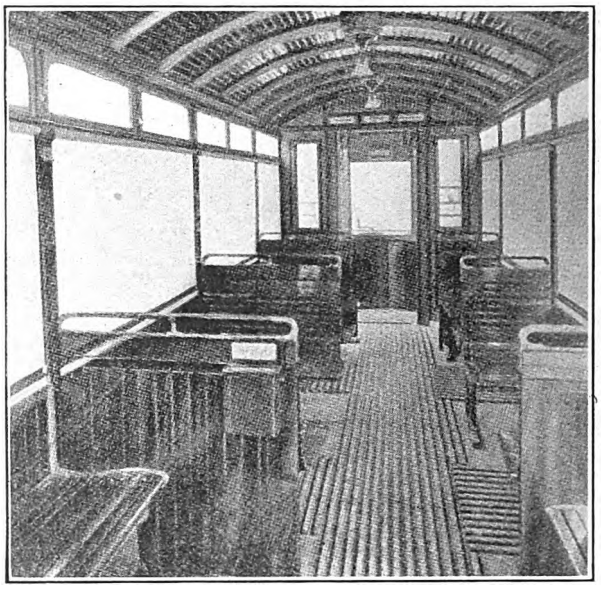


The Influence of American Practice Is Seen in This Swiss Motor Car



This Seating Arrangement Is Used Because the Car Is Only 7 Ft. 2 In. Wide

Larger Motor Cars for Zürich

An Important Feature in Construction Is Continued Use of Aluminum Panels—They Are Used for Train Service with Light-Weight Trailers

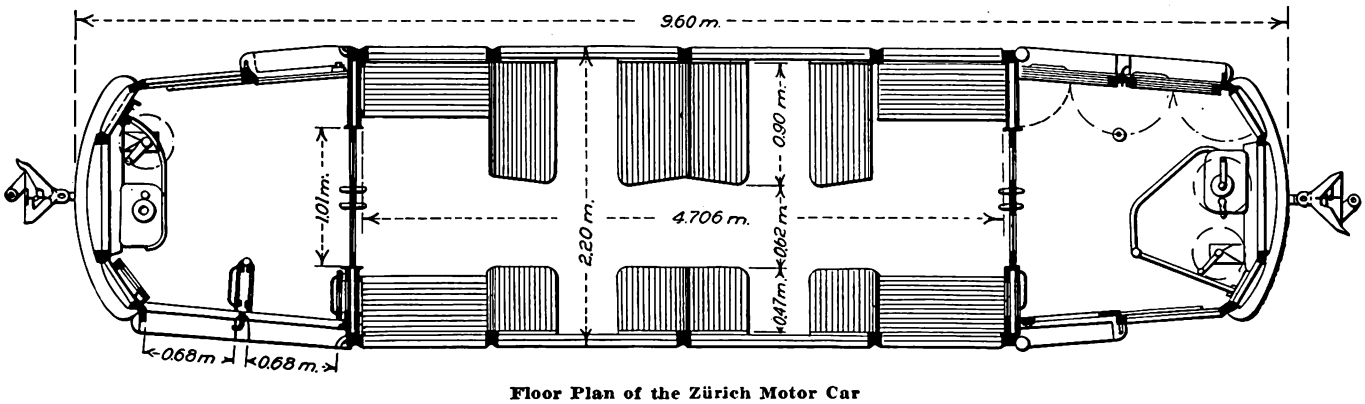
THE Municipal Tramways of Zürich, Switzerland, serving an industrial population of some 215.000 persons, has recently added twenty motor cars, eighteen trailers and six rebuilt open summer cars to its equipment. The motor cars are of particular interest as showing the most recent development in Continental practice.

Although double-truck cars were considered impracticable for Zürich track and passenger-interchange conditions, the length of the car body proper was extended from 4.16 m. (13 ft. 7 in.) to 4.7 m. (15 ft. 5 in.) and the width enlarged from 2 m. (6 ft. 6 in.) to 2.2 m. (7 ft. 2 in.). The latter change made possible the first use of the cross-seats to the extent of a double seat on one side and a single seat on the other. The platforms and vestibules have been tapered American style, following the management's previous use of this construction on its Forch suburban railway. Separate exit and entrance is now provided at the rear by means of double-folding doors, while a sliding door at the motorman's end provides for front exit. The body has end doors of sliding type. The over-all length of the car over vestibules is 9.58 m. (28 ft. 1 in.) and over couplers, etc., 9.6 m. (31 ft. 6 in.).

The car interior has twenty seats, but only four standee spaces. On the other hand, the official standee spaces on front and rear platforms are ten and eleven respectively. Thus, the legal carrying capacity of the car is forty-five passengers, twenty seated and twenty-five standing. The preceding (1915) type motor car had a total capacity of but thirty-five passengers.

The entire body length is taken up by only four fixed sash, but ventilation is provided by means of six narrow hinged sash above these stationary windows. Each vestibule is provided with a hinged sash for regulation by the motorman, according to weather conditions. Each vestibule also has a louver ventilator on each side of the signal light above the hinged sash. The car roof is also provided with two louver ventilators which operate in connection with the auxiliary hinged side sash mentioned.

The framework of the car is of oak, ash and pitch-pine, and the general finish in ash, oak and elm. The panels, however, are of aluminum in accordance with the management's standard practice since 1910. The body panels are 2 mm. (0.0786 in.) and the platform sheathing, 3 mm. (0.1181 in.) thick. The advantages found in practice are given as: (a) Easier maintenance, as in restoring bent portions; (b) less repainting than sheet steel; (c) less weight. Oxidation can be kept to a negligible amount if all contact surfaces between the sheathing and the posts are first well covered with oil paint.



Floor Plan of the Zürich Motor Car

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The motor-car body is carried on the truck through four leaf springs. The wheelbase is 2.6 m. (8 ft. 6 in.) instead of 2 m. (6 ft. 6 in.), as in the previous design. Among the up-to-date features are ball-bearing journals and automatic couplers with which the electric braking of motor and trailer is included. The two motors are rated at 60 hp. each at 500 volts, and 66 hp. each at 550 volts. The gear ratio is 1 to 4.8 and the car-wheel diameter, 860 mm. (33.8 in.). The controllers have six series positions, four parallel positions and six additional positions for the four electro-magnetic track brakes. Both the resistors and the circuit-breaker are mounted on the roof. Bow trolley collectors are used, as is customary in Zürich practice.

The total weight of a motor car is 12,800 kg. (28,300 lb.), of which the two motors alone contribute 2,700 kg. (5,960 lb.).

Of the eighteen trailers, nine are of the same width and with the same door arrangements as the new motor cars. These cars have sixteen seats and official space for twenty-six instead of twenty-two standees. They weigh 5,200 kg. (11,440 lb.) complete. Automatic couplers with electrical contacts for the brake system are used.

It may be of interest to add that while part of the electrical installation was made at the railway shops and part at the car builders' plants, the work in both cases was done by the personnel of the railway.

Important Points in Traffic Control

An Analysis of Four Important Points in Traffic Control with Their Effect on Street Congestion—Suggestions Are Made for Practical Relief

By J. Rowland Bibbins
Consulting Engineer, Washington, D. C.

IN THE ELECTRIC RAILWAY JOURNAL of Feb. 23 the broader aspects of the so-called "traffic problem" were discussed by the writer. But certain phases of the program suggested will justify much further research, along technical and economic lines, than they have received in the past. These are:

1. Increase in traffic signal control efficiency in relation to track and roadway capacity, especially at master control or key crossings.
2. Developing track capacity at electric railway downtown terminals to the fullest extent, speeding up terminal operations and providing for expansion of the terminal district and service.
3. Economic design of roadways, both in cross-section and alignment, and their economic use for maximum efficiency of the whole thoroughfare system, including transit, traffic and combined purposes.
4. Perfecting routing and operating methods, so as to forestall uneconomic competition, through betterment of rail service.

It has become quite apparent to the writer, after considerable study, that these factors are closely interdependent. This is one reason why adequate results as a whole have not been achieved in our city-congested districts because, as a rule, only one part of the problem has been considered, and this not always in a very scientific manner.

TRAFFIC SIGNAL CONTROL EFFICIENCY

Of this group, traffic signal control is perhaps of first importance. Too often the policemen on the corner, not the president of the company, determine the schedules on which the railway system will be run. Detailed time-studies indicate that today a very large amount of crossing time is lost due to the unscientific application of signal control. Moreover, this delay is cumulative, both as to cars and traffic, and mounts in lost time and money into colossal figures. Several points are involved:

(a) The duration or length of the signal cycle. This is most important and should vary according to the time of day and pressure of traffic movement.

(b) Relative distribution of time between stop and go signal—in proportion to the traffic needs in each direction.

(c) A preparatory signal. This is desirable but seldom used.

(d) Relativity of main line and cross traffic movement.

This last determines whether the master control of a long street or of a given traffic area can be properly carried out from one key point. Curiously enough, "Main Street" traffic is usually supposed to be largely *through* movement, but a traffic survey often shows the contrary, i.e., that "Main Street" is simply a *clearing street* for transverse traffic and not through traffic. In that case it should be signaled just like any terminal intersection and not as a trunk line. In some of the block signal installations in this country this incorrect assumption has led to such great confusion that the fixed block system as applied to the through artery had to be abandoned at times, although retained at the key point.

There is much to be gained by the study of the variable versus fixed signal system. For some reason, almost all of the block signal systems that have been installed have been placed on an arbitrary fixed period basis running through the day (9 a.m. to 9 p.m.) regardless of the traffic, the weather, the day of the week or the season, and particularly of the varying amount of cross traffic. The result is needless waste of street capacity and unnecessary delay to all traffic during many hours of the day. It is only necessary to observe, in cases of this kind, what a large proportion of the signals are held open after all traffic has passed (i.e., with an idle crossing), waiting for the clock to tick for the next signal change. This is most unscientific. Street car schedules cannot contain so much lost motion. Why should traffic?

A general guide to good signal control should be the minimum of rigidity, whether by block signal, semaphore or hand control. In fact, it is curious to observe how the rigid semaphore system has fastened itself onto our police regulations, and it only too often occurs

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TABLE SHOWING COMPARATIVE EFFICIENCY OF THREE-PART AND TWO-PART CYCLE

	Three-Part Cycle, Length Two Minutes or Thirty per Hour			Two-Part Cycle, Length One and a Half Minutes or Forty per Hour			
	For Cars	For N.-S. Vehicles	For E.-W. Vehicles	For all N.-S. Traffic	Equivalent Number of N.-S. Passes*	For all E.-W. Traffic	Equivalent Number of E.-W. Passes*
Length in seconds for movement	30	45	45	45		45	
Average number of unit passes per movement	4.37	27.4	26.7	1.34 cars and 20.5 vehicles	25.9	1.93 cars and 20.1 vehicles	27.8
Equivalent number of unit passes per minute of	8.74	36.6	35.7	1.8 cars and 27.4 vehicles	34.6	2.56 cars and 26.8 vehicles	37.0

* Based on an equivalent of four autos to one car.

that semaphores are installed long before they are justified. It has been demonstrated that even fairly heavy traffic will clear itself automatically and only needs a restraining hand to prevent tangles. Permissive hand control, even when semaphores are used, greatly facilitates turning movements, especially permissive right hand turns. The fixed signal intervals of the automatic "lighthouse" signal are correspondingly subject to criticism in some important locations as they exhibit no intelligence in apportioning signal periods to

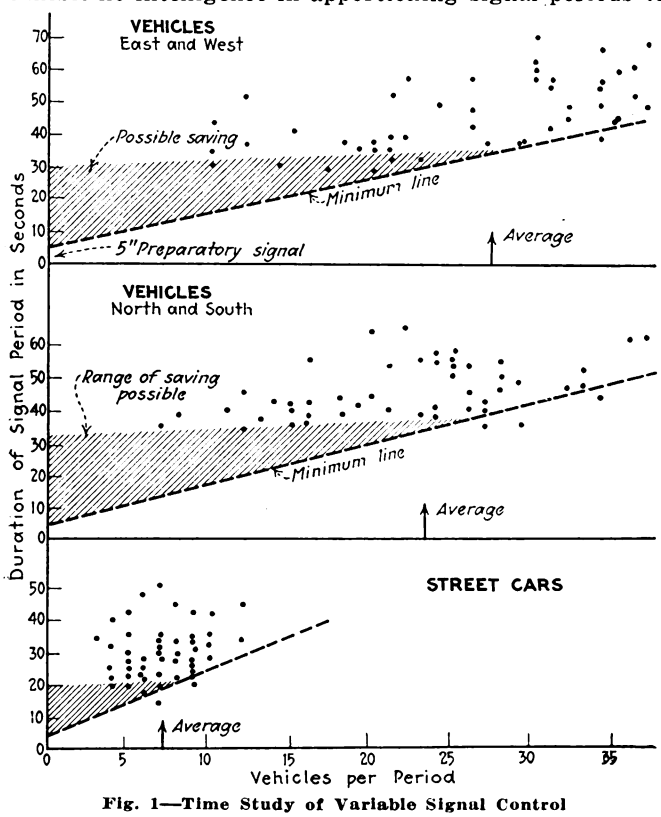

Fig. 1—Time Study of Variable Signal Control

Dots indicate actual motor and car traffic observed for varying length of signals according to street conditions. A fixed master control traffic signal on the same street a few blocks away divides the traffic movement there into three periods: Forty-five seconds for north-south vehicle movement, forty-five seconds for east-west vehicle movement and thirty seconds for surface car movement, making a two-minute cycle. But note how small a proportion of the actual traffic this fixed signal a few blocks away actually affects.

the demands of traffic. Some, however have the variable feature, i.e., may be adjusted by hand or by distant control.

Generally speaking, the shortest possible interval in the long run yields the greatest street capacity. A speed-time curve of traffic in platoons running one block each would indicate about twenty-five seconds between start and stop; two blocks, forty-five seconds. Thus, a skip-stop platoon system, assuming equal cross traffic, would call for a one-and-a-half-minute cycle along the "Main Street," or perhaps only one minute with light cross traffic. Yet we find block signal cycles ranging from two to three minutes duration. The seriousness of this cumulative delay to street car operation as well as to traffic can hardly be overestimated.

The accompanying graph shows a time study at a heavy intersection along a ten-block "Main Street" with block signal system supposed to be operated in synchronism but actually operated independent of the master-control towers. The graph shows the actual number of seconds required for each signal and the number of vehicles passed through that signal in each direction. The master signal is arranged on a cycle of two minutes, divided as follows: Thirty seconds for all cars to move, all traffic stop; forty-five seconds for north-south traffic only, all cars stop; forty-five seconds for all east-west traffic only, all cars stop. Yet it will be noticed that at the crossing shown in the diagrams the north-south traffic ranges from seven to thirty-seven vehicles per signal, but also that the signals vary from thirty-five to sixty-five seconds. Similar great variations are shown in the case of east-west traffic. Further, the time taken to pass five cars varied from twenty seconds to forty-two seconds, and for seven cars, fifteen seconds to fifty-two seconds. This variation indicates the wide range of traffic conditions actually encountered and how important it is to leave room for a certain amount of flexibility and intelligence in the signal control according to conditions.

But the most important point is this, that a signal of thirty-five seconds can pass vehicle movement up to thirty vehicles per signal. On the other hand a time interval of thirty-five seconds was used to pass as low as seven vehicles per signal. Similarly in east-west traffic thirty seconds should pass perhaps thirty-five vehicles, but the same signal period was used for ten only. Here is a great wastage of street capacity in the present signal application.

Fixed signals are too long for light traffic and maybe too short for maximum traffic. In this illustration all traffic on the street is held up every two minutes, street cars for ninety seconds and vehicle traffic for seventy-five-second intervals; that is to say, thirty cycles per hour. To demonstrate the wastefulness of these long intervals, this traffic was recast on the assumption of forty cycles per hour (instead of thirty) in a straight two-part signal (instead of a three-part) with the cars moving at the same time with the vehicles in the same direction. The result was that the average equivalent total traffic per cycle, including car movement or per minute of street opening, was actually no greater than with the longer cycle shown in the diagrams, excluding car movement. This is shown in the table above.

How important is this element of variability is indicated by the following figures, showing actual traffic movement per signal, with varying durations of periods of observation:

	Motors	Cars per Signal
Average rush hours 4 to 6 p.m.	50	4.4
Maximum sixty-minute rush period	54	4.5
Maximum thirty-minute rush period	63	4.9
Maximum fifteen-minute rush period	78	5.7
Maximum five-minute rush period	94	8.0

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The study of signaling is highly complicated, even more so that in railroading, due to the many uncertain factors. But one thing seems certain—that more flexibility and exercise of judgment are needed if the traffic of the central district is to be speeded up rather than slowed down.

Perhaps less regulation, rather than more, would be advantageous, as proved in the case of an important intersection in Washington, once badly congested. The policeman fell sick and nobody was available to replace him. The traffic promptly cleared itself, and he has been replaced by some well-placed permanent guide curbs in the street. It seems especially unfortunate that the use of the fixed synchronous block signals should be suggested for use in various cities because these have helped Fifth Avenue, New York, where conditions are unique. The installation of such an elaborate signal system should not be made until comprehensive traffic surveys and time studies have been made to determine the characteristics and needs. Then the system should be designed to meet those needs and not for conditions in some distant city.

Development of Downtown Terminal Capacity

The cumulative effect upon the operation of street railways of all the natural and artificial congestion just described is well indicated in the second graph, showing the actual minutes transit time by 150 cars looping in the downtown district at various times between 4 p.m. and 6 p.m. It will be noted that the looping time at 4:15 averaged about twelve-and-a-half minutes, at 5:20 twenty-two-and-a-half minutes, at 6 o'clock thirteen minutes. Some of this lost time is of course due to street car interferences in special work and additional time required for loading, etc. But the major proportion of it clearly occurs from traffic congestion and signals. The average trip running time of the system between termini is only about forty minutes. Thus, with the average haul, if a passenger boards these loop cars inbound to obtain a seat, more than half of his trip home is consumed in the loop. This twelve-and-a-half minutes lost time is the real point of attack. And it is easy to see when a two-minute signal cycle is imposed upon the system along the main clearing streets how this loss of time accumulates before cars can escape from the controlled area.

In developing terminal track capacity, the same type of time study should be made before elaborate or radical changes in routing and operations are put into effect. These involve the relative number of car interferences under various routing schemes, the effect of non-clearance curves, open and closed loops, proper distribution rather than concentration of loading points, standardizing of rolling stock and tractive capacity so far as possible on given lines, location of special work, segregation between railway and motor streets, and of course the effect of the signal system. Such studies on a large system for various routing plans in the terminal district have shown variations of from 100 to 200 per cent in actual track capacity at the critical point, which of course determines the minimum headway of a trunk line.

These traffic observations and surveys indicate this important point—that unless simplification of routing, ease of riding from one part of the city to the other and speed of transit can be secured there is no other way in which to forestall uneconomic competition with the railway system and the growing use of private motor cars in rush hours, especially in crosstown service. For the motor car, even if excluded through more and more rigid regulation from downtown streets, will discover by-pass routes and thus secure what is most desired, speed. Too much effort has been expended in the past on "verboten" regulations and too little upon studies of fundamental corrective measures.

Economic Design and Use of Roadways

It is a sad commentary on civic understanding and ingenuity that in a recent traffic survey of the entire central district of a large city the writer found an actual traffic efficiency of the outlet streets during maximum rush hours, outbound, of only 25 per cent of the full capacity of these roadways (even assuming solid parking along the curbs). City authorities and even railway men still recommend the decimal system of

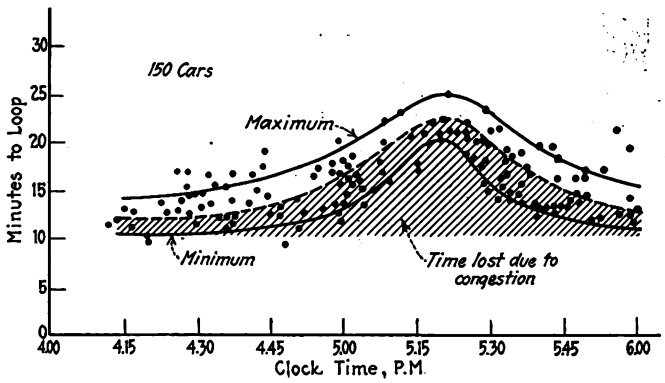

Fig. 2—Time Study of Rush Hour Transit Time Through the Loop District

This chart shows what "congestion" means in lost car-hours. Dots indicate the actual round trip time to complete terminal loops non-rush and rush respectively. The area of the "hump" converted into lost dollars, passenger time and patronage would seem to justify improvement measures.

street width, notwithstanding that decimal widths have little or no relation to the traffic needs of the roadway.

There are certain minimum widths required for various traffic lines. Obviously it is a waste of money to rebuild or widen streets unless it is possible to jump from a four-line to a six-line roadway, for example. The only exception would be to secure a five-line roadway either where one-way operation cannot be avoided or with shifting center lines, morning and evening. Taking the land values and incidental damages at only $1 per square foot, auto streets will cost for land from $70,000 to more than $110,000 per mile to widen the roadway to the next higher stage necessary to secure any increased capacity at all, and trucking streets will cost from $90,000 to $130,000. With reconstruction and paving these figures might amount to four or five times those given. And the unit figure quoted is of course very low. If the full traffic width is not secured, the cost of the change is of course practically lost.

Every main thoroughfare has a different character, use and traffic demand factor, and requires special design at various points. Especially is this true on street railway thoroughfares where surface loading stations have become almost imperative, not only to speed up car loading and reduce street accidents but also to keep traffic moving in streams instead of blocks. The low traffic efficiency above cited was found to be due not only to the rambling of motors all over the streets but mostly to the fact that the city has paid no attention to the reconditioning of the majority of these outlet streets, all of which were 90 ft. wide or over. The

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trouble was not all downtown, but fundamentally rested upon the defective thoroughfare plan of the city, which in most cases can be readily corrected.

Why are not more engineering and high-class railroading put into the traffic problem? The plain result of negligence in this particular case is this—that through this downtown district there were actually recorded during the business day one vehicle movement to every two-and-a-half people residing in the entire community, an extraordinary amount of needless cross-town traffic through the center, and an outbound vehicle passenger movement during maximum rush hours approaching that of the street car system. Congestion, poor street design, inefficient traffic operation, complicated street car terminal routing and lack of scientific cartage control in railroad and industrial freight through the loop inevitably results in slowing down the entire system until people turn to private automobiles as their last resource. The writer confidently believes that a scientific attack upon this problem offers the possibility of doubling almost immediately the traffic capacity of the streets of our congested districts.

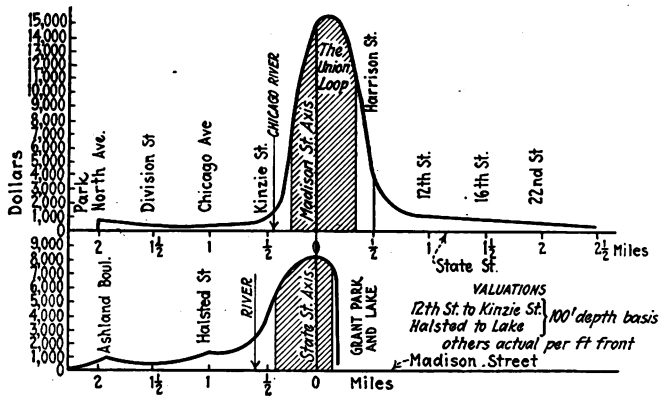

Fig. 3—For the Future Why Not Fill Up the Valleys?
Profile of land values along the main axes of a typical large city. If we are "congested" now with perhaps only 30 per cent of the maximum permissible building floor space developed, what will occur with full development? Land values, building heights, local transportation and congestion complete the vicious circle.

Improved Routing and Operating Methods

The perfecting of routing and operating methods is the final step in which the street railway industry can contribute a large share toward prompt improvement of the traffic situation. But no such improvement can be hoped for with adherence to obsolete methods, complex terminal routing and undue concentration of terminal movements. It is often helpful to develop alternative routing plans designed to untangle the loop and diffuse business over a larger area so as to be comparable with present or other plans proposed. The comparative car interferences, track density, loading density and transit time will immediately tell the story.

All too often this concentration has been brought about by the insistent demand of powerful real estate and business interests which are alone concerned in maintaining high land and rental values of abutting property. What this means must be clearly evident from the accompanying profile of land values, north-south and east-west, in a great city. Concentrated transportation means high land values, higher buildings, traffic congestion, then more transportation, and the vicious circle is retraced until the ultimate of congestion—stagnation—is reached. Shall we develop our cities along this unscientific method or set to work to devise a scientific plan of transportation based upon facts?

Telephone Dispatching in San Antonio

After an Experience of Ten Years the San Antonio Company Is Strongly in Favor of Telephone Dispatching for City Service—Many Advantages Are Listed

By William W. Holden
Superintendent of Transportation, San Antonio Public Service Company

IN ORDER to give proper supervision of its service at all times of the day and to keep in the closest possible contact with the operation of its cars, the San Antonio Public Service Company has maintained a telephone dispatching system since 1914.

Under this system, the dispatcher is located in the company's office building, and his switchboard is connected directly to telephones located at the terminals of all lines and at all junctions and other intermediate points of importance, especially at crossovers where cars may be required to turn back to fill open spaces in schedules caused by delays.

All motormen and operators regularly call in at the end of the lines. In case a car is delayed and a second car is following close, the crew will call in at an intermediate phone for orders. Minor accidents, delays, and defects in track, overhead, cars, equipment and supplies are reported at the ends of the lines. Major accidents are reported from the first available private or company phone.

The telephone dispatching system has proved itself so effective and economical that it is considered absolutely essential to operation.

A Gain in Schedule Speed Is Made Possible

On account of the telephone dispatching, cars can be scheduled at a higher rate of speed, probably as much as 10 per cent higher, because no allowance need be made for such delays as may be called frequent, but not regular. Cars must report to the dispatcher each trip, so that by the omission of a report the dispatcher knows of any delayed cars in sufficient time to take steps to take care of the break in schedule.

As a telephone report, unless it is a special report, requires only about five seconds to transmit, the time for reporting does not affect schedules. Then, too, a trainman will be more conscientious about being exactly on his schedule time when he knows that the fact of his arrival at a definite point is being recorded.

If schedules are slow enough or have sufficient layovers to allow for the worst conditions that frequently occur, it requires additional cars, and if some of the delays provided for do not occur, the service is too slow to be attractive. It is therefore more economical to provide for as fast a schedule as can be maintained on the average and to provide a quick and effective means of correcting the service when delays occur.

Inspection Service Made More Efficient

By the use of the telephone, the effectiveness of the supervision of inspectors is greatly improved and the cost of supervision reduced by at least one-half. The experience of inspectors on a line where there is no telephone dispatching is that they must station themselves at some location to check the cars as they pass. If something goes wrong, they do not know it until cars fail to show up. Then they do not know what is wrong or

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where it is, but must start a search for the trouble. After finding the trouble, they are usually so busy getting the trouble remedied that they cannot give attention to resuming service with other cars available that are not in trouble. And even after the trouble is cleared, it is difficult for them to get in touch with all of the cars in time to get normal service restored promptly.

With the telephone dispatching, every line inspector keeps in touch with the dispatcher so that the dispatcher can get him very promptly. The inspector, knowing the dispatcher will notify him of trouble, can give his full attention to instructing and assisting the men on the line. When trouble occurs, he learns of it much sooner, and when he does learn, he has complete information. When he arrives at the location, he can give his entire attention to clearing up the trouble, because he knows that if he gets the cars moving the dispatcher will take care of the work of restoring the schedule. With the telephone dispatching, if the trouble is serious, several inspectors may be sent from other lines, who would never have known of the trouble in any other way.

Supervision, thus economically controlled, can be handled with fewer inspectors because one inspector can handle several lines in the same territory.

If an inspector were assigned to each line in San Antonio, it would require thirty-five inspectors, on nine-hour shifts, not including any general inspectors in the downtown district. With the telephone dispatching, the work has been so combined that we are using only nine regular line inspectors, including downtown inspectors, plus three dispatchers, and the cost of telephones is equivalent to the salary of only one inspector, so that there is an equivalent of thirteen inspectors with telephone dispatching, against thirty-five inspectors required to do the same work without the telephone dispatching.

Prompt Emergency Work Is Possible

Reporting to the dispatcher is a mechanic, who is on duty at all times and has a small automobile equipped with minor wrecking tools. He is thus able at short notice to take care of autos stuck on the track as well as minor accidents to and breakdowns of defective cars.

A messenger for carrying transfers and change and for relieving conductors of articles found on the cars is also kept on duty at all times in the dispatcher's office for the convenience of crews, and his work is directed by the dispatcher. The two men in this service are trainmen retired from active road service.

A wrecking car is kept at the carhouse for major accidents and can be summoned by telephone. During regular working hours for linemen, the emergency tower wagon and crew are employed at all times in regular work, but they maintain close contact with the dispatcher so that they may be dispatched to trolley breaks without delays. Track and switch repair men maintain contact with the dispatcher for the same purpose.

Before the telephone dispatching was installed, both a line crew and a track trouble man were constantly on duty awaiting emergency calls. The fact that a trainman must call up the office makes it very easy for him to report defects in cars, overhead, track or other equipment. This encourages him to report minor defects in time to save major ones. Otherwise a trainman must remember the defects he has seen and make a special effort to report them after he is off duty. Even the most conscientious man will often be so interested in getting home after his work that he will forget to make such a report, or hope that some one else will.

Reporting accidents to the claim department is one of the most important functions of a trainman. There is no way to estimate the help it is to a claim department to have a definite report on all accidents, no matter how slight, within at least one hour of the time that it occurred and averaging within twenty minutes from the time it occurred. Of course, major accidents, wherever they occur on the system, are reported immediately.

Many Other Advantages

There are many little ways in which telephone dispatching has proved valuable, such as locating lost children quickly, reporting the loss of valuable articles, answering exaggerated complaints on service, and many other things too numerous to mention.

To sum up the whole situation, the San Antonio Public Service Company feels that telephone dispatching gives that close personal touch to the control of its car operation that is necessary to efficient management. The company learns of troubles in time to take action. It is convinced, after ten years of operation, that telephone dispatching is necessary for the most efficient and economical operation of street cars.

Interurbans Co-operate with Independent Bus Lines

BOTH the Interstate Public Service Company and the Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., have made contract arrangements with independent bus operators for certain co-ordinated transportation services.

The Indianapolis & Cincinnati Traction Company has two lines out of Indianapolis, one of which terminates at Rushville, Ind., and the other at Greensburg, Ind. Through rates with the interurban line have been established with a bus company operating beyond Rushville to Brookville, a distance of 32 miles. A similar arrangement has been made with a bus company whose line extends approximately 25 miles beyond Greensburg to Versailles.

The joint transportation arrangements were made with the distinct understanding that operation of the buses was to be continued throughout the winter without interruption if physically possible. These two bus lines brought 332 interchanged passengers to the railway during the month of December. The bus lines make connections with the railway and a joint timetable has been issued. Arrangements are also now being negotiated with these bus operators to extend the railway company's freight service to these same points by means of motor trucks.

In making arrangement to thus extend its services the railway selected the best of several bus operators running buses out of Rushville and Greensburg and made a contract terminable on thirty days notice by either party and providing for a settlement of revenues once a month. Both railway and bus operators report the arrangement to be very satisfactory thus far, new business coming to both as a result of the co-ordination.

The Interstate Public Service Company has made arrangements with a truck company to handle electric railway freight between Seymour, a town on the interurban line, and Brownstown, a distance of about 15 miles. A joint through tariff has been issued between points on the truck line and points on the railway line. This is said to be one of the earliest issues of such joint tariff.

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Akron's "Rubber Urge" Passes

Street Cars Resumed Operation Feb. 28 Under Better Rate of Fare—Full Statement of Settlement Given —Vote on Permanent Franchise Nov. 4—Entire Controversy Reviewed, with Expressions of Opinion on Necessity for Cars by Various Civic Organizations

AKRON is riding to work again—riding in comfort and with complacency—and riding on street cars. There will be no more guessing for a time at least—if ever—on the part of the local public as to what the next day will bring forth for them in a transportation way, for on Feb. 28 the Northern Ohio Traction & Light Company resumed full service on its railway lines and its bus routes. A month of service with nondescript autos operated by ambidextrous drivers has done more toward restoring the rule of reason than six years of talk. The politicians are penitent and pensive. The public is pleased. Akron has been riding "exclusively" on rubber since Feb. 1, but its ride was not very resilient.

The agreement under which the cars and the buses of the railway were returned to service was reached late on Feb. 27. A temporary franchise has been granted to continue in effect until May 1, 1925, pending negotiation of a permanent grant which will be drawn and submitted to popular vote on Nov. 4. Until Dec. 4 the fare is to be 5 cents with 1 cent additional for a transfer. If the grant is defeated when submitted to the public the fare is to be 6 cents with a free transfer after Dec. 4 and until May 1, 1925.

The company has agreed to keep the paving between its tracks in good repair and to pay the paving costs on West Market and Bowery Streets, and also to pay a portion of the cost of East Exchange Street viaduct. But if the permanent franchise is not granted the city agrees to reimburse the company on all these payments made.

An audit of the company's books is to be made by a reputable firm before Oct. 1 and is to be made public. If the company and city cannot agree on an auditor, one is to be appointed by Federal Judge D. C. Westenhaver of Cleveland.

All buses now operating in competition with the railway are to cease operation within sixty days. The two franchises granted last week to the Mueller Brothers and Zeno Transportation Company are revoked, but both companies will be permitted to operate on the routes over which their buses ran prior to Feb. 1, as these routes are not in competition with the lines of the railway. It is said the city has had all the motorization it wants and no difficulty is anticipated in preparing a new permanent franchise to cover the period after Dec. 4, 1924. There is nothing in the franchise which contemplates a later motorizing of the city after the November election in event of failure of the franchise to pass. In fact the city expressed itself at the conference that no such attempt would be made.

The franchise passed by the Council received the favorable vote of every member and the immediate approval of the Mayor. The franchise is also meeting with the approval of the majority of the public. It revokes the ouster ordinance of Jan. 15 and requires the withdrawal of the 7-cent rate filed by the company with the Ohio Public Utilities Commission Jan. 3.

The company is to make a number of bus extensions and will purchase twenty new buses for the purpose. Altogether, the company agrees to make expenditures amounting to between $350,000 and $400,000 in paving charges, construction and new buses. The agreement in full is printed on page 334.

THE WHOLE STORY IN BRIEF

For six years the Northern Ohio Traction & Light Company has been endeavoring to secure a new contract in Akron, but always that intangible thing called politics has stolen in at the eleventh hour to block progress. Again and again the company has shown the necessity for transportation development in the city and pointed out that real progress along these lines could not be made in view of the uncertainty surrounding the action of the city when the old contract expired. Several times an agreement was reached, and three years ago a service-at-cost franchise was agreed upon, printed and circulated, only to be kicked over by political bosses at the last minute.

It is just twenty-five years ago this month (March) that the city of Akron made a contract with its street railway to carry passengers inside the city limits for a 5-cent cash fare, six tickets for 25 cents, or twenty-five tickets for $1. The grant was to run until midnight Jan. 31, 1924, with service providing a ten-minute headway from 5 a.m. until 10 p.m., and a twenty-minute headway from 10 p.m. until midnight. The contract, like most others of its kind, provided that the company should pay for paving between the rails and 1 ft. on each side.

In July, 1920, Akron passed an emergency ordinance abolishing the ticket rates for a period of three months. Additional ordinances of a similar nature carried the rate until August, 1922, at which time the question of abolishing the ticket rates for the remaining period of the contract was submitted to a vote of the people. This proposition carried with it the right to operate a new railway line over North Main Street and the establishment of certain additional bus lines, the railway having already established two bus routes. This proposal carried by a vote of three to one. It provided a total of approximately 70 miles of rail lines and 25 miles of bus lines. Free transfers were issued between the rail lines and the bus lines operated by the company.

Approximately 200 street cars, largely of the Peter Witt type, and thirty modern steel-body buses were required to fill the schedules.

The relief granted the company by the city followed the defeat in 1919 of a twenty-five-year franchise, fixing the fare at 6 cents with free transfers. This was known as the Morse-Witmer proposal. It lost by a vote of six to one.

The Northern Ohio Traction & Light Company, which operates the Akron city system, city systems in Canton and Massillon, an interurban line from Cleveland to Uhrichsville, Ohio, a distance of 100 miles, and suburban lines from Akron to Ravenna, 20 miles, and from Akron to Wadsworth, 15 miles. The Akron city railway system is valued in excess of $7,000,000.

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This briefly presents the historical picture. The recital of these facts just at this point is regarded as essential in order that the reader may best interpret the more recent happenings. These had their setting in an educational campaign started six months ago in which figures were presented showing the actual cost of an Akron car ride to be 5.7 cents, excluding interest and depreciation. At the same time the company asked car riders voluntarily to pay 6 cents for their ride. Thousands responded to the appeal and the public was "sold" on the 6-cent fare.

About this time, the company having failed to get any definite co-operation in its movement for a new contract, a citizens' committee was organized. This committee was made up of 100 citizens representing various civic and improvement associations and women's clubs. The committee selected as its chairman Dr. H. S. MacAyeal, prominent in civic affairs for many years. The committee also named ten representative citizens from every section of the city to assist Dr. MacAyeal in his work of preparing a franchise to be submitted to the company and the city. The committee's work was wholly independent of both interests. Doctor MacAyeal spent several months in study and made a careful audit of the company's books. He visited various cities in the United States comparable in size with Akron and also some Canadian cities. The result was that the committee submitted a proposed franchise in January of this year, which had for its basic principle the Tayler grant now in force in Cleveland. The franchise further provided for the control of the transportation system by an independent board, thus taking the question out of politics. It provided no rate of fare, but suggested a property valuation of approximately $6,000,000, the construction of several miles of additional railway lines and the establishment of several other bus routes.

The proposition was looked upon favorably by the public and by the company, but the city refused to recognize it in any way. In fact, the Mayor even declined to present it to the Council.

It would now appear that back of the failure to bring about a settlement and adoption of a new contract for the continuation of a combination electric railway and bus transportation system was the desire to make Akron an exclusive bus transportation city, at any cost.

On Jan. 4, the day following notification from the street railway that it had filed with the state utilities commission a "rate of 7 cents cash, four tickets for 25 cents, on the Akron city system," Mayor D. C. Rybolt in a public statement declared he would supply Akron with "the finest bus transportation system in the world by Feb. 1, at a 5-cent fare, with free transfers."

In this connection it should be here stated that the Northern Ohio Traction & Light Company, through A. C. Blinn, vice-president and general manager, notified the Mayor and the City Council by letter on Jan. 3 that it had filed the proposed rate that day with the commission, as required by law. He added:

"We are very desirous of negotiating with the city for a new franchise, and the filing of these rates is in no wise intended to mean that the company is not willing at all times to negotiate for a contract determining rates and other conditions under which transportation may be furnished."

The letter carried a statement showing the company had lost $80,817 on its Akron city lines in the last year, excluding interest on the investment. Subsequently the city asked the company to continue operation on a 5-cent fare for a period of ninety days while a settlement was being negotiated. On its part the company offered to continue on a straight 6-cent fare with free transfers. The city rejected this offer and passed an ordinance ousting the company from the streets on Feb. 1, unless it agreed to the city's 5-cent demand within six days. The company immediately notified the city it could not operate on the 5-cent fare with free transfers, as required under the ouster ordinance. The city "stood pat" and the company was forced to abandon both its rail and bus service on Feb. 1.

That ended the first chapter!

Immediately following the passage of the ouster ordinance, H. S. Firestone, president of the Firestone Tire & Rubber Company, published a statement in which he said:

"As to motorizing the city, this can and will be done, to the great advantage of the citizens of Akron. We all realize that progress is only made by hard work and sacrifice, and naturally to make progress in this line we must expect to make some sacrifice until service is properly organized and on an efficient and economical basis. No city in the world should be more willing to make this sacrifice and demonstrate the economical and efficient basis of bus transportation than Akron, as its prosperity is based on the prosperity of highway and motor transportation."

The next day Mayor Rybolt issued a similar statement. He said:

"Akron is the tire capital of the world—if there is any place in the country where bus transportation should be a success it is in Akron. We certainly can afford to give bus transportation a fair try-out. It has proved a success in other cities and the successful operation of buses here will benefit every citizen of Akron, as the progress of the community is linked with the development of the tire industry. It is not only this city but many cities that are watching us. It will mean a great thing for Akron, for the rubber industry and for the automobile industry."

Other political leaders took up the cry, one local member of the State Legislature writing:

"Akron will lead the world as the first large city to completely motorize its passenger transportation service."

So Akron was "completely motorized"!

The first day under fair skies, clean streets and balmy atmosphere "the finest bus transportation system in the world" consisted of fifty-seven (exactly) varieties, mostly dilapidated buses from Plum Island Beach on the east, Saginaw on the north, Toledo on the west and Hicksville, Ohio, on the south. Newspapers ridiculed the attempt and there were pertinent inquiries in the press as to when the 250 double-deck buses the Mayor promised would arrive. Such queries brought a statement from Mayor Rybolt that double-deck buses "would not be feasible, because of Akron's hills." The railway had been saying the same thing for a long time.

For ten days the industrial workers took the situation good naturedly. The cars will soon be running, they said, at a 6-cent fare. Then came a blizzard from the west. Sleet and snow with the temperature near zero and a cutting wind! That was another story. A few additional buses came in, bringing the total to sixty-three. There was much suffering. Councilman Rose made a statement in Council disclosing the fact that 142 cases due to exposure waiting for buses were in the City Hospital. The storm kept gathering.

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The Women's Federation called off all night meetings because their members "could not trust the bus service and would not be subject to conditions under which they would be forced to ride." The Central Labor Council adopted a resolution demanding a "return of the street cars on a 6-cent fare." Civic associations followed with like resolutions, as did the Hotel Men's Association, the Clearing House Association and various other associations. Petitions signed by 32,000 voters asked the return of street cars at a 6-cent fare.

Then the retail merchants took a hand. A resolution adopted unanimously by them follows in part:

We believe that Akron should be served by a responsible transportation company, capable of supplying a reasonable service, and one from whom damages can be collected.

We believe that the bus system as now operating is inadequate in regard to the above-mentioned particulars.

We believe further that, pending negotiations which will result in a permanent contract with some reliable transportation company, this city should take steps to allow the Northern Ohio Traction Company to operate its cars and buses at a six-cent (6c.) fare with universal transfers for a reasonable period of time, which will relieve the citizents of Akron from an intolerable situation, and will enable the city administration to enter into negotiations with reputable companies who can furnish the necessary capital, equipment and organization to give Akron the kind of service it requires.

We make this request not alone on account of the serious losses incurred by us as merchants, but because we believe it in the best interests of all the citizens in Akron to have immediate resumption of car service.

In this connection, we would remind you that if this situation is prolonged it will become necessary for us greatly to curtail our expenses, resulting in a hardship for many men and women who may be deprived of employment.

We believe that a permanent contract with some reliable transportation company should and must be entered into, but we do not admit that to do this it is necessary to submit to the disorganized and intolerable condition under which we are now living.

We are unanimously agreed that the cars and buses of the Northern Ohio Traction Company should be allowed to operate immediately, pending negotiations which will lead to a permanent franchise.

The Lloyd Shoe Company was the first to announce in newspaper advertisements that it could not stand the strain. It said:

"We weathered the slump in business; we have weathered many storms, but we cannot weather the losses due to the abandonment of car service. We will sell our stock at cost and quit business."

The Noble-Carney Furniture Company, one of the oldest furniture houses in the city, announced an auction of its stock, saying:

"Women won't come downtown in buses. They constitute 90 per cent of our trade. It's bankruptcy for us if it continues. Twenty-three more days and we will be broke. Business is sick due to 'exposure and lack of nourishment,' due to our transportation problem. The reason is plain."

Other merchants carried advertisements saying:

"We do not ask you to come downtown under present conditions. Telephone us and we will deliver you what you want."

Two days after the merchants acted the Chamber of Commerce addressed the Mayor and the City Council as follows:

In our opinion the welfare of Akron requires a system of transportation probably a combination of electric and bus, reaching every section of the city, on which will be charged one fare with free universal transfers.

After careful investigation, we are confident that no figures based on facts can be produced showing that city-wide transportation can be furnished today with bus or electric line for 5 cents with free universal transfers.

We know that many people in Akron are now paying much more than a 6-cent fare for transportation.

In our judgment, the present experiment will materially retard the increased use of the bus transportation, and will therefore be extremely detrimental to the best interests of Akron and the world's rubber center.

This chamber, therefore, strongly recommends that the City Council take the necessary action to bring immediate resumption of railway service on the basis of a 6-cent cash fare, with universal transfers, under a temporary agreement to last until Dec. 31 of this year, and that it further proceed at once to prepare a franchise for city-wide serv ce, which franchise should be submitted to the people of this city for approval at the earliest possible date.

To all these pleas Mayor Rybolt and seven of the eleven Councilmen turned a deaf ear. They did, however, give some consideration to a new proposal last week from Mr. Blinn for the company. This provided:

1. A 5-cent fare with 1 cent transfer for sixty days.
2. An impartial audit of the company's books during that period.
3. A rate of fare not to exceed 6 cents with free transfer to be in effect until a permanent franchise is agreed upon and adopted by the people, provided an audit discloses that the company is entitled to a higher fare.
4. Elimination of jitneys on all competing rail and bus routes after sixty days.
5. Arbitration on all disputed points.

This offer, however, the Council rejected and passed two bus franchises to become effective in thirty days, one to the Zeno Transportation Company and the other to the Mueller Brothers Transportation Company, both of which have been operating for the last three or four years on routes not in competition with the railway.

This was after Council failed in an attempt to railroad through a bus franchise to the Akron Transportation Company, providing for 5, 6 and 10-cent fares immediately, based on the service-at-cost plan.

After the negotiations for the settlement had been concluded H. S. Firestone, one of the leading supporters of Mayor D. C. Rybolt in his motorization plan, said that he had frequently been misquoted as to his position in regard to motorizing Akron and the difficulty that has existed between the city of Akron and the Northern Ohio Traction company. He has explained that he made every effort within his power to have the street cars continue in operation and an amicable adjustment made between the city and the traction company. However, when it became evident that the street cars would discontinue to operate Feb. 1 he felt as a citizen of Akron that it was his duty to use whatever means were at his command to help Firestone employees and other citizens of Akron secure transportation in the crisis and he had 200 Ford cars brought into Akron and offered them to the city or to anyone to operate for the benefit and welfare of the people of Akron. He said: "I never have had and have no intention now, of organizing or financing a transportation company."

Mr. Firestone considers the fundamental basis of the new franchise fair and equitable. In regard to the future of the motor bus Mr. Firestone said:

"I am a firm believer in automotive and highway transportation and expect that buses will replace street cars in response to the growing demand for economy of time and relief from traffic congestion. However, I feel that this should come through properly organized channels such as the traction company and I hope that some amicable and fair basis may be found. Until then, I feel it my duty to be of whatever help I can to give Akron the best transportation under the existing conditions."

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Full Text of Ordinance Under Which Northern Ohio Traction & Light Resumed Service in Akron

ORDNANCE No ——— contracting with the Northern Ohio Traction & Light company for the transportation of persons for hire in electric street railway cars and in motor buses at a fare of five cents (5c.) with one cent (1c.) for transfers, on certain streets of the city of Akron, for the period ending May 1, 1925, and repealing Ordinance No. 55— 1924 passed Jan. 15, 1924.

Whereas under Sec. 3, 4 and 5 of Article XVIII of the Constitution of Ohio, municipalities have the right to enter into contracts by ordinance for the service of public utilities, and,

Now, therefore, be it enacted by the Council of the city of Akron:

Sec. 1. That the Northern Ohio Traction & Light Company is hereby granted the right and privilege of operating its street cars in the city of Akron on all of the streets where said company has its rails and tracks now laid.

Allows 5-Cent Fare

Sec. 2. Said the Northern Ohio Traction & Light Company shall be entitled to charge and collect a fare of five cents (5c.) for each passenger carried, and may sell tickets in such lots as it deems advisable at the rate of five cents (5c.) for each ticket. The payment of such cash or ticket fare and the payment of one cent (1c.) for a transfer, when transfer is required, shall entitle the passenger to one continuous ride from any place in the city of Akron on said system to any other place in the city on the lines of the grantee's tracks or buses, provided that but one transfer charge shall be made for a continuous ride; provided further that any transfer issued as herein provided shall be used by the passenger on the next car or bus leaving transfer point after the passenger's arrival at such point, except and provided only that the company shall not be required to issue transfers entitling passengers to ride upon a car or bus substantially to the point of boarding the car or bus upon which the fare was paid or transfer issued; said rate of fare to continue until Dec. 4, 1924.

Sec. 3. Children five years of age or under, when accompanied by an adult, and all policemen and firemen of the city in uniforms, shall be carried free.

To Control Routing

Sec. 4. The motor bus lines as operated by said company on Jan. 1, 1924, shall be continued with the same rate of fare as that for street cars, and the same transfer charge, and the city by and through its Council and the Mayor, shall have the control of the routing of cars and buses and the determination of the transfer points, except that the transfer points and the routes of cars in effect on Jan. 31, 1924, shall continue, unless changed by consent of both parties.

Sec. 5. The schedule and service shall be adequate for the needs of the public, and shall be at least as frequent and as good as the service furnished by said company in the month of January, 1924.

Sec. 6. The company shall install extensions of bus service from the end of the company's present railway lines on Wooster Avenue, westerly on Wooster Avenue to East Avenue, and southerly on East Avenue to West South Street, and on Main Street from Steiner Avenue south to Firestone Boulevard. The easterly terminus of the company's crosstown bus line shall be Martha Avenue and East Market Street, and the westerly terminus of the company's South Maple Street bus line shall be Hawkins Avenue.

Helps With Paving

Sec. 7. The company shall lay new ties and rails and pay in installments as essessed, its proportionate cost of paving on West Market Street between West Street and Marvin Avenue, and on Bowery Street, when and if said streets are improved by the city during the term of this grant and prior to Dec. 4, 1924, the company's part of said paving to be the part between its tracks, the devil strip and twelve inches on the outside of the outer rails, and its reasonable proportion of the cost of the East Exchange Street viaduct, as and when such assessments and installments are payable; provided however, that in the event a permanent grant or franchise is not made by the city of Akron to the company for the right to continue the operation of a street railway and bus system in the city of Akron, on or before the fourth day of November, 1924, and accepted by the company, then the company shall be relieved of any and all assessments and payments for each and all of said improvements, and the city shall be liable to and shall reimburse the company for all payments which may have been made by the company on any of said improvements. The company shall maintain its tracks and the paving between these tracks in good repair.

Ouster Ordinance Repealed

Sec. 8. Ordinance No. 55—1924, passed on the 15th day of January, 1924, entitled "Ordinance No. 55—1924, requiring the Northern Ohio Traction & Light Company to cease operating its cars on Feb. 1, 1924, and to remove its tracks, etc., unless it notifies the city of its willingness to operate its street cars at said time at a 5-cent rate of fare," be and the same is hereby repealed.

Sec. 9. The city and the company shall immediately begin negotiations for a permanent grant or franchise from the city to the company for street railway and bus service, and if the city desires for the purpose of such agreement, the city may ask an audit and analysis of the company's books pertaining to the operation of street railway and bus service in the city of Akron for the year 1922, 1923 and any succeeding period, and an appraisal of the company's railway and bus property used and useful in its Akron City System, which audit and analysis shall be completed and made public not later than the first day of October, 1924. Such audit, analysis and appraisal to be made by certified public accountants and engineers of recognized standing, to be agreed upon, and if the city and the company are unable to agree, then said accountants and engineers, shall be selected by Federal Judge D. C. Westenhaver, or his successor. Such proposed franchise, if submitted to an election, shall be submitted not later than the November election, 1924.

Six Months Longer

Sec. 10. In the event a permanent grant or franchise does not become effective on or before Nov. 4, 1924, then the company shall, upon the city's request, continue operation of said street railway service and bus service from Dec. 4, 1924, until May 1, 1925, and shall be entitled to charge and collect a reasonable rate of fare to be determined by the audit, analysis and appraisal provided for herein, but not to exceed six cents (6c.) with free universal transfers.

Sec. 11. The city reserves the right to prescribe the form and manner in which the records and acounts of the company relating to its Akron city Street Railway and Bus System shall be kept; and shall have the right to audit, examine, make and keep copies of such records and accounts and to require from said company, detailed reports at any time relating to the finances, operation, management and ownership of said company and its said property; provided however, that the form of accounts which the state public utilities commission may prescribe, if lawfully applicable hereto, shall be controlling insofar as they go, but the council may prescribe more detailed forms and exact more comprehensive reports than is required or stipulated by said state commission.

Assumes Responsibility

Sec. 12. The said company assumes and shall at all times assume full responsibility for the operation of its said cars and buses upon said streets, and it shall save the city harmless against all loss and liability for any and all claims which may arise for injuiry to persons or property of the company pursuant to this contract.

Sec. 13. All of the terms, conditions and provisions of the charter of the city of Akron relating to franchises and applicable hereto, are and shall be considered as a part of the terms and conditions of this ordinance as if the same were fully written herein, and this ordinance not to be considered as an exclusive franchise.

Right to Purchase

Sec. 14. The city of Akron shall have the right and option, at the end of the third month period, to purchase, or lease the property of said company used or conveniently useful, for the transportation of passengers under this contract, provided the city, not less than one month prior to said date, by ordinance, notifies the company of its desire to make said purchase or lease; and provided further, that the price to be paid by the city shall exclude all value of this grant, extension or renewal. In case the city desired to make said purchase, the price to be paid by the city to the said company shall be agreed upon between the parties hereto, but in the event of the failure to agree, the said price shall be determined and fixed by arbitrators, to be appointed as follows: Each party (the Council acting for the city) shall choose an arbitrator, and the two thus chosen shall choose a third arbitrator, and upon failure for five days to agree on the third arbitrator, the Federal District Judge, D. C. Westenhaver or his successor, shall appoint said third arbitrator, and said board of arbitrators shall make a valuation of the property of said company used and useful in carrying out this contract, which valuation shall be made within thirty days after they are chosen. The party choosing an arbitrator shall pay the compensation and expenses of said arbitrator, and the compensation of a third arbitrator, together with the expenses of the investigation, shall be borne equally by the parties. Within three months after said value shall have been agreed upon or fixed as aforesaid, the city of Akron shall pay the amount thereof to the company in cash, wherupon the city shall be entitled to have conveyed to it, and shall be given possession of said property.

City to Pay Costs

The City Council may refuse to be bound by the price fixed by the board of arbitrators, in which event the city shall pay the total cost of said arbitration, including the compensation of the arbitrator appointed by the company, and no further proceedings shall be had under said notice to purchase.

In the event the city desires to lease said property, within thirty days after the said rental price shall have been agreed upon or determined by arbitration, as provided herein, the parties shall make a lease, letting to the city said property for the balance of the term of this contract, and binding the city during said term to pay to said company the rental in monthly installments in advance.

Sec. 15. The motor buses put into operation upon the streets of the city on and after Feb. 1, 1924, and any buses now in transit or en route to the city of Akron to be placed in such operation, shall not be permitted to operate for a longer period than sixty days from the passage and approval of this ordinance.

Routing of Buses

If any vehicles carrying passengers for hire, taxicabs excepted, are permitted to operate in the city after April 28, 1924, the same shall be routed by the proper city authority, so as to exclude their operation upon any or all streets occupied by the street railway tracks and street railway bus lines. Nothing herein shall in any way affect the operation of the motor buses which were being operated in the city under Ordinance No. 8357, prior to Feb. 1, 1924, Motor buses as used in this ordinance shall mean vehicles with a seating capacity of ten or more passengers.

Sec. 16. This ordinance shall not become effective unless and until the said Northern Ohio Traction & Light Company shall have withdrawn the rate schedule filed by it with the Public Utilities Commission of Ohio on Jan. 3, 1924, wherein said company declared its intention to charge seven cents (7c.) cash fare, four tickets for a quarter, on or after Feb. 1, 1924, and this ordinance shall not become effective unless the said the Northern Ohio Traction & Light Company shall in writing accept the same within one day after the said ordinance shall have been passed and approved, or if not approved by the Mayor, shall have been duly passed over the Mayor's veto, as provided by the charter of the city of Akron.

Contract to be Void

Sec. 17. Upon failure of said company to carry out and comply with all the provisions of the foregoing ordinance as its part, this contract shall be null and void.

Sec. 18. This ordinance shall not be effective until accepted in writing by the Northern Ohio Traction & Light Company within one day after its passage and approval, otherwise the same shall be null and void, and this ordinance shall take effect if accepted, as aforesaid, at the earliest date allowed by law, and shall continue for the period ending May 1, 1925.

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Bus Competition Ends at Wheeling

Independent Bus Company and Wild-Cat Operators Competed on Interurban Runs for Two and One-Half Years—Bus Service Finally Suspended Thanksgiving Day —Its Effect on Wheeling Traction Company Analyzed

ONE more chapter has been added to the already long story, and again it has been proved that, in general, local transportation services cannot successfully compete, but that in their nature they must be monopolies and properly co-ordinated.

Buses first appeared in competition with Wheeling Traction cars on March 12, 1921, and last turned their wheels on Nov. 25, 1923. From a maximum of twenty-five buses in operation in the summer of 1921, the competition gradually dwindled down, until but five remained during the last few weeks before a receivership ended the whole demonstration.

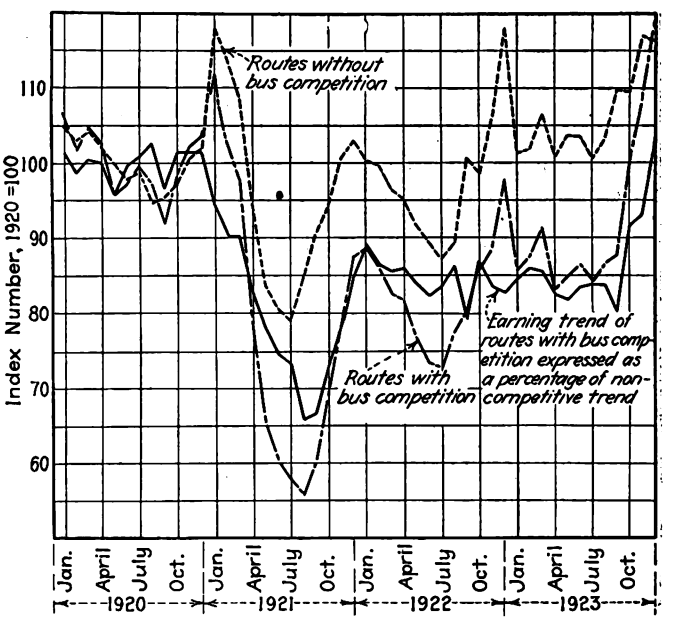
The buses started as a result of a chain of circumstances that seemed to invite uninitiated operators to enter the business. Wild-cat jitneys in many parts of the country apparently were doing well. Up to that time neither Ohio nor West Virginia had attempted to regulate bus transportation or protect the existing agencies of travel. The Wheeling Traction Company had made an increase in fares in December, 1920, which, though not large, involved re-zoning of the system and naturally changed the accustomed fare limits of the riders.

The business depression, which had been creeping upon the country since the summer of 1920, reached Wheeling early in February, 1921, with unusual suddenness. The steel mills promptly shut down and men were thus out of their own work. The buyer's strike which precipitated the slowing down or hesitation in business produced a near panic among the merchants. Automobile and truck dealers in that district particularly were overstocked with equipment and parts and were obliged to find an outlet for their goods. Equipment was therefore offered on very favorable terms. Furthermore, many truck operators who had been making a fair living handling merchandise began to cast about for new business.

It is well understood that the electric railway's business does not fluctuate in such marked manner as the non-utility industries. Although the traction system suffered a loss in revenue of approximately 15 per cent, due directly to the business depression, no material change was made in operating schedules. The reduced riding was not sufficient to be noticeable to the casual observer. The bus promoters and jitney owners did not realize the true conditions and fancied that there was ample business to be had at the rates they proposed to make effective.

Wheeling is the center of an important industrial district. Within a half-hour ride are the principal towns of Benwood, McMechen and Warwood on the West Virginia side of the river, and Bridgeport, Martins Ferry and Bellaire on the Ohio side. The first bus placed in service was sponsored by a resident of Martins Ferry, who owned a garage and had had four years experience as a taxicab operator. The date of starting was March 12, 1921, and one Ultimate machine seating sixteen people was operated between Martins Ferry and Wheeling at a comparatively low rate of fare. From the standpoint of patronage the venture was an immediate success, and consequently a second Ultimate bus appeared on March 17. Thereupon the Ultimate Bus Company was organized and heralded as a savior of the common people from the "predatory" corporations.

The traction company had been misunderstood by town councils and the public generally in Martins Ferry and Bellaire because of efforts to secure franchises free from the burdensome requirements so common in the early street railway grants. The atmosphere was charged with a feeling of bitterness at the time, and the competition that was offered to rail lines



Index of Trend of Earnings, Wheeling Traction Company, Showing Effect of Bus Competition

was enthusiastically welcomed. Moreover, the bus company offered common stock to the residents of the towns served, and thus the people had the opportunity of participating in the management and expected profits of the business.

Other Bus Service Started

This apparent success encouraged other bus activities in and around Wheeling. Most of these, however, were of a makeshift character, using light, unsuitable cars. The equipment was inadequate and, with no definitely organized and scheduled routes, the competition between the buses themselves proved very destructive, so that only the strongest operators survived.

The traction company logically protested this uneconomic competition, but could not obtain the necessary protection under the prevailing laws or ordinances. It could not even prevent buses making their runs just ahead of the street cars in order to pick up waiting trolley passengers.

The good roads law of West Virginia, among other

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provisions, made it necessary before a bus could be operated over state highways that a certificate of public convenience be secured from the Good Roads Commission. This did not preclude city operation or interstate travel when West Virginia state highways were not used. Thus lines between Wheeling and Ohio points were outside the pale of authority of the Good Roads Commission.

For safety in travel and in order to equalize taxation an ordinance was passed by the city of Wheeling imposing a seat-mile license tax and requiring rear doors, specifying the routes and regulating the stopping points, but it did not prevent competitive operations. Unfortunately, the Ultimate Bus Company used Wheeling streets only as a terminal and very little of its mileage was inside the city, so that the city tax was not an effective remedy.

In the early stages of the competition there were certain clashes between the companies, due to disputed rights and privileges, but after the late summer of 1921 no further open conflicts were evident. The traction company realized that the traffic would not support both bus and rail services and therefore adopted the policy of giving the buses enough latitude to permit them to wear themselves out promptly.

By midsummer only the Ultimate Bus Company had survived under the rates of fare which had been inaugurated. The revenues evidently were not sufficient to pay expenses and satisfactorily maintain the equipment. After the disappearance of the "tramp" buses, operated by individual owners competing with each other and not attempting to cover specified routes or operate on definite schedules, the technical position of the Ultimate Bus Company evidently improved.

The traction service still attracted the major part of the riding, and as the first winter approached the buses became less and less popular. To any one acquainted with the transportation business, it was realized that the bus operations as conducted in the Wheeling district could continue but a comparatively short time. The buses were wearing out. During April, 1923, the bus company was operating fourteen buses, the maximum number which it ever operated. Six of these buses ran to Bellaire and six to Martins Ferry, while the other two were held in reserve. In July four were withdrawn from service, and shortly after the big Wheeling Fair in September the total number of buses remaining in operation was reduced to five. The service was finally discontinued entirely on Thanksgiving Day.

Effect of Competition on Railway Earnings

It is interesting to review the course of traction revenues during this period. To begin with, revenues were also affected by the general business depression of 1921 and again by the recovery in 1922 and 1923. During this time inroads obviously were made by the buses. The accompanying chart has been prepared using the revenue of 1920, a normal year, as a basis, subsequent monthly revenues being expressed as a percentage of the 1920 average to present a clear picture of the situation. Seasonal variations in revenues have been eliminated. As nearly as can be determined the traction loss is expressed by the difference in indexes between those lines which suffered through bus competition and those lines that did not, the latter being selected to get a fair comparison. Obviously in a case like this it is possible only to determine the loss with approximate accuracy, but it is believed that these two groups of route earnings would have closely followed the same trends except for the diversion caused by the buses.

The heavier curve shows that the routes affected have been operating at 34 per cent to 7 per cent below the otherwise normal, the average for the period being approximately 21 per cent. As but two routes were affected by the competing buses, the entire traction system lost only approximately 6 per cent of its revenue to the buses. The traction service was never reduced because of this lessened business, but as time went on it was gradually improved. At no time did the buses add a necessary service, so that the economic result was that the same amount of business was called upon to support the increased total cost caused by the added bus service. In other words, the operating expenses of the bus company were a dead loss to the community.

In December, 1922, the traction fare basis was changed. Up to this time the system had been divided into fifty-three short zones at 3½ cents each, with a minimum ticket fare of 6⅔ cents. The system had been designed especially to give the privilege of riding additional distances beyond the first fare unit at less than full fare zone charge; that is, while the first unit of fare was 6⅔ cents, all beyond that were at 3½ cents, which very closely approximated an ideal mileage or distance method of charging. Short zones, however, did not prove popular in this district. The new fare adopted in December, 1922, lengthened the zones, so that while the average rate per mile over the entire system was not changed, the fare unit for all zones was changed to 5 cents by ticket or 8 cents cash. In addition, reduced rate strip tickets, unlimited as to use, were adopted between Wheeling and some of the neighboring towns where the distances traveled by the majority of the people were apparently considerably less than full zone units.

Undoubtedly the reduced minimum fare and the reduced fare between Wheeling and Martins Ferry changed the sentiment on the bus situation. However, the fare element is not the sole factor in influencing riding, as the following experience on the Wheeling and Bellaire division demonstrates:

Relation Between Patronage and Fares, Wheeling

	Index of Number of Patrons		Fare Between Wheeling and Bellaire, Cents
November,	1922	191	13⅓
December,	1922	231	13⅓ and 10
January,	1923	221	10
February,	1923	213	10
March,	1923	246	10
April,	1923	216	10
May,	1923	225	10 and 12½
June,	1923	221	12½

This case evidently offers further confirmation of the fact that buses and street cars cannot compete where either alone may successfully serve the traffic.

The laws have changed in Ohio and West Virginia since 1921, in that while buses which operated before the present laws were passed may still continue, no new routes may be started in either state without a certificate of public convenience. The day of the "wildcat jitney" is gone. The future offers possibilities for the bus, but it must be co-ordinated with other transportation facilities and economically suited for the service to be supplied.

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Association News & Discussions

Insull Proposes Rapid Transit Plan

Would Build Extensions to Present Elevated System in Ten Steps and Finance Through Customer-Ownership Plan—Also Would Have City Build Subway for "L" Through Loop District

A PLAN whereby the city of Chicago would obtain additional rapid transit facilities through customer ownership was proposed by Samuel Insull, head of the elevated railroads, gas and electric utilities in Chicago, in an address before the Chicago and Cook County Bankers' Association on Feb. 21. These additional facilities are to be had by additions and extensions to the existing "L" lines which would provide a midcity cross-town main line straight north and south through the city's center of population, at Roosevelt Road and Ashland Avenue, extending from Seventy-fourth Street and Ashland Avenue to connections with the North Side "L" lines near Belmont Avenue. The cost is placed at $23,000,000, which, according to Mr. Insull, is a small amount when compared with what other public service companies have spent for extensions.

The financing of such a project was held to be feasible under a customer-ownership plan. Preferred stock of the reorganized Chicago Rapid Transit Company would be offered to the people, who will derive the benefit of additional service and the enhanced property values which will result from improved transportation. Adequate financial returns to the customer-owners is assured by the conservative capitalization of the Chicago Rapid Transit Company, which is less than the actual value of the company's property as appraised by the state utility commission.

In explaining the reason for the present traction situation and his proposed solution, Mr. Insull said:

"In the last five years there has been expended in public utility extensions, including the city's water works, the sum of $169,958,194. Of this vast sum $155,816,875 was provided by private enterprise for the extension of telephone, gas, electric and transportation service, the balance, $14,141,329, having been invested by the city of Chicago in its water supply system. These vast expenditures are all divided as follows:

Commonwealth Edison Company	$67,042,623	
Illinois Bell Telephone Company	50,770,776	
People's Gas Company	28,470,265	
City Water Works	14,141,329	$160,424,993
Chicago Surface Lines	$5,428,879	
Elevated Railroads	4,104,322	9,533,201
Total		$169,958,194

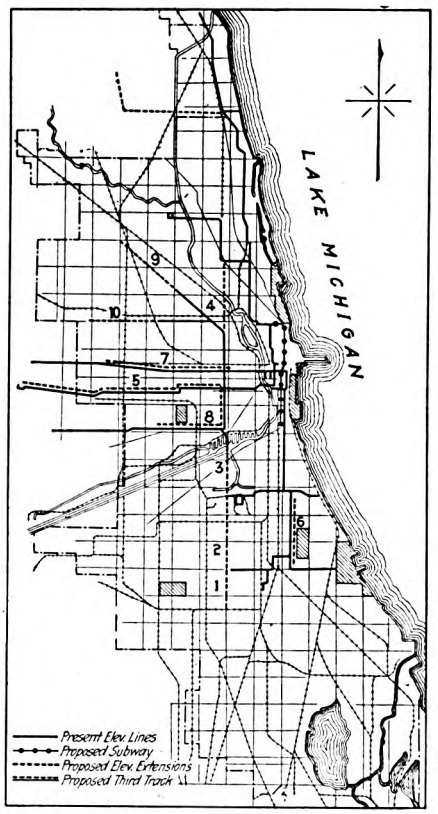
"Of the total amount spent, the surface and elevated lines spent only $9,533,201, or little more than 5 per cent, notwithstanding the pressing need and the constant demand for improved transportation. Why have the transportation needs of the city been neglected, while other utilities have gone forward to meet the growing demands on their service? There are many answers to this question—the increase in the cost of transportation as a result of the high prices of labor and material caused by the war; the fear of the investors as to whether the investment would be remunerative or not; short time or expiring franchises; to be candid, a lack of initiative in recent years on the part of the managements of both the elevated and surface properties, caused in no small degree by some of the foregoing reasons, but to my mind the greatest obstacle of all has been the continued maintenance of the traction question as a political issue.

"The utilities outside of traction have not for a number of years been subject to any great extent to political agitation, but in one form or another the traction question has been a burning question in every local political campaign for years past. Extravagant and impossible promises have been made before election and very little, if any, really constructive work has been done after election.

"I am not a believer in municipal ownership or operation as a cure for the traction ills we suffer from. I do not believe that you can expect to overcome our present troubles by the removal of personal incentive or the abolition of business management and the inauguration in its place of political management.

"On the other hand, if the community wants municipal ownership, if the people desire to substitute political management in the place of business management, I believe in giving them what they want if a means can be found to do so. The task of finding such means is not mine. I propose to address myself this evening to pointing the way to the possible development of rapid transit facilities by the use of existing agencies, namely, the elevated railways and the employment of capital supplied by our own citizens for this purpose."

The following construction steps, and the estimated cost of each, to give to Chicago rapid transit facilities capable of handling 200,000,000 additional passengers a year were outlined by Mr. Insull. The extensions to the elevated system are indicated by corresponding numbers which are shown on the accompanying map.



Proposed Extensions to Existing Rapid Transit Lines, as Outlined by Mr. Insull

Step 1	Extend Englewood branch, South Side, west to Ashland Avenue and south to Seventy-fourth Street; distance, 1¼ miles	$1,500,000
Step 2	Build double-track line near Ashland Avenue connecting Englewood and Stock Yards branches South Side Elevated; distance 3 miles	3,000,000
Step 3	Build double-track line near Ashland Avenue connecting line built in Step 2 with Metropolitan Elevated Douglas Park branch near Twentieth Street; distance 2¾ miles	3,000,000
Step 4	Build double-track line near Ashland Avenue connecting Metropolitan Elevated Logan Square branch at Milwaukee Avenue with Ravenswood branch Northwestern Elevated; distance 2¾ miles	3,000,000
Step 5	Third-track Metropolitan Elevated Garfield Park branch from Marshfield Avenue to Forest Park; distance 7½ miles	2,500,000
Step 6	Third-track South Side Elevated from Forty-third Street to Sixty-third Street for express service; distance 2½ miles	2,000,000
Step 7	Complete the third-tracking of Lake Street line from Ashland Avenue to Laramie Avenue	800,000
Step 8	Third-track Metropolitan Douglas Park branch from Marshfield Avenue to Lawndale Avenue	1,800,000
Step 9	Extend Logan Square branch of the Metropolitan to Irving Park Boulevard; distance 2¾ miles	3,000,000
Step 10	Extend Humboldt Park branch of the Metropolitan west for 2½ miles	2,500,000
T	l	$23,100,000

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In addition to this contemplated rapid transit system, a north and south, four-track subway, owned and built by the city, would relieve the traffic congestion in the Loop, Mr. Insull said. He stated that the solution of the transportation problem in Chicago rests directly with the people of the community, and that customer ownership offers a method for speedily carrying out the much-needed extensions to the existing rapid transit system.

Electrification Standards Urged

STANDARDIZATION of contact line type and voltage for heavy railroad electrification was urged by W. S. Murray, consulting engineer, at a joint meeting of the American Institute of Electrical Engineers and the American Society of Mechanical Engineers at New York on Feb. 27. Mr. Murray stated that while the direct-current motor at not more than 1,500 volts is most economical for motive power, the economies of the high-tension alternating-current overhead trolley system are too great to be overlooked. To use d.c. motors and a.c. line requires a conversion unit on the locomotive, which can be a motor-generator set. Experimental locomotives of this type are now being built, and it is hoped that they will furnish valuable cost and operating data.

The importance of having a uniform contact system was especially urged by the speaker, who felt that it is desirable to have an electric locomotive able to operate on any standard gage railroad track in the country, as a steam locomotive can do now. No electric locomotive of any one of the seven principal electrified lines, he stated, can be used on any of the others.

The possibility of increasing greatly the mileage of electric divisions was pointed out by Mr. Murray. An electric locomotive can operate as high as 6,000 out of the 8,760 hours in a year, while the steam locomotive can operate barely 3,000 hours.

On this basis the electric passenger locomotive can average 700 to 1,000 miles a day, and the electric freight locomotive 300 miles a day. The present steam freight locomotives, he said, average 55 miles a day.

The power requirements of electrified roads are very moderate, according to the speaker. One modern 60,000-kw. unit could supply the entire New Haven electrification with a good margin of safety, as the present normal load is approximately 35,000 kw.

Program of Wisconsin Association

THE tentative program of the Wisconsin Utilities Association's annual convention to be held at the Hotel Pfister in Milwaukee, April 17 and 18, has been sent out by John N. Cadby, secretary of the association. General meetings will be held in the forenoons, while the afternoons will be occupied with separate sessions of the gas, electric and railway sections. Speakers at the electric railway section will include: James C. Jamieson, Dayton Mechanical Tie Company; Francis Fox, Griffin Wheel Company; Dudley Montgomery, Madison Railways, and Andrew R. McDonald, member Wisconson Railroad Commission.

The annual dinner will be held on April 18. M. H. Aylesworth of the N.E.L.A. and E. F. Wickwire, Ohio Brass Company, will speak.

New England Club Meeting

THE twenty-fourth annual meeting of the New England Street Railway Club will be held at the Copley Plaza Hotel, Boston, Mass., on March 27.

American Association News

Special Pullman Booth at St. Louis

THE Southwestern Passenger Association will establish a special Pullman ticket booth in the lobby of the Chase Hotel, St. Louis, on March 3 and 4 for the convenience of those attending the Midyear Meeting of the American Electric Railway Association. Through this arrangement it will be possible to make full arrangements for the return trip without leaving the hotel.

Dr. Ely on Midyear Program

AT THE afternoon session of the Midyear Meeting of the American Electric Railway Association at St. Louis, March 4, in addition to the speakers previously announced on the topic "The Improved Condition of Electric Railways," Dr. Richard T. Ely, professor of economics at the University of Wisconsin, will consider the subject from the standpoint of the economist. Dr. Ely is head of the Institute of Land Economics, and is an authority of wide reputation on taxation problems and land values.

Way Matters

A LENGTHY discussion concerning the best method of securing a service test of various types of rail joints featured the meeting of the committee on way matters held at Easton, Pa., Feb. 13 and 14. Following a description of the tests which had been made previously, not including any service test however, E. M. T. Ryder described a new plan to secure data on the latter subject. The original plan was to construct a rotary service machine, and a machine of this sort had in fact been designed. But when bids were received from the manufacturers the cost of this machine proved greater than the sum available. Some doubt was expressed concerning the value of the information to be derived from the use of the machine and for that reason the matter had been allowed to rest.

The new plan suggested was to build a circular track 200 ft. in diameter and operate fourteen double-truck cars around the circle. The outer rail was to be the association standard grooved girder rail and was to have the proper elevation, approximately 9 in., for a constant speed of 15 m.p.h. The inner rail was to be plain T, with bolted guard rails on both rails. The inside and outside wheel diameter were to be arranged so that there should be no slippage. It was felt that if this was done it would be unnecessary to make the axles truly radial. The flange on the outer wheels was to be removed so that there should be no flange wear during the test. The committee discussed this subject at length, but its members were about evenly divided in their opinion concerning its feasibility and desirability and no definite action was taken.

The form of a questionnaire on substitute ties was determined upon after considerable discussion. It was decided to send this questionnaire to all member companies as well as to those railways which are known to be using various substitute ties.

A comprehensive statement covering the experience of the Toronto Transportation Commission with methods of surface hardening of rails was given by A. T. Spencer. Data were presented and some samples exhibited to show the practical application of the "in situ" process used in that city. Much information from other sources describing various processes and the results obtained was also presented by Mr. Spencer.

The committee decided unanimously to adopt the A.R.E.A. type of track spike as standard for the American Electric Railway Engineering Association. No definite action was taken in regard to tie rod specifications. The subject of narrow grooved guard rails was discussed, but the committee decided to lay the matter over until the next meeting. Final action on the standardization of frogs was also postponed until the next meeting. A progress report was made covering flange for manganese steel crossings, steam over electric railway.

The standardization of switches and mates was discussed, and a progress report submitted concerning gages and flangeways with their permissible variations and clearances. An interesting study was presented by E. M. T. Ryder on the subject of a standard switch tongue. He showed the dimensions of the various types now in use and suggested a method of standardizing. The committee voted to continue the study of this subject and requested all the manufacturers to co-operate in securing further data before the next meeting. Revision of existing specifications was briefly considered and it was suggested that proposed changes be submitted at the next meeting. It was decided at a luncheon at the Northampton Country Club to hold the next meeting in Baltimore on April 16 and 17.

During the afternoon of Feb. 13 the committee spent several hours inspecting the plant of the Wharton company. This proved to be both interesting and instructive. The entire arrangements

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for the meeting at Easton were in the hands of the officials of Wm. Wharton, Jr. & Company. The committee voted its sincere appreciation of the way that the arrangements had been carried out.

The members of the committee present were: W. W. Wysor, C. A. Alden, V. Angerer, S. C. Baker, E. B. Entwisle, R. B. Fisher, A. T. Spencer, H. H. Guillot, representing G. C. Estell; E. M. T. Ryder, C. F. Gailor and H. H. George, chairman.

Time for Answering I. C. C. Extended

THE time for filing an answer to circular No. 3 on depreciation of electric railway property issued by the bureau of accounts, depreciation section of the Interstate Commerce Commission, under date of Jan. 26, 1924, has been extended until April 6 (original limit March 6) at the request of the committee on national relations of the American Association.

Electric Lines File Depreciation Brief

American Electric Railway Association Committee Discusses Basic Questions of Useful Life and Depreciation Reserves Before the Interstate Commerce Commission

THE American Electric Railway Association was granted permission by the Interstate Commerce Commission to intervene in the proceedings under No. 15100, Depreciation Charges of Steam Railroad Companies, being a hearing before the commission on the recommendations of the bureau of accounts, depreciation section, with regard to the setting up of depreciation accounts by the steam railroad companies, and the action which should be taken by the commission in reference thereto under Sec. 20, Par. 5, of the interstate commerce act, as amended Feb. 28, 1920.

A committee consisting of W. H. Maltbie, chairman; R. R. Bradley, A. W. Brady and Frank Karr prepared a 4,500-word brief which was filed with the commission on Feb. 20. On account of the importance of the subject to the industry, the principal contentions in the brief are given below practically in full.

The conditions which surround the electric railway industry, although similar in some respects to those which surround the steam railroad industry, present nevertheless many points of difference, both as to the character of the traffic handled, conditions under which operations are performed, and relations of the companies involved to the general economic and financial situation in the country as a whole. Interest in the present case, therefore, is confined to the discussion of some of the general principles underlying a system of depreciation accounting, which by virtue of their general application might be applied in any subsequent cases relating to the accounting of carriers other than steam roads, and also because of the precedents established for subsequent cases before the Interstate Commerce Commission and state commissions.

No attempt is made in this case to file any full brief or complete discussion of the question of depreciation as applied to electric railway accounting. The present brief is intended only to cover a few general questions on principles which are so broad as to be of general application.

The recommendations made by the depreciation section, as the committee understands them, involve the division of the depreciable property of the carrier into two classes to be handled, respectively, on a unit and a group basis. For both classes depreciation is to be accounted for on the straight-line basis. Estimated useful life is to be determined with due allowance for possible retirement through obsolescence, inadequacy, changes in the art, and public requirements. These estimates as to useful life are to be made in the first instance by the Interstate Commerce Commission for the various classes of roads, and thereafter are to be subject to modification for individual lines in the discretion of the commission, on application by individual roads; and the corporations are to be under no restrictions as to the use which they shall make of the depreciation reserve.

In the case of property in the unit class the ratio of salvage to ledger value is to be determined by estimates, a separate depreciation account is to be set up for each unit, and if a unit is retired before the end of its estimated useful life the shortage in the depreciation reserve accumulated for that particular unit is to be charged to operation as of the year of retirement. If, on the other hand, the unit exceeds its estimated useful life, no further reserve is to be accumulated for it after the expiration of the estimated useful life.

In the case of property in the group class the ratio of salvage to ledger value is determined not by estimates but by actual average experience over the preceding period equal to the estimated life cycle, the reserve is set up for the group as a whole, and there is therefore no opportunity to determine whether a particular portion of the group which it becomes necessary to replace has or has not an adequate reserve accumulated for it; and there is therefore no opportunity or cause for charging into the operating expenses of any particular year any special deficits such as those which arise in the case of property handled on the unit system.

These recommendations raise, either directly or through conditions which inevitably follow their adoption, certain basic questions, on three of which the committee presented comments for consideration of the commission. These questions are:

First—Shall the useful life of property for depreciation purposes be estimated on the basis of normal exhaustion through use, or shall there be included the effect of possible retirement through obsolescence, inadequacy, changes in the art, and public requirements?

Second—Shall a depreciation reserve be set up on a unit basis, on a group basis, or as a single reserve for the composite property?

Third—Shall a depreciation reserve be built up for the purpose of ultimately refunding his investment to the investor, or in other words for the liquidation of the securities issued, or shall it be limited to the replacement of property which it becomes necessary to retire?

Estimation of Useful Life and Effect of Obsolescence, Etc.

Attention is called first to the fact that the inclusion in the determination of useful life of possible retirement through obsolescence, inadequacy, changes in the art, and public requirements has the effect of shortening the estimated life as compared with normal wearing life, and consequently results in an overcharge against the public during the earlier part of the life cycle of all property which lives out its normal life.

Retirement through obsolescence, inadequacy, changes in the art, and public requirements does not occur in accordance with any known or determined law, and the experience of the past is no guide as to what will probably happen in the future. The only result of including these elements in the estimate of useful life is therefore a shortening of useful life by an arbitrary amount, making it by so much less than normal wearing life. It follows, therefore, that the reserve for all those units which live out their normal life will be fully accumulated before the expiration of their period of usefulness, or in other words that the patrons during the earlier part of the useful life will pay not only their own particular depreciation charge but also the depreciation properly chargeable against the patrons during the remainder of the useful life.

On the other hand, if we consider those cases in which retirement through obsolescence, inadequacy, changes in the art, or public requirements actually occurs, it follows that, since the average useful life is the weighted mean between those cases in which the property does and does not live out its normal wearing life, the actual cases of retirement through obsolescence, inadequacy, changes in the art, or public requirements must occur prior to the termination of the estimated useful life and that therefore, working on the unit rule, the accumulated reserve for each unit will be inadequate and the deficit will fall upon the patrons of the particular year in which the retirement occurs, since this deficit is to be charged to operating expense. Practically, however, since rates cannot be adjusted to take care of this deficit, the burden will fall upon the security holders and result in a reduction or elimination of returns for the year in question.

The committee submits that the only practical methods of providing for these uncertain losses of value are by

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the accumulation of a separate reserve, by amortization after they occur, or by a combination of the two.

SHALL DEPRECIATION RESERVES BE ON UNIT OR GROUP BASIS?

If the depreciation reserves are to be set up on a unit basis under the system recommended by the depreciation section, the amount of accounting involved in the case of the larger properties will be enormous; but in addition to this, even if the estimated useful life is made equal to the normal wearing life, without regard to retirement through obsolescence, inadequacy, changes in the art, or public requirements, the system will result in marked inequality of charge for depreciation purposes against the users in successive years, and in particular against the collective group of patrons during the first life cycle as compared with the collective group during the second life cycle.

Assume, for example, that this rule is in force and consider the charges against the patrons during the first life cycle of a group of new units. These patrons will be charged, first, full replacement cost on those units which live out or overlive their estimated life; second, full replacement cost on all those units that fail to live out their estimated useful life; third, full annual depreciation charges on those units which replace the units which fail to live out their estimated useful life. Patrons of the second life cycle, on the other hand, are relieved of any payments for depreciation during the remaining life of all those units of the group which exceed the average estimated useful life. In other words, the patrons during the first life cycle pay for more equipment than they wear out, while those during the second life cycle have the use of equipment without charge for its wear.

As a matter of fact, rates cannot be adjusted upward and downward from year to year in order to take care of these fluctuations in the depreciation appropriation, and the variation in the burden must be met by the security holders.

The accounting would have been simplified, exactly the same amount of money collected, and the charge equitably distributed if the reserve had been accumulated for the group and not for the individual units.

Another injustice to the patrons of the first life cycle from the adoption of the unit rule also follows in the case of all existing companies which have not already accumulated a depreciation reserve upon this basis. In other words, the general effect of the adoption of the regulation, at least in all properties where the number of units is sufficient so that annual replacements are approximately equalized, will be to force the shipping public to refund to the investors approximately one-half of the service value during the first life cycle after the adoption of the rule. The committee submits that, even if such refund is desirable, the present economic situation does not justify the loading of this burden upon the patrons of the railroads at the present time.

The difficulties growing out of the unit system of depreciation are all due to the fact that the depreciation section has attempted to determine useful life on an average basis, apply the resulting figures to individual units, and charge the deficit in the case of any unit which does not live out the average life to the unfortunate user or security holder at the moment of its retirement. It is obvious that such a system is economically unsound.

It is submitted that if the estimate of useful life is to be based on the average life of a large group or field of units, then the charges against operation for the establishment of a depreciation reserve or reserves for those units must be set up for the same group or field; and, further, that the overpayment on long-lived units (resulting in the completion of their reserve before the termination of their useful life) shall be used to meet the deficit due to underpayments on short-lived units which failed to live out their estimated useful life. The result of such use, of course, is a deficit in the reserve of the long-lived units which is properly charged against the patrons who get the benefit of these units during the remaining life years. It is certainly more equitable to charge this inevitable deficit against those who are given the use of the property than to charge it against those who happen to be the users in the year of retirement.

But if this position is adopted the reserve is practically on a group basis, and unit accounts become unnecessary.

All forms of dealing with theoretical depreciation demand for their application a predetermination of service life, and this is impossible for any particular piece of apparatus or for the collective apparatus of any particular company. Even those estimates of average life which are based upon a nationwide experience are, in view of the constantly increasing service demand, of doubtful value; but even if such average figures were accurate and dependable they could not equitably be applied to any particular company. Average service life estimates can only be equitably used when replacement costs are chargeable to a general replacement account. Vital statistics are accurate and dependable, but they are not a safe basis for self-insurance by the individual.

The method recommended for the handling of depreciation upon group properties differs, as noted above, only in the method of determining the ratio of salvage value to cost or ledger value, but the impossibility of isolating the units retired from time to time results in a second difference in that it will be impossible to charge into operating expenses of the year of retirement any deficit in the reserve, since there will be no indicated or designated portion of the reserve applicable to the property retired. This method, therefore, will not result in the inequality of charge between patrons in the first and subsequent life cycles, and will not accumulate a reserve in excess of current needs in the case of older properties where replacements costs have become practically uniform from year to year. In the case of new properties, however, or in the case of extensions of existing properties of sufficient importance to justify their recognition as a separate depreciation accounting group, the comments herein made as to accumulation of an unnecessary reserve still hold.

IS RESERVE FOR REPLACEMENT OR LIQUIDATION?

A depreciation reserve can serve but one or the other of two purposes. The first is the insurance of necessary replacement of property; the second is liquidation of the capital invested. Since, however, the investor in a major railroad business does not anticipate at any time an ultimate liquidation, he is not interested in and does not demand the accumulation of a liquidation reserve. Moreover, the public is not interested in the accumulation of a liquidation reserve and, in so far as it understands the fact that this reserve must be accumulated at its expense, does not demand (and in fact opposes) its accumulation. Regulatory bodies therefore should deal with a depreciation reserve only as a means of replacement.

The unit plan operated under the rules proposed will build a liquidation as well as a renewal reserve for all companies, old or new. The group plan operated under the rules proposed will build a liquidation as well as a renewal reserve for new companies (assuming ratio of salvage to ledger value to be estimated in view of the lack of experience) and also in the case of new extensions of sufficient magnitude to be treated as a group. It accumulates only a replacement reserve in the case of companies sufficiently old or with property sufficiently diversified to have practically uniform annual replacement costs.

The committee believes, therefore, that as between the group and the unit methods the former should be adopted, but we go further and respectfully urge that the practical, businesslike way of dealing with depreciation in the case of companies where the investor does not look to an ultimate liquidation is to allow each year as operating expense a sum reasonably in excess of the replacement costs of that year until a sufficient reserve has been accumulated in a general depreciation account to serve as a balance wheel or reservoir out of which to take care of any year-to-year variations in replacement costs; and thereafter in the event of any abnormal replacement cost which cannot properly be handled out of the reserve reservoir to charge the excess to a suspense account and amortize it in subsequent years.

POSSIBLE TO DEVISE EQUITABLE SYSTEM

This association believes that it is entirely possible for the commission to set up under the interstate commerce commission act as amended a classification of depreciable electric railway property, fix tentative rates for each class, group the individual companies according to their needs, and devise a system of depreciation accounting that will equalize replacement burdens, prevent the accumulation of excessive reserves, and still leave the companies a reasonable and necessary economic freedom.

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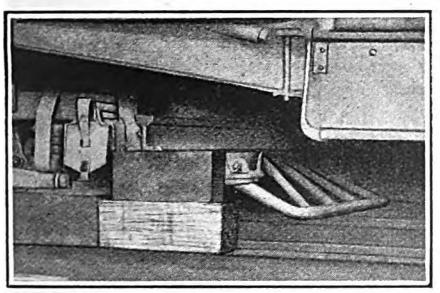
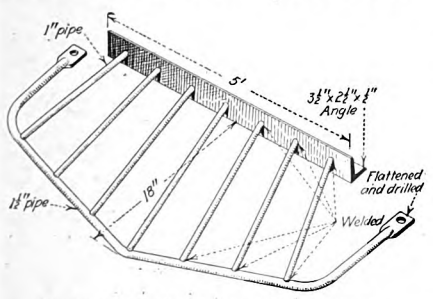
Maintenance of Equipment

Car Fender Made of Pieces of Steel Pipe

A SATISFACTORY though inexpensive type of car fender consisting mainly of short pieces of steel pipe is being used by the Chicago & Joliet Electric Railway on its interurban and suburban cars. For the outside edge of the fender a piece of 1½-in. pipe is used. A 3½-in. x 2½-in. x ½-in angle bar forms the



This Fender Is Made of Pipe in the Shops of the Chicago & Joliet Electric Railway



Details of the Joliet Pipe Fender

back transverse member, which is attached to the truck frame, while seven pieces of 1-in. steel pipe, spaced equidistant, serve as supporting members between the angle and the outside or lower pipe. The ½-in. pipes, slanting upward, also act as a guard to prevent large objects from getting under the truck while the car is in motion.

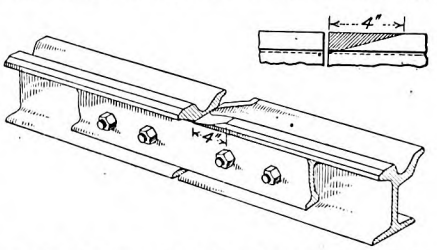
The piece of 1½-in. pipe is bent to the desired shape over a templet. The angle is cut and drilled to receive the bolts for anchoring it to the truck frame. With the pipe laid out flat on the floor the angle is placed on a support 6 in. higher and in the proper relation to the pipe to secure the correct angularity of the supporting members. The seven pieces of 1-in. pipe are cut to the exact lengths to fit. The two end supports are oxyacetylene welded into position first, after which the remaining five pipes are welded in position.

The outside member of the fender is attached to the same portion of the truck as the angle, the end of the pipe being flattened and bent into a position flush with the bottom face of the angle. A hole is drilled in this flattened portion to receive the bolt for fastening to the truck frame.

Fenders of this type have proved very satisfactory in the service in which they are used, and in no instance have the joints opened due to vibration of the truck. As mounted, the lower edge of the fender clears the track by about 7 in.

Rail Head Cut Back Before Welding Battered Joint

IT HAS been found by the Union Street Railway, New Bedford, in building up badly battered rail joints that more satisfactory results are obtained by cutting back the head of the rail on a diagonal before commencing to weld. This is done with an acetylene torch and takes only about ten minutes longer per joint than the old method. The cut is made on a slant from the top of the fish plate or from the bottom of the groove to the head of the rail at a point about 3½ or 4 in. back from the rail end. The joint is then built up

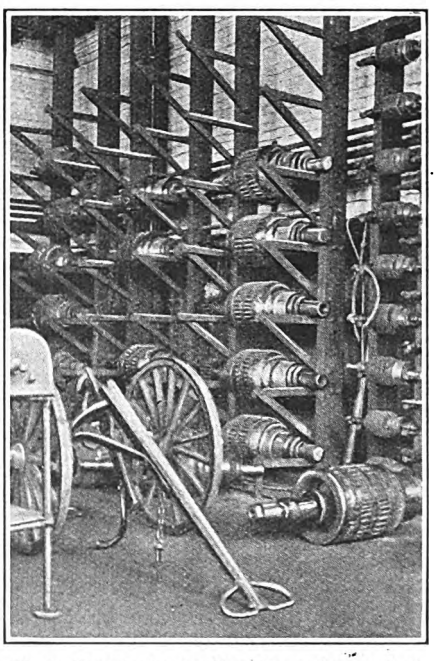


Head of Battered Rail Is Cut Back Before Building Up

by welding with hard steel and ground. The whole operation takes about one hour per joint and a job done in this way will last considerably longer than when the joint is built up simply by welding without cutting back the head of the rail for a new surface.

Armature Life Prolonged by Careful Storage

SPARE armatures are stored in the shops of the Holyoke Street Railway in racks built up of metal bars as shown in the accompanying illustration. The supports are short arms extending from vertical posts and braced underneath by diagonal pieces. To prevent the armatures



These Simple Racks Provide a Convenient Place for Storing Armatures

rolling off the end, the supports slope back slightly. A chain hoist traveling on an overhead trolley is used to lift the armatures and convey them to and from the racks.

Dipping and baking armatures is not favored by this railway. Insulating varnish has been found to be sufficient protection. In spite of the fact that winters are severe in Massachusetts and much snow usually falls, there have been few burned out armatures. The principal cause of failure is in the bearings. During December, 1923, and January, 1924, there was only one armature burned out on the sixty-odd cars operated on this railway.

The care exercised in handling armatures is thought to be an important element in prolonging their period of service.

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Chattanooga Signal Record Still Improving

THE effect of careful maintenance on the forty-two Nachod signals in use on the single track in and about Chattanooga, on the lines of the Tennessee Electric Power Company, continues to show improvement, as revealed by the annual report of the signal department, covering the year 1923. This is to be compared with a report covering the years 1919-1922 in the Feb. 10, 1923, issue of ELECTRIC RAILWAY JOURNAL, page 254.

In the table below figures are given showing specific troubles found, with the number of cases of each. During 1923 these were reduced to seventy-one from eighty-six in 1922, while the total of all the signal operations was increased from 2,082,404 in 1922 to 2,124,680.

The operations per failure were 24,214 in 1922 and 29,928 in 1923, an increase of almost 23 per cent. A comparison of previous years shows that the record has been consistently and continuously improved from 11,336 operations per failure in 1919. The number of lamps out has been markedly reduced, due to regularly renewing them at stated periods, while contactor troubles almost completely disappeared.

COMPARATIVE RECORD OF SIGNAL TROUBLES FOUND IN CHATTANOOGA

	1922	1923
Line wires	3	2
Fuses blown	9	15
Lamps out	19	8
Relay trouble	11	13
Setting contactor	6	4
Restoring contactor	5	4
Bad grounds	3	6
Pole wiring	13	6
No trouble found	12	3
Miscellaneous	5	10
	86	71

	1922	1923
Total operations of all signals for year	2,082,404	2,124,680
Number of operations per failure	24,214	29,928
Average yearly operations of each block of signals	99,162	101,174
Average daily operations of each block of signals	272	276
Number of blocks in service	21	21

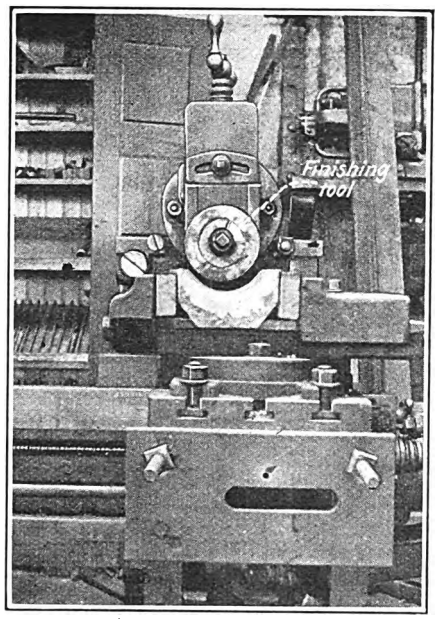
The department overhauled twenty-two old signals and relays, at the same time converting them into the latest model. The oil in which the relays are immersed was renewed in twenty-five of the signals. Three blocks of signals were converted into other types to conform to different operating conditions, and one of them was made to work in conjunction with a Cheatham switch. Twenty-seven overhead trolley contactors were taken down, painted and adjusted and 2½ miles of iron line wire replaced with No. 10 copper.

The signal department also installed one Cheatham switch and changed the location of two others of these switches.

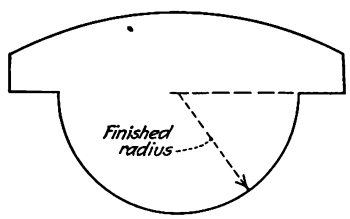
Finishing Journal Bearings on a Shaper

IT IS quite common practice among electric railways to fit journal and axle bearings to the particular shafts on which they are to operate. After babbitting, the insides are usually either turned or bored out to the required dimensions. As clearance is usually allowed at the side for the entrance of oil, the important fitting dimensions are the depths and the radius at the top.

The Philadelphia & Western Railway, Norristown, Pa., has found it convenient to machine journal and axle bearings in a shaper by employing a circular tool which is bolted to the tool post. The edges of this steel disk are beveled so as to provide a cutting face, and by use of different diameters for the disks any desirable variations in the finished bearings can be produced. In finishing, the bearing is clamped to the bed of the shaper and as the tool is moved back and forth the cuts can be regulated as desired. An allowance of approximately $\frac{1}{16}$ in. babbitt is made for machining purposes.



Cutting Babbitt from a Journal Bearing in a Shaper



Gage Used for Accurate Fit of Bearings

In order to provide for accurate gaging of the bearings during the machining operation a circular gage is provided which gages the inside radius from the split bearing face. An accompanying illustration shows the method of machining the bearings and type of gage used.

New Handles for Old Tools Save Money

THE maintenance of way department of the Springfield Street Railway, Springfield, Mass., has made a saving in the purchase of new tools by a program of replacing the handles in old ones. Among such tools as shovels, picks, hammers, axes, and the like, a broken handle is usually the cause of the tool being discarded.

To avoid throwing away good material the railway employs one man in the storeroom of the track department during bad weather to refit tools with new handles. The latter are purchased locally for such tools as picks and axes and are made in the carpenter shop of the railway for tools for which handles cannot readily be purchased.

Heavy Plow Tears Up Pavement Quickly

AN UNUSUAL method of removing old pavement from between the rails is used by the Boston & Worcester Street Railway. A small car has been constructed with a square framework of 20-in. steel I-beams. Inside of this frame is another frame, triangular in shape, and built of 15-in. I-beams. To the bottom of the triangular frame 75-lb. T-rails have been bolted upside down. These are pointed at the front end and bent downward three-quarters of an inch. Adjustment of height is made by blocks under the springs so that the pointed rail ends will clear the pavement or dig into it to any desired extent.

The triangular frame has been filled with 4½ tons of concrete, making the total weight of the pavement digger about 9 tons. It is pulled by a 1⅛-in. steel cable 20 ft. in length and attached to the vortex of the triangle. Two 30-ton cars are used to pull the digger. On a recent job, pavement was removed by this apparatus in six hours that would have cost $1,800 to remove by hand.

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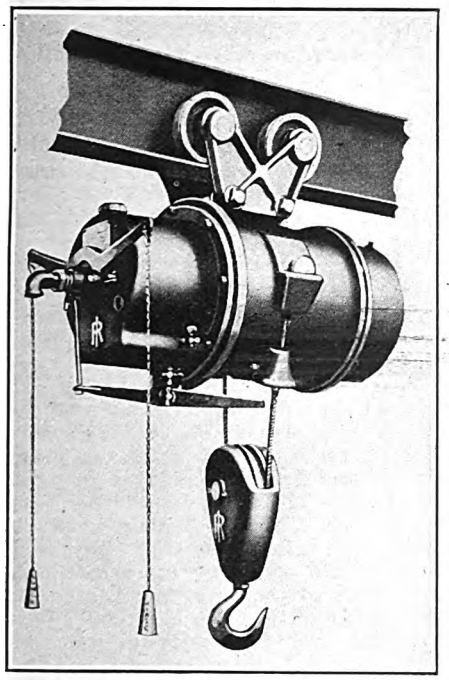
New Equipment Available

Air Motor Hoists with New Features

FOUR heavier sizes of air motor hoists have now been added to the line supplied by the Ingersoll-Rand Company, New York. These hoists range in capacity from 500 to 10,000 lb.

Among the features incorporated in these hoists is a balanced three-



New Air Motor Hoist

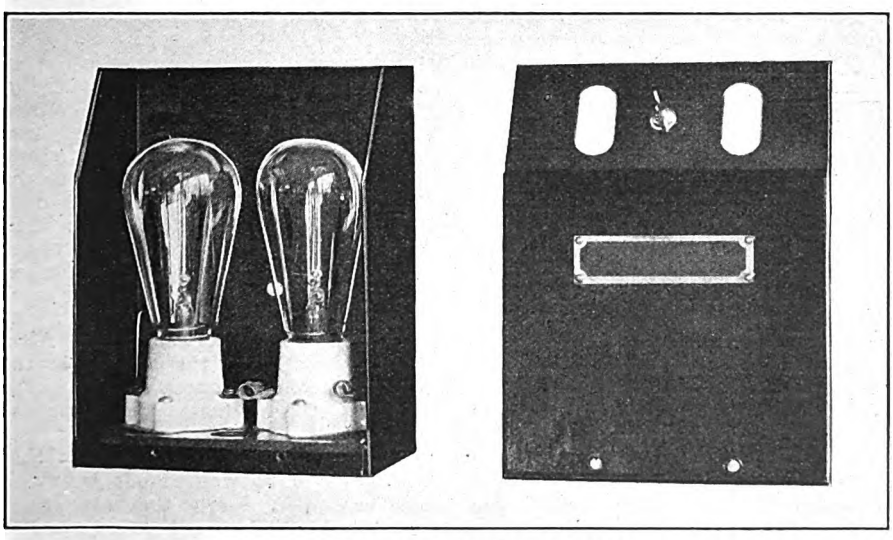
cylinder air motor which operates in either direction. The throttle graduation is very fine and controls the hoist at any speed. A safety stop lever is provided which closes the throttle and stops the motor whenever the load is by chance raised to the top of the hoist.

The addition of an automatic brake is a new feature. This holds the load at any desired position regardless of air pressure. The brake consists of a disk attached to the motor shaft and a brake plunger with a friction base which is held in contact with the disk by a spring whenever the hoist is not operated. It is entirely automatic in its action.

Light Box Signals Traffic Officer as Well as Motorman

A NEW type of signal light box has been developed by the National Pneumatic Company, New York. An interesting feature of this box is the inclusion of two holes in the back of the box opposite the top of the two signal lamps. With the doors closed and the car ready to start light shines through these holes. The box is installed so that these come just above the window ledge at the front of the car, and traffic officers can thus see when lamps are lighted and are advised that the car is in readiness to move. They can thus signal traffic for prompt operations of cars.

Another new feature of the signal box includes a dimmer for the front signal holes, so that during the night time some of the rays from the lamps can be shut off, but during the daytime the maximum illumination is obtained. This consists of a slide inside the cover with a wing nut attachment on the front. By loosening this slide can be changed so as to dim the illumination or give full illumination as desired.

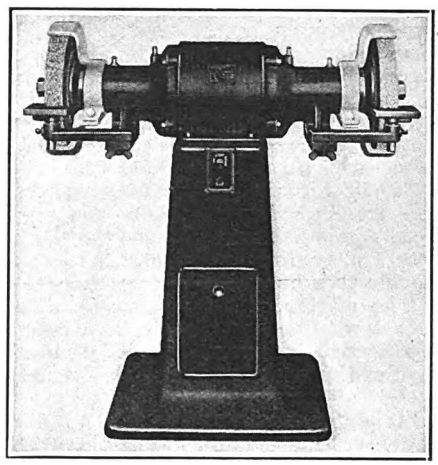


Signal Light Box with New Features

Wide Swing Grinder

A NEW construction in grinding machines with the wheels spaced 37 in. apart is being marketed by the Hisey-Wolf Machine Company, Cincinnati, Ohio. This wide spacing permits grinding of large bulky castings and at the same time prevents interference where two workmen grind at the same time.

This machine is equipped with a 3-hp. motor and can be furnished for



Wide Spaced Grinding Wheels Fitted with Open End Wheel Guards

either alternating or direct current operation. The size wheels recommended are 14 in. in diameter and the machine is suitable for use in mounting wire brush wheels or buffing wheels. A special feature is the adjustable open end wheel guard, which can be readily removed if desired.

A fully inclosed and combination wheel guard can be supplied to order. This guard is fitted with removable end covers and exhaust pipe connection, and, like the open type guard, is of dimensions and specifications as recommended by the American Engineering Standards Committee. It is adjustable to any angle and can be moved back as the grinding wheel wears. This full safety guard is interchangeable with standard open end guard. Four high-grade ball bearings are fitted to the spindle.

The grinding rests are adjustable and are held in position by clamping nuts and bolts with concealed heads. The spindle is of one-piece construction and made of high grade steel. The grinder has a base 22 in. x 25 in. and the motor has a no-load speed of 1,600 r.p.m.

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The News of the Industry

Detailed Improvement Plan Submitted

Rerouting, Trackless Trolley and Gasoline Bus All Included in Commissioner Cann's Plan for Toledo

General rerouting of railway lines, establishment of a trackless trolley crosstown line, and the development of a double-deck gasoline bus "de luxe" service on Collingwood and Madison Avenues—the most exclusive residence and business thoroughfares in the city—are included in a plan which Street Railway Commissioner W. E. Cann laid before the City Council at Toledo. The entire plan will possibly come before the Council on March 3. The cost of the plan is estimated at $760,000, with $532,820 for the physical changes in the present system, $157,000 for overhead equipment and cars for the trackless trolley line, and $76,000 for the double-deck buses.

The matter of the trackless trolley crosstown line has already been before the Council for several weeks. Disposition of the issue has been delayed from week to week because it is feared it will be practically impossible to pass the necessary enabling measure without some concessions.

It is believed that in order to carry out the double-deck gasoline bus feature, which is an innovation, a separate corporation would have to be organized to operate the buses. A 10-cent fare would be charged on the buses and a ten-minute schedule maintained. It is not known what the attitude of the Community Traction Company would be toward this form of operation, but it has already frowned upon the use of buses on the crosstown line.

The commissioner told the members of the Council at a special meeting on Feb. 23 that he estimated the changes would increase operating expenses by $666,951 a year, while the revenue of the lines would be increased by $558,930 through the economy of the changes and additional service possible.

He intimated that the apparent loss of $108,021 would be easily absorbed through economies of one-man operation on various lines at all except rush hours.

Retaliatory Measures Resorted to by New York City Board

The Board of Estimate of New York, sitting in committee of the whole, adopted formally on Feb. 25 a policy of refusal to enter into contracts with the Brooklyn-Manhattan Transit Corporation for the operation of subways or any other form of transportation lines. A resolution to that effect was offered by Comptroller Craig as the result of a discussion of the withdrawal of surface car service across Williamsburg Bridge. Every member of the board voted for the proposal except Borough President Maurice E. Connolly of Queens, who said he saw no need of such action. A large delegation of Brooklyn residents criticised the present municipal operation of the bridge cars and asserted that because of the municipal 3-cent operation thousands of passengers were forced to pay an additional fare or walk.

The board laid over for further consideration the method of construction of the extension of the Fourteenth Street-Eastern subway. Two hundred men and women from the Ridgewood and East New York sections of Brooklyn urged immediate action, and the members of the latter delegation opposed the construction of an elevated structure. Borough President Connolly of Queens urged that the line should be built through Wyckoff Avenue instead of Cypress Avenue, which brought opposition from both delegations. The board decided to visit the sections affected with Arthur S. Tuttle, its chief engineer, before making a decision.

Transportation Puzzle Solved

Cincinnati Street Railway and Traction Company Submit Agreement—Seven and One-Half-Cent Fare Favored at the Meeting—Much Yet to Be Done to End Controversy

SUBSTITUTION of an entirely new traction contract for the present service-at-cost franchise, declared to be "beautiful in theory, but not workable as a practical proposition," appears to be likely to result from negotiations that terminated in the presentation to the Council committee on street railroads on Feb. 21 of a plan for the solution of the railway problem of Cincinnati, Ohio. The Cincinnati Traction and the Cincinnati Street Railway, the two parties to the controversy, insist that the agreement will achieve all that the city administration has sought in addition to improved service and lower fares. The agreement, signed by W. Kesley Schoepf and Walter A. Draper for the traction company and by Robert A. Taft and Samuel Assur for the street railway, was discussed in executive session by city officials, Councilmen and members of the Mayor's citizens' street railway committee following the public hearing in the Council chamber. The terms will also have to be approved by the directors and stockholders of the two companies, to whom they are to be submitted at the earliest moment.

The agreement was read to the members of the Council committee. It is predicated upon demands made by Mayor George P. Carrel and the City Council two years ago. In substance, these demands called for a scaling down in capitalization; a consolidation of the two companies involved, so that the city might deal with a single corporation, and a divorcement from the present street railroad organization of all activities that were not directly concerned in the actual operation of the railway.

It was announced that before the administration would commit itself as to the acceptability of the agreement between the two companies there must be a definite understanding as to what is to become of the other provisions of the franchise, since the conditions imposed by the agreement were considered to clarify only one phase of that contract. Accordingly it was suggested that a special committee be named by Council, to be composed of the Mayor's cabinet, including the service and the safety directors, vice-mayor, street railroad director, city solicitor and members of the Council committee on street railroads. The members of this committee will listen to further proposals from the railway company, which is to become the operating company under the terms of the agreement, as to the disposition of the other questions affecting the present service-at-cost franchise.

Some of the questions to be determined are: What shall be the rate of fare? Is the cost of operation to be the determining factor, as provided for under the existing contract, or shall that contract be discarded entirely and a new franchise substituted that will contain a definite fare to be charged until 1932, when, under the original franchise granted under the Rogers law, there is to be a revision?

With regard to the fare feature some of those at the conference favored a straight 7½-cent fare until 1932, provided other terms of the proposed amended franchise tax were satisfactory. A further question to be determined is whether or not the city, in the interest of the car rider, shall forego the franchise tax, which, under the existing contract, is to be paid when earned, and if so, is the operating company to assume the obligation of maintaining the streets between rails? Also, what return upon the capital is the company to be permitted to earn in the interest of low fares and improved service?

These are some of the details that will have to be worked out before it can be stated finally that the entire problem definitely has been adjusted to the satisfaction of all parties at in-

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terest. It was predicted that it will be at least three or four months before an end is reached in the five-year controversy. The report recites that the Cincinnati Street Railway agrees to purchase all the interests of the Cincinnati Traction Company in the system, and that thereby two of the demands of the Mayor and the Council will have been met.

As to reduction in capitalization, it provides that the capital shall be reduced by approximately $10,000,000, exclusive of any reduction in the capital of the Cincinnati & Hamilton Traction Company, known as the Millcreek Valley line. The present capital of that corporation is $2,200,000, divided equally into common and preferred stock.

While the agreement makes no direct reference to the fact, the new operating company as soon as possible also will purchase the Millcreek Valley line outright from present stockholders. Whatever price is paid for that property will be additional capital.

The basis of the purchase price of the Cincinnati Traction Company interests and of the leasehold of the Millcreek Valley line from the Ohio Traction Company is $4,250,000 in stock of the Cincinnati Street Railway and the assumption by the latter company of $2,817,000 of outstanding obligations, together with $1,651,000 car trust certificates. In addition the Cincinnati Street Railway will assign its perpetual leasehold in the Chester Park property. That property comprises approximately twenty-five acres, now devoted to amusement purposes. The lease contains a privilege of purchase clause for $100,000.

The Traction Building and the Cincinnati Car Company also will be retained by the Ohio Traction Company. In that connection a new company will be organized to take over the park property, car building plant and the Traction Building. W. Kesley Schoepf, president of the Cincinnati Traction Company, will head this new organization.

If the terms of the joint agreement are ratified ultimately the total outstanding permanent capital of the new operating company would be $22,761,950 exclusive of any stock that may be issued for the purchase of the Millcreek Valley Line. The total capitalization will include, however, the $2,817,000 outstanding obligations to be assumed and which are being liquidated and also the $1,631,000 car trust certificates which are being paid off through charges to depreciation.

It was stated that neither of these items represents permanent capital, the total of which, even with the purchase of the Millcreek Valley Line, will approximate not more than $24,000,000. If this last figure represents the total permanent capitalization, it will be $1,000,000 less than suggested as the maximum by the Mayor's citizens' street railroad committee. The joint report submitted by representatives of the two companies indicates that with the $10,000,000 reduction of the existing capital there will be an annual saving to the car rider of approximately $546,000, which in terms of fares, would represent a trifle more than one-half cent per passenger. This will make possible a reduction in fares as soon as the new arrangements have been put into effect.

Co-operation on the part of the city of Cincinnati and of Norwood is sought by foregoing the franchise tax and also the percentage tax on gross earning demanded by the two municipalities respectively under existing contracts. If that is done, the capital reduced as proposed and the other suggested economies are carried out, a 7½-cent fare is possible. The company now pays approximately $500,000 property tax annually for county, city and school purposes, in addition to other taxes which aggregate $800,000 a year without considering any municipal franchise tax.

Detroit's Corporation Council Removed

The appointment of C. E. Wilcox to handle the claims of the Department of Street Railways at Detroit, to which reference is made elsewhere in this issue, was opposed by Corporation Counsel Richard I. Lawson, who maintained that the Corporation Counsel's office was equipped to care for the legal matters that might arise in connection with the street railways.

Mr. Lawson was appointed Corporation Counsel by Mayor Frank E. Doremus. He was dismissed by Joseph A. Martin, acting Mayor during the absence of Mayor Doremus, who is ill. Mr. Martin's drastic action followed Mr. Lawson's refusal to recede from his position in opposition to the appointment of Mr. Wilcox as the executive head of the claims division of Department of Street Railways. Mr. Lawson contended that under the charter he alone as Corporation Counsel is vested with the authority to name counsel for any department of the municipal government.

Acting Mayor Martin stated that Mr. Lawson's refusal to approve the action of the Street Railway Commission in appointing Mr. Wilcox made Mr. Lawson's dismissal necessary in order to sustain the actions of the Street Railway Commission and to protect the people's interest in the municipally-owned street railway.

Proposal Made to Reestablish Galva-Kewanee Line

B. F. Lyons, Beloit, Wis., has presented to Kewanee's City Council a proposition to take over all the local public utilities, including the railway system and the interurban line between Galva and Kewanee, now inactive.

It is Mr. Lyons' plan to extend the local railway to the north end of town, which was not served by the Galva & Kewanee system, improve the interurban service, give the city a modern electric light plant and reduce gas rates 25 per cent.

Mr. Lyons emphasized the need of a railway between Galva & Kewanee. He pointed out that during 1922, 132,077 people rode on the interurban between the two cities. In the same year, 739,353 passengers were carried on the city line.

Paper Says Buses Are Fair Weather Agency

The Grand Rapids *Herald* of Feb. 23 says that when the blizzard of Feb. 19 blocked the highways of western Michigan bus lines generally called in their cars and hung out the "Roads closed" sign. The paper says that on the other hand their competitors, the interurbans and the steam railroads, put on special crews of workmen and recommissioned their snowplows. Thus the job of opening the highways was left by the bus lines for the county and state to do with the public's tax money, while the job of keeping the railroads and electric lines going was accomplished by the transportation corporations out of their own treasuries. The paper sees in this evidence of a remarkable difference in standards, methods and expenditures of two competing transportation services. In commenting on the situation the paper said:

> Throughout the storm last Tuesday the rail lines, including the street railway here in Grand Rapids, made every effort to keep up service, and by noon Wednesday practically all schedules were restored to normal. This storm service was not profitable. It costs Michigan railroads and electric lines thousands of dollars each year. But it is a fundamental doctrine of rail transportation that service must be maintained. On the other hand, snow removal and storm service cost the bus lines little or nothing. When the roads are opened it is county and state plows, operated at public expense, which break through the drifts. And as soon as the job is done the buses are back in service.
>
> The same is true of the jitney bus as a means of local transportation. It is fair weather transportation, punctually available when transportation is least necessary. Street cars, on the other hand, are an all-weather transportation, functioning particularly when needed most.
>
> This telling point exemplifying the essential difference between present highway and railway transportation is not necessarily an argument in favor of less consideration for buses. But it is either an argument for more consideration for interurbans and other rail lines or an argument for fixing greater responsibilities on bus lines. Society's problem in terms of transportation is to equalize the responsibilities and burdens of these competing elements.

Legislature Will Consider Railway in York, Ont.

Negotiations are in progress looking toward giving full power to the York Township to operate railway service in any or all parts of the municipality. It was arranged at a recent meeting with Toronto transportation officials that the township should submit a definite proposition to the commission, on which future negotiations would be based. It is believed that the township will ask the commission to build and operate the line and provide the cars. No matter what the Legislature at its session will decide, it is practically certain that the township will take over and rehabilitate the section of the old Toronto Suburban between the city limits and the Humber River, a distance of approximately 1 mile. This will cost the township $20,000, and another $20,000 to rehabilitate it. The township scheme includes the construction of the Oakwood line, of about 4½ or 5 miles of double track, at an approximate cost of $1,250,000. The people of the district have already indorsed the project, but the necessary money by-law has not been submitted. The commission stated that all negotiations were subject to approval of Council.

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Goodyear Did Not Oppose Akron Railway

The news report from our Akron correspondent published on page 226 of the Feb. 9 issue stated, in connection with the circulation of a petition for signatures favoring the franchise sponsored by the railway company, that car men had been refused entrance into the plant of the Goodyear Tire & Rubber Company, and, furthermore, that employees had been warned against signing the petition on penalty of dismissal.

The JOURNAL has been satisfied that this statement was an injustice to the Goodyear Tire & Rubber Company.

The circulation of the petition in question in the Goodyear plant was refused, but this is merely a standing rule of the company against all petitions, and similar refusal was made on a petition against an increase of the 5-cent fare. As to the threat of dismissal, Goodyear officials claim that no such instructions were issued. It may be that some discussion among the men gave rise to the spread of this report, but it was not a company measure. The Goodyear people also claim not to have been identified in any way with what has been felt was a generel movement of the tire people to back the motorization of Akron.

During the controversy one of the Akron newspapers printed a statement to the effect that Goodyear Assembly workers had backed the Mayor in his fight for a 5-cent fare. A company official writes that the Goodyear Assembly is an institution of factory laborers which acts independently of the policies of the Goodyear company in its opinions, and it does not in any way represent or reflect the attitude of the company. As a matter of fact, it is explained that the Assembly is not unanimous in its stand, inasmuch as one of its members, also a member of the Akron City Council, introduced an ordinance advocating a 6-cent fare for the railway.

It should be stated in passing that the Goodyear Tire & Rubber Company is a member of the American Electric Railway Association.

Fighting the Season's Blizzard

The baby blizzard which swept the Atlantic Coast on Feb. 19 blanketed New York City in several inches of snow, pressing into service thousands of employees with their plows, tractors and other snow-fighting apparatus. Traffic was delayed and, with the after-business and after-theater rush, subways were jammed to capacity. In order to inconvenience the daily toilers as little as possible the New York Transit Commission offered a suggestion that employers send home their help early so that the traveling might be a little more evenly distributed. In Rochester the New York State Railways called out all the available men and equipment. By hard fighting both the city and the interurban lines were kept open throughout the storm, although traffic was delayed generally. The East Avenue bus lines kept running, but on delayed schedules. Several interurban bus lines radiating from Rochester were tied up by country drifts on Feb. 20. In Pittsburgh, when the ice and sleet began to cripple seriously the transportation, several hundred employees of the Pittsburgh Railways were out clearing the car tracks instead of being decorated at their safety rally, which had to be postponed indefinitely.

$24,500,000 Program

Chairman of Boston Trustees Indicates Need of Extension of Term of Public Control

A program of improvements on the Boston Elevated Railway to cost $24,500,000 has been prepared by the trustees of the company. It was outlined by Chairman James F. Jackson on Feb. 28 before the committee on street railways of the Massachusetts Legislature in connection with a hearing on a bill to authorize the company to issue bonds. The program is as follows:

1—Completion of Everett Shops.	$4,500,000
2—Modernizing surface carhouses, repair units and track layouts	4,000,000
3—Completion of South Boston boilers, cable and switching requirements at South Boston, underground conduit and substation additions	3,000,000
4—(a) 25 steel elevated cars needed for increased traffic. (b) 53 Cambridge subway cars for Dorchester extension. (c) Replacing 400 inefficient surface cars 22 years old. (d) Replacing 100 wooden elevated cars 22 years old.....	10,000,000
5—Storage for 60 elevated cars at Everett, lengthening elevated station platforms for eight-car trains; miscellaneous machinery, buses, garages, Everett and Linden Street terminals, track betterments over a period of three years	3,000,000
Total	$24,500,000

Chairman Jackson in addressing the legislative committee reviewed the affairs of the company at length, repeating as was necessary in a statement of the kind many facts about operation noted from time to time in the ELECTRIC RAILWAY JOURNAL. He said that five of the ten years fixed as the period for the public control of the railway by the state ended June 30, 1923, and that it would seem to go without saying that the commonwealth must desire a genuine test of the service-at-cost furnished by the State to its citizens. As he sees it the outstanding need of the railway is additional capital for changing and extending the existing subways and permanent structures and for building additional subways and structures.

Mr. Jackson says that while the policy of gradually replacing obsolete and worn-out cars with modern equipment can be continued through the use of operating revenue, the time has come when additional cars must be provided, the cost of which cannot be met from operating revenue but must be met from capital. He also says a second unit must be built at the Everett shops.

Mr. Jackson says:

> Capital for all these purposes is ordinarily obtained by the issue of corporation stock or bonds. Under the settled policy of this Commonwealth no stock can be issued at less than par value, and no bonds can be issued in excess of outstanding stock. Until, therefore, the stock of the Boston Elevated sells at par and the margin between outstanding stock and bonds has been increased the door is closed to the issue of corporate securities.
>
> The cold, calculating money market is extremely sensitive and independent in its movements. It all seems to come to this, that unless there be legislation extending the period of public control any new issue of stock at par will be impossible. And without such preliminary issue of stock there can be no issue of bonds.

Mr. Jackson is opposed to any special legislation changing in this case the State policies with reference to issue of stocks or bonds. Moreover, he does not think any such change would solve the problem. In conclusion he says:

> It would seem consistent with sound public policy that there should be legislation which would enable our car-riders to secure necessary capital upon rates that would reflect the advantage of a public over a private service.
>
> Apparently, look in whatever direction one may, the all-important change in the present situation seems to be the making more definite in one way or another what is to be the tenure of public control, whether or not it is to extend beyond 1928.

Expert Answers Transit Queries.—How soon can new subways be built and to what extent will they relieve present conditions in New York City, N. Y., are questions which James Blaine Walker, secretary of the Transit Commission, is answering in a series of articles in the New York *Evening Post*. Article I, under date of Feb. 27, gave the general outline of the transit problem, dwelling on the terrific increase in travel in the past twenty-odd years and the resultant need of not two subways but of three or four subways. In the next article Mr. Walker will give the history of the subways with some interesting news angles.

Posters Give Information.—Posters which really carry a message and at the same time have sufficient coloring and effective layout to attract the eye were used during February in the cars of the Philadelphia Rapid Transit Company, Philadelphia, Pa. One poster advertised a new and improved trolley route guide, route map and directory for sale by conductors and "L" cashiers at 10 cents. Another told that the longest suspension bridge in the world could be seen on special trolley routes of the Elevated and urged patrons to "watch it grow." Still another suggested seeing the waterfront, manufacturing district and Roosevelt Boulevard—16 miles for 19 cents by bus and railway.

Engineer Should Study Subway Plan.—According to a tentative report submitted to the City Council of Pittsburgh, Pa., recently by a special committee of five appointed several weeks ago, traffic problems and other matters which enter into the plan for a $6,000,000 downtown subway loop should be carefully studied by a qualified engineer, with a selected advisory committee of citizens. The committee is of the opinion that experimental investigations into the further control of the vehicular and railway traffic within the triangle district is necessary. It further suggests that these experiments might be put into operation during certain hours of the day and not in effect at other times. The committee said that no definite conclusions have been reached because since 1917 four plans for subway facilities have been advocated.

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Financial and Corporate

$1,800,000 Net for P. R. T.

$1,000,000 Loss in Revenue in Philadelphia Attributed Largely to Frankford "L"—Consolidation Suggested

The year 1923 again shows the 6 per cent dividend on the Philadelphia Rapid Transit Company's $30,000,000 capital stock to have been earned. It is explained that while passenger revenue increased $2,490,597, the greatly increased use of free transfers, through the operation of the Frankford "L," reduced the average fare from 4.91 cents to 4.81 cents, the equivalent of one mill on each of 918,000,000 passengers. This represented a loss in revenue through reduction in fare of almost $1,000,000.

Operating expenses and taxes increased $2,182,143. The principal contributing factors here were increased car service given, increased cost of purchased power and duplication of operating costs due to the impossibility of making effective the reduced surface car service which was contemplated to offset the riding diverted to the Frankford "L."

The stockholders approved the payment of a 1922 and 1923 co-operative wage dividend to employees not to exceed 10 per cent of the annual wages. Since this is payable only after the stockholders' 6 per cent has been earned and paid, the company explains that P. R. T. becomes in effect a preferred stock, underwritten by the employees. Mitten Management, with the stockholders' assent, proposes to continue the 10 per cent co-operative wage dividend during 1924.

An unexpected wage increase of 3½ cents an hour to which the men were entitled from June 1 under the three-city average scale made it impossible to earn the full 10 per cent co-operative wage dividend for 1923, after payment of fixed charges and the stockholders' 6 per cent dividend. The employees, believing that ownership of the workshop was more important than receiving 3½ cents an hour more in the pay envelope, signed over this wage increase—amounting to $600,000 for the year—to the co-operative wage dividend fund. This wage investment, together with the wage dividend actually earned, which amounted to $1,200,000, made up a total of $1,800,000 added to the fund during 1923. This leaves the fund short by $50,000 of the full 10 per cent for 1923, but men and management have jointly undertaken to make up this amount by added effort during 1924.

The company points out that the $2,500,000 real estate mortgage loan, secured by car terminals and guaranteed by P. R. T., provides $1,500,000 for the new southern car terminal, after retiring outstanding liens. Reference is also made by the company to the plan to increase P. R. T. indebtedness from $15,000,000 to $25,000,000, to cover $3,500,000 of two-year 6 per cent notes, and to provide $6,500,000 for future financing. Stockholders will be asked to approve plans for equipment trust certificates which may later be issued in the acquisition of new motor buses.

The initial motor bus installation was made in September, 1923, when the Roosevelt Boulevard line connecting Frankford and the North Philadelphia section was placed in operation. Plans are under way for the establishment during 1924 of additional auxiliary bus routes covering 40 miles and requiring about 150 buses.

PHILADELPHIA RAPID TRANSIT COMPANY
INCOME ACCOUNT FOR YEARS ENDED DEC. 31, 1923 AND 1922

	1923	1922
Gross passenger earnings	$44,249,360	$41,758,764
Other operating revenue	681,130	770,779
Railway operating revenue	$44,930,491	$42,529,543
Way and structures, equipment and power—maintenance, renewals and depreciation	8,560,400	8,560,400
Power operation	4,416,307	3,475,307
Conducting transportation	14,003,087	13,383,432
General	4,060,159	3,548,378
Taxes, including paving tax	2,695,708	2,586,000
	$33,735,661	$31,553,517
Operating income	11,194,830	10,976,026
Non-operating income	621,539	706,429
	11,816,370	11,682,455
Interest	1,161,637	1,020,090
Rentals	8,674,732	8,683,087
Sinking fund—City contract	180,000	150,000
	$10,016,369	$9,853,177
Net income	$1,800,000	$1,829,278

An experimental installation of the trackless trolley was made on Oregon Avenue, the southernmost crosstown street, to serve the shipping industries on the Delaware River. At present this section does not offer sufficient traffic to justify the large investment necessary in surface tracks.

Expenditures for improvements and additions during 1923 are shown in the accompanying table:

520 passengers and 56 utility cars	$6,616,703
Track extensions and track construction in co-operation with city paving	646,140
Motor bus and trackless trolley development	508,420
New substation, carhouse, shop and other equipment	536,302
Final repayment of U. S. Government war-time advances	1,381,759
	$9,689,324

President Dunbar says that the consummation of the plan looking to the simplification of the present complicated corporate structure of the P. R. T. leasehold system, now under consideration, would greatly strengthen P. R. T. by giving it the added financial power necessary to greater participation in city-company transit development. This plan contemplates a consolidated ownership in one corporation, providing for an exchange of the various securities of the present owning and leasing companies for such bonds and stocks in the new corporation as will preserve existing relative priorities.

Boston Elevated Bonds Returned to the Legal List

Boston Elevated Railway bonds are again on the official list of securities in which the savings banks of Massachusetts may invest. The Massachusetts Department of Public Utilities has certified to the Bank Commissioner that the Elevated has earned and paid the required dividends for five successive years, which makes its bonds legal investment for the banks. The company dropped off the list when it failed to earn and pay the dividends, and the question has been raised whether the help which the company received from the various communities during its period of public trusteeship can be counted toward qualifying its bond issues for bank investment. This question was submitted to the Attorney-General, who has handed down an opinion in the company's favor. On the strength of this opinion the bonds have been certified to the Bank Commissioner.

Birmingham and Tidewater Railways to Be Sold on March 24

The date of the sale of the property of the Birmingham Railway, Light & Power Company, Birmingham, Ala., at public auction has been changed from March 15 to March 24. On this same date the Birmingham Tidewater Railway property will also be offered at auction at a minimum price of $500 000. The Tidewater company is under the same control and management as the Birmingham Railway, Light & Power Company. Both companies have been in the hands of receivers for some time.

PASSENGER STATISTICS OF PHILADELPHIA RAPID TRANSIT COMPANY

	Passengers Carried		Average Rate per Passenger		Passenger Revenue	
	1923	1922	1923	1922	1923	1922
January	74,857,899	68,147,370	4.84c	4.94c	$3,625,767.94	$3,363,925.75
February	68,570,408	62,513,337	4.82	4.93	3,305,182.54	3,082,552.87
March	79,422,257	71,625,943	4.82	4.92	3,827,671.64	3,525,522.04
April	76,730,494	71,430,998	4.81	4.92	3,694,068.56	3,514,679.44
May	82,591,742	75,952,200	4.81	4.91	3,973,888.38	3,727,018.41
June	77,264,587	70,675,234	4.82	4.91	3,723,608.11	3,467,919.88
July	72,719,051	67,563,520	4.80	4.89	3,493,820.93	3,305,598.30
August	71,609,710	66,713,224	4.80	4.89	3,435,641.53	3,261,881.54
September	73,237,080	69,350,179	4.80	4.90	3,515,750.30	3,396,512.88
October	81,258,998	74,757,191	4.80	4.89	3,898,959.12	3,658,031.40
November	78,555,394	74,246,140	4.80	4.89	3,771,562.44	3,634,190.44
December	80,969,615	75,908,176	4.81	4.91	3,983,439.27	3,820,930.51
Total	917,787,235	848,883,512	4.81c	4.91c	$44,249,360.76	$41,758,763.46

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The minimum sale price of the Birmingham Railway, Light & Power Company's property is set at $20,000,000 by the court, which includes all liabilities. All claims against the receivers of the company must be filed by March 7, according to the court order. Bids on the Birmingham Railway, Light & Power Company's property will be received up until noon on March 24. Bids on the Birmingham Tidewater Railway property will be received up until 12:30 o'clock on March 24.

Warren Street Railway to Be Sold

Application was made to the Pennsylvania Public Service Commission recently for permission to transfer the stock of the Warren Street Railway, Warren, Pa., to the Penn Public Service Corporation. The transfer includes the interurban lines to Jamestown, N. Y., and Sheffield and also the light and power franchises held by the Warren corporation.

The Warren system was founded in 1892 with D. H. Siggins as head of the enterprise. He built the lines to Sheffield and Jamestown. Later the active management was turned over to Hugh A. Siggins, who added the power and lighting facilities.

Hearings on Abandonment and Rates Combined in Ohio

The application of the Cleveland & Eastern Traction Company for permission to abandon its lines running between Cleveland and Chardon and between Warnerdale Junction and Middlefield, Ohio, on the grounds that the lines have been operating at a loss and can never be operated at a profit, was heard by the Ohio Public Utilities Commission on Feb. 15.

Coupled with the abandonment proceedings was the hearing on the application made by the company for an increase in fares from 3 cents a mile to 3.34 cents a mile, average, from a point 8 miles out of Cleveland to the terminals, Chardon and Middlefield. This would raise the cost of a ticket to the former point from 75 cents to 90 and to the latter from 95 cents to $1.20.

No decision was rendered on this application, while the hearing of the abandonment proceedings was continued until March 19 to enable the protesting parties to work up their case on the basis of the presentations made by the railway.

Both Robert D. Beatty, secretary and general manager of the company, and Charles Currie, Cleveland, ascribed the gradual decline of the interurban to three factors, in all of which the advent and maintenance of good roads is a factor:

1—Widespread use of the privately owned passenger automobile.
2—Growth of bus lines.
3—Increasing use of motor trucks for hauling milk, farm produce and freight.

Mr. Beatty testified that the red ink figures first appeared in 1922, when the opposition came strongest, while Mr. Currie testified that a survey made by him had showed a decrease in freight business from 1920 to 1923, a situation in which, he said, he was unable to find any indication that this branch of the business would ever become profitable.

Investors Service Reviews Utilities

The third survey of the utility field by Moody's Investors Service, dated Feb. 28, chronicles another year of genuine progress and prosperity. The outstanding developments of the electric railways, electric light and power companies, telephone and telegraph companies, gas companies and water companies are reviewed. With respect to the electric railways, Moody's says that in endeavoring to appraise and evaluate the many factors which enter the conviction arises that the final conclusions must wait upon further developments. Without going so far as to predict an era of prosperity for the electric railways, Moody's says that one can readily find much ground for encouragement with respect to them.

Better Report in Toledo in January

Operations of the Community Traction Company, Toledo, in December provided $5,041 plus $165 bank interest to be added to the fare stabilizing fund. Gross revenue was $359,859, an increase of $26,467 over the same month a year ago. Increased taxes, wages, interest charges and depreciation and maintenance allowances, however, cut down the net.

Through the sinking fund an additional $120,000 of 6 per cent bonds of the Community Traction Company has been purchased and retired and a corresponding par value of common stock issued to the city. This makes the city holdings now $596,000 of common stock. On this $2,980 a month in revenue is refunded to the sinking fund. Actual operating expenses for the month were $268,760. This is equivalent to 72.86 per cent of gross revenue. Revenue passengers numbered 5,535,810, an average of 178,574 a day compared with 176,784 in December.

Bus feeder lines continued to be operated at a loss.

Auction Sales in New York.—At the public auction rooms of A. H. Muller & Sons there were no sales of electric railway securities this week.

Net Income Falls Off.—For the six months period ended Jan. 31, 1924, the Brooklyn City Railroad, Brooklyn, N. Y., reports a passenger revenue of $6,854,569, against $6,815,593 for the same period ended a year ago. The net corporate income showed a falling off from $1,180,409 for the six months ended Jan. 31, 1923, to $1,143,871 for the six months ended Jan. 31 of the current year.

Deficit for Six Months.—For the six months period ended Dec. 31, 1923, the Interborough Rapid Transit Company, New York, N. Y., reported a deficit of $442,645. The total revenue for the six months period was $28,082,921. Income available for all purposes was $7,247,292.

Suggests Purchase Consideration.—The Colorado Springs & Interurban Railway, Colorado Springs, Col., recently announced to the City Council that owing to operating losses caused by the increase in automobile traffic it will not apply for a renewal of its franchise. The company has suggested that the city take up the question of buying the company's property, valued approximately at $3,500,000. The railway is owned largely by the estate of Winfield Scott Stratton, one of the city's chief benefactors. The company has not paid bond interest for two years and no dividends have been paid since 1912 on the $500,000 of preferred stock outstanding.

Another Payment on Account of Municipal Railway Purchase.—The remaining debt of the city of Seattle on account of its purchase of the local railway lines, for which $15,000,000 in bonds was issued to the owners of the system, was reduced to $12,501,000 recently when City Treasurer Terry wired to the city's fiscal agency in New York $1,337,187 to meet bond interest and principal payments due on March 1. The payment included $833,000 principal and $333,350 interest on the railway purchase bonds, also $26,800 interest on other railway bonds.

Want Property Transferred.—Hugh Goodfellow, Warren Olney and W. I. Brobeck, as trustees of the San Francisco-Oakland Terminal Railways, have applied to the California Railroad Commission for authority to transfer to the Key System Transit Company, East Oakland Railway and Oakland & Hayward Railway, the properties formerly belonging to the San Francisco-Oakland Terminal Railways. The Key System Transit Company has also applied to the commission for authority to sell $2,500,000 of first mortgage bonds and to execute a mortgage to the Oakland Bank, as trustees, to secure an issue of $10,000,000, par value, first mortgage bonds, due July 1, 1938, in conformity with the reorganization plan.

The **Indiana Service Corporation, Fort Wayne**, during 1923, carried 20,276,514 revenue passengers. Although the single cash fare on city lines in Fort Wayne is 7 cents, the average fare per revenue passenger was 5⅝ cents through the general use of the "weekly pass."

Interborough Sells Hotel Property.—The Hotel Belmont, New York, was recently sold by the Interborough Rapid Transit Company, New York, N. Y., for approximately $7,000,000 to William Ziegler, Jr. The Ziegler residence in East Sixty-third Street, which is said to have been constructed and decorated at a cost of $1,250,000, was accepted in part payment. It will be resold by the Interborough Company.

Seeks Abandonment.—The Chautauqua Traction Company, Jamestown, N. Y., has applied to the Public Service Commission for authority to abandon that part of its line south of the village of Mayville to a point at the south line of the village of Westfield. The line proposed to be abandoned operates on the bridge in Mayville over the Pennsylvania Railroad tracks, replacement of which is required. The company alleges that its line is not meeting operating expenses and taxes.

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Traffic and Transportation

Another Atlanta Hearing on March 4

Public Discussion of Fares Expected to End Then—Terms of Company's Plea Restated

In connection with the work of reporting the hearings on the petition of the Georgia Railway & Power Company, Atlanta, to the Mayor and the City Council looking toward the adoption of a plan designed to put railway operation there on a satisfactory financial basis, sight has at times been lost of the correct aims of the company. Even the ELECTRIC RAILWAY JOURNAL fell into this error in the issue of Feb. 16 in reporting the events of the fifth public hearing. It was stated that the company was asking for an increase in fare from 7 to 10 cents, for the privilege of asking 2 cents for a transfer, and for the elimination of jitneys from the streets on which the railway operates. It was further said that unless these things can be secured, the company has warned the public that it cannot make any extensions or improvements in its service, and may be forced to cease operation.

As a matter of fact the company is merely suggesting seven definite remedies to assist the railway, and has offered, provided the public does not approve any of the plans advanced, to try any fair plan the public thinks will best serve its interest so long as the plan will provide the necessary revenue. Thus the 10-cent fare clause asks only for a 10-cent cash fare, tickets to remain at 6⅔ cents. The definite changes asked in the conditions under which the railway is now operating are as follows:

1. Complete elimination of jitneys from streets upon which street cars are operated.
2. Renewed and effective enforcement of regulation of street traffic.
3. Ten-cent cash fare on street cars; tickets to be sold at the present rate of 6⅔ cents. Car riders will pay no increase in fare if they buy tickets.
4. Two-cent charge for transfers.
5. Reasonable revision in the operating routes of the cars in the interest of more efficient operation.
6. Elimination of unnecessary car stops to effect quicker street railroad service.
7. Relief to the extent necessary from paving charges and gross receipt taxes.

So that there may be no possible misinterpretation of the facts in connection with the matter it has been deemed advisable to set down again that if the city and the public grant its petition the railway will:

1. Submit its books, records and accounts to any fair audit and pay the cost of the same in order that its statements may be verified.
2. Negotiate an agreement between the city representing the public and the street railroad as to what constitutes a living basis and thereafter will operate the street railroad system and buses in co-ordination to the extent necessary to accommodate the traffic under proper supervision of the public and Public Service Commission as efficiently and economically as possible, and will extend and improve the service to the extent its revenue and credit permit, as trustee for the public.
3. Agree to any fair conditions of continuous supervision, representation or auditing the public desires or deems necessary to secure proper administration of the plan agreed to.
4. Agree to maintain the service at the highest standard under the lowest rate of fare that will support it on the living basis agreed to.

The petition was filed with the Mayor and the General Council on Dec. 1, 1923. The recapitulation of its principal provisions at this time appears particularly pertinent as it comes on the eve of the public hearing set for March 4, which is expected to be the last one.

At the sixth hearing on the company's petition, held on Feb. 21, the principal speakers were Marion Jackson, a leader of the Municipal League of Georgia, and Preston S. Arkwright, president of the railway. Mr. Jackson opposed the appointment of John A. Beeler to conduct the survey of Atlanta's traffic conditions. He proposed that the appointment of an engineer to make the local survey be left to Newton D. Baker, former Secretary of War, or to some other prominent man outside of Atlanta. Alderman Bachman, chairman of the special committee of the City Council handling the company's petition, defended the choice of Mr. Beeler by the committee, and refused to change his position in the matter.

Bridgeport Will Join Other Cities in Fare Petition

A hearing is scheduled for March 11 in Hartford on the petition of the Connecticut Company for authority to raise the rate of fare in Bridgeport to 8⅓ cents. At the same time petitions will be heard from New Haven, Hartford, Waterbury, Meriden, Stamford and New Britain, which seek a reduction of the 8⅓-cent charge put into effect on Feb. 10. This hearing will take the place of any local hearing in Bridgeport to which the city might have been entitled. A conference of representatives of several cities decided to ask for a hearing at which the whole subject of rates would be discussed. Reference was made to the probable hearing previously in the JOURNAL

Chicago "L" Extends Non-Stop Service

Special Sunday express service between 10 a.m. and midnight has been started on five branches of the Chicago Rapid Transit Company's system. This service is an extension of the week-day "shoppers' special" trains which were placed in service during the holidays last December to accommodate patrons, especially women shoppers, living in the outlying districts and suburbs. The popularity of the week-day trains during the holidays led the management to continue the service afterward, and now it has been extended to provide the same service on Sundays. Trains are operated between the Loop and some outlying station on each branch without stops in either direction on a thirty-minute headway. Time-tables have been distributed by the agents at the stations at which these trains stop, indicating the exact time the train will depart from each station. The success of the week-day train is attributed to the punctuality and speed of the trains.

Bus Will Replace Emporia Railway

Voters of Kansas Town Decide to Permit Local Company to Make Substitution

Emporia, Kan., a city of 11,000, has authorized its City Commissioners to arrange to substitute buses for the railway. The decision was made after buses had been tried out for several months along the routes where street cars had been running for twelve years. At a referendum election on Feb. 19 the majority for the buses was 353, a substantial number when it is considered that only 1,600 out of an electorate of 5,000 showed enough interest in the election to cast ballots.

The commissioners agreed to submit the question after the buses had been tried out and had met with the approval of the patrons served. Under the agreement made by the Kansas Electric Power Company, operating the local railway, six bus lines will be established instead of the three car lines.

"We found the buses dependable and easy to operate," said Ralph Smalley, manager of the power company. "We found them slightly more expensive to run that the street cars, but to offset that they carried more passengers, and we believe when the new lines are well established we can turn our transportation system from one that is losing money to one that will earn money, or at least break even."

Three or four days before the election, a driving snowstorm covered the car tracks, and with the thermometer at zero the cars were unable to run. The buses, however, maintained schedule and won friends for the new form of transportation. Another factor was the vote from a portion of the city not served by the car lines. Here the vote was especially heavy for the buses, the people realizing that the power company could not be induced to extend its railway while it was losing money, and they voted for the buses as their only opportunity to obtain service. Patrons of a line which extends into a ward where the streets are not paved, however, voted almost solidly against the buses, basing their action on the contention that the buses cannot run on muddy streets, and in rainy weather their service would be stopped.

According to the ordinance approved at the referendum the power company will pay the city a stated sum for tearing up the car tracks, the company to be relieved forever of paving maintenance.

Two bus lines already are in operation and the other lines will be established as soon as the company decides on the type of bus it will use.

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Bus Certificate Refused.—For the same reason that it refused a certificate to the Red Star line to operate a bus line between Columbus and Chillicothe, Ohio, the Public Utilities Commission has also withheld a certificate from the same company to establish bus transportation between Columbus and Portsmouth. The Scioto Valley Traction Company testified that the proposed routes followed its right-of-way.

Parlor Car Service Started.—Parlor car interurban service was established by the Milwaukee Electric Railway & Light Company on Feb. 27 between Milwaukee and Waukesha. This new service will be in addition to the company's regular railway and bus service. An interesting feature is the plan of the company to institute a postcard referendum on the cars by which it will seek to determine the most desirable time schedules in order to make the new service as convenient as possible.

Buses May Replace Cars.—Buses will supplant trolley cars of the Galesburg Railway, Light & Power Company between Galesburg and Knoxville, Ill., on April 1, if the Illinois Commerce Commission approves. The railway operates over a highway which is to be surfaced with concrete and the state highway department has ordered the company to vacate by April 1. It is expected that the bus service will be permanent. Later it may be extended to Abingdon, should permission be given to abandon the railway between Knoxville and Abingdon.

Keeps to Decision of Voters.—The City Commission of Muskegon, Mich., recently reiterated its views, through Commissioner Paul R. Beardsley of the transportation committee, that bus service must not compete with the electric railway service. The occasion for the City Commission again taking this stand was the coming up of a petition for extending a bus line. The commissioner said the city would abide by the vote of the people, who decided some time ago by a vote of ten to one that cars should be retained and competing bus lines removed.

Higher Fare Asked by North Carolina Road.—In order to take care of the loss which, officials say, has been occurring steadily for many months in the operation of its Wilmington lines, the Tide Water Power Company plans to file with the State Corporation Commission an application to increase its fare from 7 to 8 cents, with two tickets for 15 cents. Announcement to this effect was made by F. A. Matthes, executive vice-president of the Tide Water company, at a general meeting of the Chamber of Commerce.

Buses for Interurban Traffic.—Looking toward a new way of handling interurban traffic on the Chicago, South Bend & Northern Indiana Railway, R. R. Smith, general manager, has announced that the company has sent out calls for bids for buses to be operated between South Bend, Elkhart and Goshen, Ind., on one route and South Bend and Niles, Mich., on another, as part of the interurban system. Mr. Smith said that the company had under consideration placing buses on South Bend, Laporte and Michigan City lines.

Legal Notes

FEDERAL COURTS—*Statute Penalizing Employer Who Makes Non-Membership in Union Condition of Employment Held Unconstitutional. Clayton Act Does Not Prohibit Injunction Against Union Officials Not Party to Dispute.*

This case relates to strikes called on the Pacific Electric Railway by the Brotherhood of Railroad Trainmen and the Brotherhood of Locomotive Engineers in July, 1918, and in August, 1919. The case was decided in the District Court in favor of the company, but was appealed, and the decision was affirmed Nov. 13, 1923, by the Circuit Court of Appeals, Ninth Circuit. Among the points decided was the unconstitutionality of Sec. 679 of the Penal Code of California, which provides that any employer or his agent who shall compel any person to agree not to join any labor organization as a condition to secure or continue in employment shall be guilty of a misdemeanor. This law, in view of 35 Sup. Ct. 240, was held by the Circuit Court to be repugnant to the due process clause of the Fourteenth Amendment and therefore void. Another point decided was in connection with an injunction issued by the District Court restraining the railroad brotherhood officials and others from interfering with the company's business and with contractual relations with its employees, who were under agreement not to join any labor organization. The brotherhood officials claimed that this injunction was in violation of Sec. 20 of the Clayton act prohibiting injunction against certain acts and disputes between employer and employee. But in view of the fact that none of those against whom the injunction issued were employees and that the company at no time had had relations with either of the labor organizations which these officials represented the Circuit Court held the injunction was proper. It pointed out in this connection that "the right of the employee to strike does not give the outsider the right to instigate a strike," and quoted 38 Sup. Ct. 65, 72. [Montgomery et al vs. Pacific Electric Railway, 239 Fed. Rep., 680.]

FEDERAL COURTS—*Property Covered by a Contract to Lease and Equip a Railway.*

In 1892 the Ninth Avenue Railroad and in 1895 the Eighth Avenue Railroad, then horse railways, were leased for long periods to the New York Railways, under an agreement by which the latter company agreed to equip the lines electrically and return to them at the termination of the lease. In the case of the Eighth Avenue line this return was to cover "all property of every kind used by the said lessee in the maintenance and operation" of the railway. The Ninth Avenue lease declared that all the cars, etc., which the lessee should "provide, purchase, substitute, or supply" for the operation, should revert to and become the property of the lessor. During its operation of these lines the New York Railways used many cars over all or part of the lines, and the suit in question was brought to determine what equipment must be turned over to these companies after the New York Railway passed into the hands of a receiver in 1919. The court decided that where delivery in kind, as with cars, could be made, the number to be supplied could be determined on a pro rata car mileage basis. Another question arose when, on the whole system operated by the lessee, say, one machine of a certain kind was used, and such a machine was necessary and proper or even suitable on the former leased lines. Then, if such a machine was not supplied, there was a breach of covenant, for which pecuniary compensation may be demanded. For such claims, however, the lessors are on the basis of the general creditors of the company. Since materials, equipment, and supplies of public utility corporations are not regarded as chattels in the ordinary sense because needed to enable quasi public corporations to carry out their franchise duties, the rights of lessors, as against a lessee of lines operated as a unit, to apportionment of cars and equipment on termination of leases, are not affected by any rights of general creditors, who relied on the possession of the property by the lessee when they extended credit to it. [New York Railways et al vs. Eighth Avenue Railroad et al; same vs. Ninth Avenue Railroad et al., 293 Federal Rep., 633 (See also 612).]

GEORGIA—*Duty as to Safe Place for Passengers to Alight Stated; Directing Passenger to Alight From Left Side of Street Car Held Not Negligence in Itself.*

In looking to the safety of its passengers, the street railway must exercise proper caution, not only to see they leave the car safely but have a reasonably safe place at which they may alight. But where a passenger was struck by an automobile soon after he had left the car, the mere fact that he had been directed to leave the car from its left side could not be accounted negligence on the part of the company, in the absence of any further and additional allegation indicating how or why. [Jernigan vs. Georgia Ry. & Power Co., 120 Southeast. Rep., 439.]

KENTUCKY—*Passenger Stepping Off Car Into Way of Automobile Contributorily Negligent.*

Assuming that the opening of the door of the vestibule was an invitation to alight, a passenger stepped through the door in broad daylight, while the car was moving very slowly, with the result that he was struck by the rear fender of an automobile traveling in the same direction. The court held that he was guilty of contributory negligence, the danger being obvious and apparent. [Twaddell's Adm'r. vs.

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South Covington & C. St. Ry Co., 255 Southwest Rep., 1027.]

MICHIGAN—*Franchise Requirement for Paving Will Be Enforced.*

Where a franchise requires that the company pave between the rails and the village pave the rest of the streets, this paving must be done by the company even if the street is taken over for a county road and the county paved 16 ft. and the village 12 ft. Financial inability of the company to perform this obligation does not relieve it from such duty or prevent a forfeiture of the franchise, even though such forfeiture will operate to the detriment of other municipalities and interfere with the public duties of the railway as a common carrier. Where the franchise is for single or double track, it may take up the double track and establish a single track, but this does not change its obligation for the paving fixed by existing double track, and the village has put in its share of the paving. A franchise requiring paving of the streets between the rails does not require paving of the devil strip or to the ends of the ties. [Village of Grandville vs. Grand Rapids, Holland & Chicago Railroad, 196 N. W. Rep., 351.]

WISCONSIN—*Under Condemnation Proceedings, the Offer of a Railway to Grade and Surface Property Not Considered in Fixing Damages, but Condemnation of Special Easement Permissible.*

In order to build a second track, a railway company condemned a triangle constituting the greater part of the frontage of a city lot and agreed to grade and surface the property to be condemned and maintain it in such condition in the future, under penalty of forfeiture if there was a breach of the conditions. This offer was urged in diminution of the damages to be paid. But the court held that such a plan was not desirable, because the question of maintenance of proper grade of the surface might involve serious dispute in the future, and a forfeiture clause is not favored in law, and might also lead to numerous lawsuits. There was no objection, however, to the condemnation by the electric railway of a special easement. [Milwaukee Electric Railway & Light Co. vs. Becker et al., 196 Northwest Rep., 575.]

UTAH—*When on a Public Street a Car Should be Under Such Control that it Can Be Stopped When the Headlights Disclose an Automobile Ahead.*

The part of a public street occupied by street car tracks remains a part of the street, though not paved, and one entering thereon is not a trespasser. Hence, it was the duty of a motorman operating at night, during a rain storm, along such a route, to have his car under such control that he could stop it within the distance that his headlights would disclose an automobile on the track, as the unpaved part of the street was separated by curbs from the paved portions. [Kakunis vs. Ogden Rapid Transit Co., 221 Pacific Rep., 853.]

Personal Items

Wickwire Made "O. B." Vice-President

Well-Known Secretary of Ohio Brass Company Recently Elected to New Office

Edward F. Wickwire, secretary of the Ohio Brass Company, than whom few men in either the electric railway or electric light and power industries are better known, has been elected vice-president of that company. Mr. Wickwire is one of those men who appears to be everywhere and in everything, and always with him go new ideas (and a pleasing wit). In a dynamic sense he is Rooseveltian. But there is no intention here to attempt to build up a comparison by any method

E. F. Wickwire

vidious or invidious, Plutarchian or otherwise. So far as his connection with the Ohio Brass Company is concerned, Mr. Wickwire has been with that company since 1903. In fact, he has been connected with the manufacturing end of electric railway work practically all his business career.

Mr. Wickwire was only twenty-two years old when he started traveling for the Sterling Supply & Manufacturing Company, New York, which manufactured fare registers, safety brakes and other electric railway specialties. After he had been on the road about two years the Sterling Supply & Manufacturing Company absorbed the Meaker Manufacturing Company, Waukegan, Ill., and changed its name to the Sterling-Meaker Company. Mr. Wickwire was made secretary and general sales manager of the company at the time of the merger, but in 1903 he resigned that position to become identified with the Ohio Brass Company, in charge of sales in the Middle West territory.

Before he left school in his home town of Cohoes, N. Y., Mr. Wickwire took a trip to New York and observed the fact that a newspaper became "stale" in the metropolis fifteen minutes after it was off the press. This led him to figure out that people back home in Cohoes were reading history instead of news because they bought New York morning papers and read them in the evening—that being the only time that most people in a factory town had time to read the daily paper. To think is to act with Mr. Wickwire and so he secured the agency for the New York *Evening Journal* and introduced that paper in his home town and succeeded in building up quite a "respectable" circulation.

As a result of this venture, he shortly afterward secured a place in New York in the circulation department of the *Evening Journal.* Later he had some experience in newspaper reporting work. Whether or not a spirit of contrition for any of his past journalistic acts had anything to do with it, Mr. Wickwire next got himself a job as secretary to the president of the New York, Ontario & Western Railroad, among the emoluments of which position were free transportation not only in this country but abroad. However, he had no time to go or money to spend when he got there—just the reverse of the well-known "all dressed up" bromide.

Incidentally his "wim, wigor and witality" caused him to join the Twenty-second Regiment, N. G. N. Y., and he volunteered with that regiment for service in the Spanish-American War. His mother appealed to Mrs. McKinley and his discharge was ordered, but he said it took more nerve to withdraw than it did to proceed and finally convinced his mother that it was his duty to see it through. He was transferred to the Seventh Artillery of the Regular Army, stationed at Fort Slocum, where he claims he performed his duty to his country by helping to prevent the Spanish Mackerel from invading Manhattan Island.

Mr. Wickwire's work on the entertainment, publicity and membership committees of the American Electric Railway Association is well known. This year he is a member of the A.E.R.A. executive committee, publicity committee, committee on interurban operation, committee on city operation and is chairman of the committee on co-operation of manufacturers. He has also very recently been made chairman of the publicity committee of the Central Electric Railway Association.

Mr. Wickwire is also active in civic work in Mansfield, for he is not like the prophet in his home town. He has staged lots of entertainments for the Elks, the Country Club, the Auto Club and for miscellaneous events. He was really the organizer of the Richland County Auto Club and its first president. He is also a vice-president of the Ohio State Automobile Association. He has been active in connection with his automobile affiliations in getting

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adequate bus and truck regulation in Ohio.

This, however, is really a statement of only part of the activities of the man. As the facts that have been set down indicate, Mr. Wickwire has been both a maker of events and a recorder of them. It is quite natural, therefore, that his experience, combined with his unusual natural talents, should result in Mr. Wickwire being called upon to serve in connection with all the multifarious activities noted previously, which after all, as just indicated, is only a cursory list.

J. W. Gerke Goes Into Equipment Business

J. W. Gerke, familiarly known as "Jake" Gerke to thousands of railway men, has opened a sales office at 303 Fifth Avenue, New York, N. Y., from which he will handle the sales of new and used equipment of all description suitable for the electric railway industry. Mr. Gerke recently retired from the Transit Equipment Company. Before this he represented the Texas Company for three years, selling Texaco lubricants to the railways.

Mr. Gerke is familiar with all phases of street railway operation, as he has had twenty-one years experience in the construction and operation of street railways in the Middle West and in the East. During this time he served as superintendent of maintenance of the New York & Queens County Railway, Long Island City, N. Y., and as superintendent of equipment for the Long Island Electric Railway and the New York & Long Island Traction Company. Back in 1909 Mr. Gerke acted as master mechanic of the Tri-City Railway, Davenport, going to that position from Washington, D. C., where he served as superintendent of the Washington, Arlington & Falls Church Railway. Following his connection with the Davenport property he became master mechanic of the Wilmington & Philadelphia Traction Company, with headquarters at Wilmington, Del.

C. E. Wilcox Appointed to Handle Municipal Railway Claims

Clarence E. Wilcox, Corporation Counsel for the city of Detroit under former Mayor James C. Couzens and under Frank E. Doremus, the present Mayor, has been appointed head of the claims division of the Department of Street Railways at Detroit by the Street Railway Commission.

Mr. Wilcox was active under former Mayor Couzens in drawing up the ordinances which were approved by the voters bringing the Department of Street Railways into existence. The appointment of Mr. Wilcox was approved by acting Mayor Joseph A. Martin. He will supervise all damage suits against the D. S. R. Mr. Wilcox resigned a short time ago to enter private practice.

John Meagher has been appointed purchasing agent, succeeding J. M. Pogue, of the Indiana, Columbus & Eastern Traction Company. Mr. Pogue was recently promoted to manager.

William G. Marshall Succeeds the Late Cecil G. Rice in Pittsburgh

William G. Marshall has been appointed manager of the associated bureaus and superintendent of the claims department of the Pittsburgh Railways, to succeed the late Cecil G. Rice. Mr. Marshall has been in the employ of the Pittsburgh Railways since 1916, following a year in the law office of Burleigh & Challener. He was born in Pittsburgh, March 17, 1888. He attended the Wilkinsburg public and high schools. He was graduated from Washington and Jefferson College in 1911 and from the University of Pittsburgh law school in 1914. The same year he was admitted to the bar in Pittsburgh.

W. G. Marshall

James Mangan, formerly superintendent of the railway department of the Rutland Railway, Light & Power Company, will assume charge of the transportation department of the Ephrata & Lebanon Traction Company, Lebanon, Pa., effective March 1.

Robert K. Brown, superintendent and chief engineer of the Salt Lake & Utah Railroad, Salt Lake City, Utah, has been elected president of the Engineering Council of Utah, to succeed Dr. Joseph F. Merrill. The Engineering Council of Utah is composed of representatives from all societies of professional engineers in Utah.

Charles S. Crable, for the last three years superintendent of equipment of the Jamestown Street Railway, Jamestown, Westfield & Northwestern Railroad and the Chautauqua Traction Company, Jamestown, N. Y., will resign on March 1. Mr. Crable will assume the presidency of the Jamestown Welding & Brazing Company, Jamestown.

Neal Nash, who has been connected for many years as manager of the Wisconsin Rapids Street Railroad's properties, which furnish service in Wisconsin Rapids and interurban electric railway service to Nekoosa and Port Edwards, announces his resignation from the managership of that company to accept a position on the salesforce of a Chicago paper company. L. M. Nash, president of the company, announces that Mr. Nash will be succeeded as manager by L. C. Wipperman, who for many years has been in charge of the company's south side carhouses and rolling equipment. Mr. Wipperman in turn will be succeeded by Joseph Nash, to be in charge of the south side carhouse.

George Donley, Orange, Mass., has been chosen superintendent of the Athol & Orange Street Railway, which goes under municipal operation on March 1. The appointment was made on Feb. 23 by the new board of trustees, of which W. W. Woodward, Athol, is chairman. Mr. Donley has been with the Athol & Orange road during practically the entire time of its operation, working as a platform man and in other capacities. He was assistant superintendent when the line became part of the Northern Massachusetts system.

Frank E. Marsh, for ten years superintendent of the Northern Massachusetts Street Railway, has retired from service with the Templeton division, recently purchased by a company headed by Charles Melhardo. Mr. Marsh is still in charge of the Athol & Orange section. It was about ten years ago, when the Connecticut Valley system took over the Northern Massachusetts lines, consisting of the Templeton Street Railway, the Gardner, Westminster & Fitchburg and the Athol & Orange, that Mr. Marsh was on the ground as active superintendent. At that time J. A. Taggart, who was superintendent of the Connecticut Valley lines, assumed the title of general manager of the Northern Massachusetts as well as the Connecticut Valley, but he spent most of his time in Greenfield.

Obituary

James H. Nichols, one of the incorporators and original owners of the Denver Tramway, Denver, Col., who left Denver in 1919 to take up his abode in California, died recently at the age of eighty-one.

Charles H. Lake, chief engineer of the plant of the Ohio Valley Electric Railway at Kenova, W. Va., died suddenly while on duty at the plant on Feb. 13.

Dr. Plimmon Henry Dudley, prominent inventor of improvements in railroad engineering, died on Feb. 26 in the Hotel Commodore, New York, in his eighty-first year. Making rail transportation safe was a hobby of his. He invented the track indicator in 1880 to detect track defects. In that same year he became consulting engineer for the New York Central and had remained continuously with that road. Doctor Dudley was born in Freedom, Ohio. He was educated at Hiram College. He designed the first 5-in. steel rail used in the United States, high carbon rails and 6-in. 100-lb. rails. He made a special study of rails, including their composition, strength and form. The ELECTRIC RAILWAY JOURNAL has reproduced Doctor Dudley's opinions where they dealt with subjects bearing on electric railway transportation.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Birney Club's Second Year

Arranges St. Louis Convention Details —Fraternal Body Becoming Factor Among Manufacturers

Through the Birney Club, which was organized in January, 1923, the manufacturers of electric railway equipment in the St. Louis district have been brought together and are now co-operating in a really constructive program for the industry. At the second annual meeting of the club, held Jan. 30, 1924, the following officers were elected: C. O. Birney, president; Edwin B. Meissner, vice-president; B. W. Stemmerich, secretary; O. E. Turner, treasurer. They have all held office since the foundation of the club and it was felt that they should be re-elected because the results achieved during the first year of the club's life warranted continuation of the same officers for another year.

Until St. Louis was selected for the Midyear Meeting of the American Electric Railway Association only a few people outside of that city really knew that there was such a thing as a Birney Club. When announcement was made that the bulk of the local work in connection with that meeting would be looked after by members of the Birney Club there were many who asked, "What is the Birney Club?" But those in St. Louis and the vicinity have appreciated for some time the tremendous good that this club is doing and its sphere is so steadily broadening that it is now receiving national recognition.

As the name indicates, the foremost figure in the club and the one most influential in its original organization is Charles O. Birney, superintendent of car construction, Stone & Webster, Inc. The club is really an outgrowth of the gathering together of those interested in the Birney safety car. As time has passed, the movement has widened so that, although the original idea is still kept in mind, it is today a club devoted primarily to fostering friendship and fellowship among its members and the promotion of the best interests of the electric railway industry.

There is no question but that the Birney Club has brought about a close personal friendship among all its members, of whom the great majority are competitors one with another. The members are still keen competitors, but with a spirit different from that previously apparent. The spirit of fair dealing, one with the other, is uppermost in their minds. The fact that all the members of the Birney Club are closely co-operating and are interested in the electric railway industry made it possible for this club to be the foundation stone of the local organization to take care of the Midyear Meeting. Every member of the Birney Club is a working member of the local midyear committee and practically all the important sub-committees are headed by members of this club.

The Birney Club will have in evidence at this meeting two new rubber-tired safeties which will be used for the convenience of the guests and will be objects of interest to all those attending.

A meeting of the club held Feb. 25 approved a new constitution which provides that membership shall be open to the electric railway industry and "allied interests," leaving it open to the membership to decided from time to time just what constitutes allied interests.

Collier Gets B.-M.T. Concession

The New York Transit Commission on Feb. 28 approved a proposed contract between the Brooklyn-Manhattan Transit Corporation and Barron G. Collier, Inc., covering the advertising and vending privileges upon the lines of the company. Commissioners Harkness and O'Ryan voted to approve the contract, while Chairman McAneny voted in the negative.

Under the Collier contract, which is for a period of fifteen years, the company will receive a minimum of $15,000,000, divided $4,500,000 for the first five years, $5,000,000 for the second five years and $5,500,000 for the third five years.

The proposed contract for advertising and vending privileges was submitted to the commission early in January by the New York Rapid Transit Corporation (B.-M. T.) after lengthy negotiations between the company and Barron G. Collier, Inc., in which it was developed that a much larger profit could thus be made from these privileges upon the company's lines than was apparently possible through their exercise by the company's own organization, the Broadway Subway and Home Boroughs Car Advertising Company, which had carried on the business for several years. The commission points out that there is a public interest in these profits, in the sense that the larger the revenue derived by the company from all of its operations the nearer comes the day when the city may begin to realize a direct return financially upon its investment in the lines.

The first Collier offer proposed a base rate of $800,000 a year for fifteen years, with certain increments based upon possible increases in gross sales, which was a substantial increase over the best profits ever made by the company's own organization. When the contract with Collier came before the Transit Commission for approval, and thereupon became public information, three other advertising concerns became very active for the privilege and offered bids higher than Collier's. The commission directed that these figures should be used as the basis of negotiating a new contract. Later the company submitted a new contract with Collier at the figures named above. This contract also provides for further payments to the company based on earnings which result in a potential increase of $500,000 over the period of the contract. There was a rather heated contest before the commission, but the contract was said to have been finally awarded on the basis of probable performance.

ELECTRIC RAILWAY MATERIAL PRICES—FEB. 27, 1924

Metals—New York

Copper, electrolytic, cents per lb.	13.125
Lead, cents per lb.	9.00
Nickel, cents per lb.	28.00
Zinc, cents per lb.	7.15
Tin, Straits, cents per lb.	54.875
Aluminum, 98 to 99 per cent, cents per lb.	27.00
Babbitt metal, warehouse, cents per lb.:	
Fair grade	60.00
Commercial	28.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$4.725
Somerset mine run, Boston	2.325
Pittsburgh mine run, Pittsburgh	2.125
Franklin, Ill., screenings, Chicago	1.95
Central, Ill., screenings, Chicago	1.50
Kansas screenings, Kansas City	2.25

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$43.00
Standard open hearth rails, gross ton	43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	3.10
Tie plates (flat type), cents per lb.	2.60
Angle bars, cents per lb.	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.125
Steel bars, cents per lb.	2.40
Ties, white oak, Chicago, 6 in.x8 in.x8½ ft.	$1.70

Hardware—Pittsburgh

Wire nails, base per keg	3.00
Sheet iron (28 gage), cents per lb.	3.85
Sheet iron, galvanized (28 gage), cents per lb.	5.00
Galvanized barbed wire, cents per lb.	3.80
Galvanized wire, ordinary, cents per lb.	2.75

Waste—New York

Waste, wool, cents per lb.	.15
Waste, cotton (100 lb. bale), cents per lb.:	
White	12–18
Colored	9–14

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), per gal.	$0.96
White lead (100 lb. keg), cents per lb.	12.00
Turpentine (bbl. lots), per gal.	$1.02
Car window glass, (single strength), first three brackets, A quality, discount*	84.0%
Car window glass, (single strength), first three brackets, B quality, discount*	86.0%
Car window glass, (double strength) all sizes, A quality, discount*	85.0%
Putty, 100 lb. tins, cents per lb.	4–6

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb.	15.50
Rubber-covered wire, No. 14, per 1,000 ft.	$6.60
Weatherproof wire base, cents per lb.	17.75

Paving Materials

Paving stone, granite, 4x8x4, f.o.b. Chicago, dressed, per sq.yd.	$3.60
Common, per sq.yd.	3.20
Wood block paving 3½, 16 treatment, N. Y., per sq.yd.	2.56
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots	54.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.85
Cement, Chicago consumers' net prices, without bags	2.20
Gravel, ¾-in., cu.yd., f. o. b. N. Y.	2.00
Sand, cu.yd., N. Y.	1.25

Old Metals—New York and Chicago

Heavy copper, cents per lb.	10.75
Light copper, cents per lb.	9.125
Heavy brass, cents per lb.	6.00
Zinc, old scrap, cents per lb.	4.00
Yellow brass, cents per lb. (heavy)	6.00
Lead, cents per lb (heavy)	7.50
Steel car axles, Chicago, net ton	$20.25
Cast iron car wheels, Chicago, gross ton	21.25
Rails (short), Chicago, gross ton	22.25
Rails, (relaying), Chicago, gross ton	26.50
Machine turnings, Chicago, gross ton	12.75

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Denver Attracts Missouri Car Company Interests

Orrin Merry, president of the Missouri Car Company, East St. Louis, has announced at Denver that within a short time his company expects to begin the erection of a $750,000 car equipment shop in the outskirts of Denver. The site for the plant is said to have been selected. The works will take up 12 acres. It is said that the concern will be known as the Colorado Central Railways. It is planned to incorporate under the laws of Colorado, with a capital of $500,000. M. L. Phelps will be the consulting engineer.

It will be recalled that the affairs of the Missouri Car Company have recently been under official inquiry. During this investigation Mr. Merry explained that the company had no orders at that time for cars, but he ascribed this to lack of capital with which to begin operations. He said that he took charge of the company's affairs last May under control vested in him by the stockholders and that one of his first official acts was to dismiss the force of stock salesmen, through whom $178,000 of stock had been sold, most of it locally and some of it at commissions as high as 25 per cent. He further said that he had always worked to conserve the assets of the company. Mr. Merry was formerly with Durant Motors.

Manufacturer Co-operates by "Post" Advertising

An excellent example of co-operation of a manufacturer with the electric railway industry is contained in the March 1 issue of the *Saturday Evening Post*. The Westinghouse Electric & Manufacturing Company has a full-page, two-color advertisement which carries to the more than two million readers of the *Saturday Evening Post* the message that "You need street cars." The copy under this caption follows:

How do you suppose the great bulk of the people in your town get about on their errands of business and pleasure? You may go in your automobile—but most people ride in street cars! Street cars are the links in the endless chain of transportation that bind your community together for business, social and industrial growth.

Given a square deal, which is all it asks, your electric street railway company will be a tremendous factor in the growth, progress and prosperity of your community, whether it is large or small. You and all other citizens will act in your own interests if you make sure that your street railway company always has a fair chance to provide the kind of service your community needs.

Many of the technical problems that have surrounded the development of street cars to their present state of efficiency have been solved by Westinghouse Engineering. Many more problems, apparently insurmountable today, will be solved by them in the future. With your interest and helpful co-operation—and that of our citizens as well—it will always be possible for your community to enjoy the resulting economy and the increasing efficiency of the street car.

Rolling Stock

Community Traction Company, Toledo, Ohio if Commissioner Cann's plan is approved, will spend $157,000 for overhead equipment and cars for the trackless trolley line and $76,000 for the double-deck buses for that line.

Tygarts Valley Traction Company, Grafton, W. Va., during the year just ended purchased two additional safety cars.

Illinois Power & Light Company, Chicago, Ill., recently purchased for one of the interurban lines of the Illinois Traction System seventeen lightweight double-truck cars weighing approximately 36,000 lb. equipped, each with a seating capacity of fifty-two persons. The cars are to be equipped with four motors, type GE-265, form 4, 35 hp., prepared for 4½-in. axle, 26-in. wheels and K-35 single-end control with DB-981 line breaker. The new cars will replace very heavy cars, equipped with GE-73 motors. These motors and control will be incorporated in old passenger cars rebuilt for locomotive service.

Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., has ordered ten single-deck coaches from the Yellow Coach Manufacturing Company, Chicago.

Springfield Street Railway, Springfield, Mass., will shortly purchase four additional buses in anticipation of the independent jitneys being banned May 1. The new buses will be of from twenty-five to thirty-passenger capacity.

Boston Elevated Railway will spend $10,000,000 for rolling stock if suggestions of trustees receive legislative sanction.

General Electric Company, Schenectady, N. Y., recently received orders from the Detroit United Railway, Detroit, Mich., for motors and control to be used on a standardized medium-weight type of car which it was recently decided to adopt. These cars, ten of which have been purchased, will be operated on four major divisions. The new cars are 56 ft. long, seat fifty-four persons and weigh about 64,000 lb. each, fully equipped. Each car will be equipped with four GE-275-E, 600-volt, 60-hp., tapped-field motors and PC-5 single-end control. A Universal equipment will be used, geared for about 48 m.p.h., on 600 volts, thus allowing an economical application to limited, express and local service on all four divisions.

British Columbia Electric Railway, Vancouver, B. C., through the British Columbia Rapid Transit Company, its subsidiary, has placed orders for five Fageol buses and one White bus. The six buses will be ready for service on May 1. They will cost $12,400 each. The new buses will seat twenty-two passengers and have a baggage compartment.

Pittsburgh Railways, Pittsburgh, Pa., will place within a day or two an order for 140 standard center entrance city cars. It is reported that the company will shortly place another order for forty-three one-man, two-man single-entrance cars, forty-five one-man, two-man double-entrance cars and fifteen interurban cars, making 103 cars in all. These orders are part of the general rehabilitation plan mentioned in the ELECTRIC RAILWAY JOURNAL, issue of Feb. 2.

Track and Line

New Brunswick Power Company, St. John, N. B., has under consideration the construction of an extension to the electric railway operated since the acquisition of the lines of the St. John Street Railway. It has been proposed that a line be built to Millidgeville.

Pacific Electric Railway, Los Angeles, Cal., has been ordered to lower its tracks to specific grade level on American Avenue between Anaheim Street and North Long Beach. The company must eliminate curbs and pave the avenue full width from curb to curb.

Tygarts Valley Traction Company, Grafton, W. Va., during 1923 relaid its track on Main Street and Walnut Street with steel ties, new joints and bonds, in a concrete base. The company also replaced the old wooden structure under the Dorsey Street Bridge, over the Baltimore & Ohio tracks, with a substantial steel structure.

Wisconsin Traction, Light, Heat & Power Company, Appleton, Wis., will make track and roadbed improvements on Third Street in Menasha, Wis., in connection with the proposed plan of the city to pave this section of the city as soon as weather conditions permit.

Trade Notes

Chester F. Gailor, New York, N. Y., announces that he is no longer connected with the Rail Welding & Bonding Company, but that he will continue to handle reliable and practical welding, grinding and bonding machines and accessories, as well as general track tools and equipments produced by the Railway Track-Work Company, the Liteweld Company, the Witherow Steel Company, General Grinding Wheel Corporation, Stackpole Carbon Company and welding rod and joint plate concerns.

Hardwood Manufacturers' Institute, Chicago, Ill., will hold its second annual convention at the Seelbach Hotel, Louisville, Ky., May 8 and 9. Special attention is being given to the development of an attractive program dealing with subjects of mutual interest to all branches of the industry. A most cordial invitation is extended to other manufacturers as well as to the consumers and distributors of hardwoods.

S. B. Thayer Son & Company, Washington, D. C., will move their office on March 1 to suite 308-316 Bond Building, Washington, D. C. The change is necessary because of the necessity for more office space than is available in the Munsey Building. The company has been established more than eighty years and is equipped for work in connection with engineering, organization, hydro-electrics, industrial development, railroad construction, short railroads or extensions to develop a resource or industry, and the arrangement of bond issues upon sound operating properties.

Ohmer Fare Register Company, Dayton, Ohio, recently announced the appointment of J. F. Ohmer, Jr., as third vice-president.

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New York, March 8, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 63
Number 10

St. Louis Meeting Shows Industry Improving

THE local men, under the chairmanship of W. H. Sawyer, who looked after the arrangements for the Midyear Meeting and dinner at St. Louis on March 4 are to be congratulated for their part in the success of the gathering. No pains were spared in working out detail plans to meet every wish of the delegates. To them also goes a large part of the credit for bringing together so large an attendance. The business meetings were well attended, and places were set for 769 at the banquet. A good spirit of optimism prevailed, and one could sense among railway men a widening feeling of certainty as to the course to be taken in the future and confidence in the ultimate results. The days of floundering and uncertainty and poor management are rapidly passing, and the condition of the industry reflects it. And naturally there is a happier air at the conventions, for gloom has been dispelled. All that is needed now is much hard work, for the course is charted and the way is clear.

Traffic Relief Work Given Impetus at the Midyear Meeting

PROBABLY the most profitable session of the St. Louis Midyear Meeting was that devoted to the discussion of street congestion and the means of bringing relief. The subject was treated from a viewpoint much broader than the direct interest of the electric railway, for any substantial measure of relief can come only through effort directed toward considerations many of which are quite apart from the direct operation of the railway. In fact, the problem is so broad in its scope and the railway man's interest is so important that he will in future have to take a very active part in city planning work if he fulfills his obligations to the car riders and his company.

The papers and discussion on the subject presented at St. Louis and printed elsewhere in this issue bring out nearly every angle of the problem and offer many suggestions for relief. Not all of these are in agreement. But there was unanimity of opinion that parking in downtown streets must be totally prohibited. Parking is not only one of the worst causes of congestion and there is the least justification for it of any of the causes, but its elimination is the most readily available measure of relief. At present we are making a very improvident use of streets, as their entire width should be devoted to the use of moving vehicles and not in large part for storage which benefits the few while penalizing the great majority.

There was also agreement that the height of buildings in business districts should be restricted in order to avoid further overloading of the street space. This would tend to bring about decentralization, and unless this is accomplished cities will strangle themselves in business development. While decentralization is certainly desirable from a traffic standpoint, none of the speakers mentioned the economic advantage of the concentrated business district in the general transaction of business. This is the reason, of course, for concentration. But it is rapidly reaching the point in most of our larger cities where street congestion is becoming the controlling consideration.

Decentralization is actually taking place already. The logical decentralization plan is to move business out by trades and centralize by trades in separate sections. This process has been going on in some cities, notably New York, and a desirable feature of this is that it not only relieves congestion and makes possible faster street car operation but it means more off-peak riding and better spreading of the peak riding over the railway system.

Parking abolition and building height limitation were considered the primary steps to be taken. They should precede the building of subways, double-deck streets, elevated and depressed sidewalks, etc., which tend to pyramid the problems both physically and financially.

To emphasize again the importance of railway men taking part in the broad planning for relief of street congestion, it may be said that while they are only indirectly interested in some of the planning, they will directly profit or suffer by the success or failure of the broad relief plan considered as a whole. The St. Louis session has undoubtedly served to give the study of relief measures a great impetus among railway men.

Be Sure to Have the Right Picture on the Screen

WHO has not seen the discomfiture of a lecturer who was illustrating his talk by lantern slides when he suddenly turned around and discovered that the picture on the screen was not the one he had been talking about? This is similar to a pitfall into which some unwary electric railways occasionally stumble.

It is undoubtedly desirable for the railways to give the widest possible publicity in their various communities to the improvements being made in their equipment and to the quality of service they are rendering. But in so doing care must be exercised to avoid attracting the attention of the public to conditions which in reality are not as described—boasting about something that isn't so.

An instance can be cited where a railway was spending considerable sums of money for publicity to tell the public what was being done to make the service convenient and attractive. Yet on the same day that the company was "boasting" of the quality of its service it happened that a package-express car was dispatched from one terminal of an important interurban line

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immediately ahead of a limited passenger car. The package-express car was heavily loaded and was unable to maintain a high speed. It dragged along in front of the limited and caused the latter to reach its destination five minutes late. As a result several passengers missed a railroad connection.

"So this is what the traction company calls giving service," remarked an irate passenger.

Such an occurrence goes to show the importance of accuracy in publicity work. Be sure the right picture is on the screen. Get the standard of service up first, then tell the public about it. And keep telling the public about it, for this tends to keep the men on their toes to live up to the advertising. It works both ways.

Detroit's Articulated Train Is a Progressive Experiment

DETROIT'S new articulated train, described in this issue, is a good example of a type of pioneering valuable to the electric railway industry. This train incorporates in its design a number of ingenious construction features and represents a unique development in rolling stock. The officials of the Department of Street Railways of Detroit, together with the manufacturers, are to be congratulated on their vision and courage in having a unit of this much-talked-of type built so that its practicability may be determined.

Now that the first unit has been placed in operation, one is naturally led to consider both the advantages and limitations of this type of vehicle for city street service. Its size makes a permanently coupled train of this type suitable for only the heaviest traffic conditions. On only a limited number of streets in only the largest cities are such traffic conditions found outside rush hours.

In Detroit there are several unusual factors that appear to favor such a unit. These include the practice of staggering industrial hours and the peculiar features of Woodward Avenue traffic. This street is unusual in that there are three distinct heavy loads per day from the Highland Park plant of the Ford Motor Company, in addition to the ordinary morning and evening downtown business district load. In most other cities, even on streets that have unusually heavy traffic, economical operation of so large a unit during the rush hours would result in objectionably long headways.

Although a considerable saving in weight, first cost and operating cost is shown for the articulated train by the figures compiled in the Detroit analysis, it is too early at this time to know whether the unusual conditions on Woodward Avenue are such as to make the articulated three-car train suitable for all-day service. From the fact that the calculations in the article are based on utilizing the existing type of motor-trailer trains to carry the base schedule, it may be assumed that there is some question as to whether, even on this unusual street, the new articulated train is not too large for other than just "tripper" service. If this is the case, the analysis of costs, to give a true picture of the whole problem, should also include in favor of multiple-unit equipment the economies to be derived by the use of equipment adapted to all-day operation, thus retiring the older and less efficient equipment to rush-hour operation only. On the principle of putting one's best foot forward, there is also to be considered the favorable effect on the public of having the most modern and best-looking equipment in service throughout the day, and operating the more or less obsolete looking equipment only when required in rush hours.

Articulated Unit May Have Field on Interurbans

THE previous editorial outlines the principal limitations of the articulated train in city service. It would seem that we cannot look for a widespread use of this type of equipment in such operation. It may be, however, that the articulated train can be advantageously used in interurban service. A feature of the train which was particularly noticeable in the run made under its own power from Cincinnati to Detroit was its excellent riding quality. This characteristic was the subject of much favorable comment by many of the sixty railway men who made the trip. As pointed out by Mr. Colby, in the article in this issue, the result is attributable to the elimination of overhang at the adjacent ends of the connected cars. In view of this feature, such a unit might be used in high-speed service, and it makes for a substantial saving in weight as compared to ordinary cars in trains.

In addition to the improved riding qualities, the new vestibule design gives a satisfactory construction for affording safe communication between cars on roads having curves of comparatively short radius. This was of particular interest to the interurban men who made the trip, because of the possibility for equipping a unit of this type to give a combined coach, diner and parlor car service.

The Annual Blast in Washington

NEARLY every year the local electric railways in the District of Columbia are subjected to a legislative lacing. Civic affairs there are under the supervision of a committee of Congress, and the legislators, convened from all sections of the country, appear to take special delight in picking upon the railways. In years past they have found fault with the service. They have urged the consolidation of the principal operating companies, just as if the controlling interests in the properties were not astute enough voluntarily to bring about such a consolidation if a basis equitable to both could be found. Last year they sought elimination of one-man operation of cars. Now, the legislators want fares reduced to 5 cents. To accomplish this, they would abolish the local utilities commission.

It matters nothing to the legislators that the facts with respect to the local companies are all contained in their annual statements and in the reports and accounts of the operations of the companies made by the Public Utilities Commission. As politicians the legislators are more interested in factors than they are in facts. In politics, whatever is done must be done while the tom-toms beat. Even the dabbler in civic affairs knows that the public often accepts semblance for the substance.

Of course the members of the committee would deny that their intent is destructive, but about the only things that the committee does by such agitations is to destroy the confidence of the public in the local public service commission, affect the credit of the railways by causing an unwarranted degree of anxiety among the holders of the securities of the companies, and prevent the officers of the companies from functioning to their best ability by dissipating in no inconsiderable measure energies that might better be directed to constructive effort, and would be so directed if the members of the committee would only look upon the railway business as they do upon their own private business.

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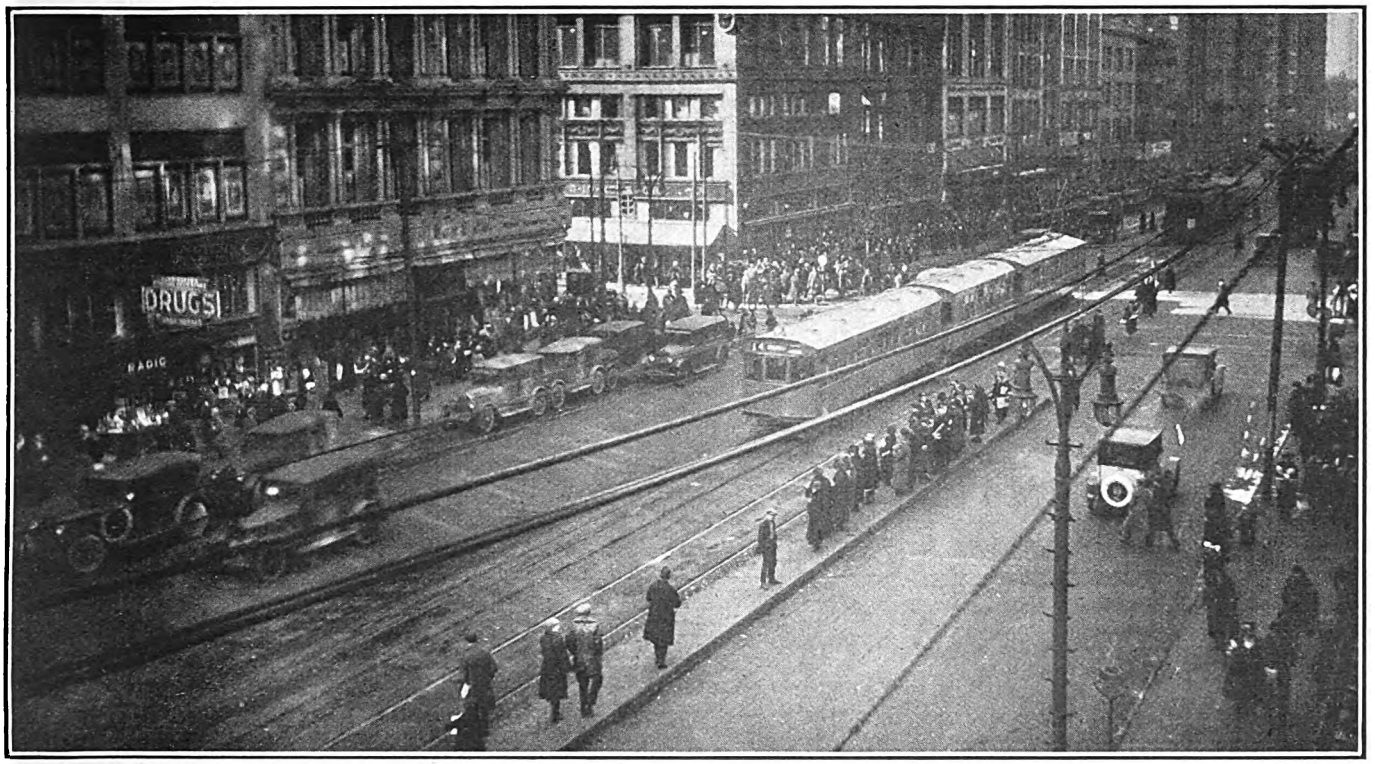

The Train Was Placed in Service on Woodward Avenue the Day After It Arrived from Cincinnati Under Its Own Power

Three-Car Articulated Train for Detroit

Many Unusual Features of Design Are Incorporated in This Initial Unit —The Seating Capacity Is 140 Passengers—Articulated Construction Reduces Weight and Cost and Also Gives Improved Riding Qualities

By A. C. Colby
Superintendent of Equipment, Department of Street Railways, City of Detroit

THE Department of Street Railways, City of Detroit, has recently placed in operation on the Woodward Avenue line a three-car articulated unit designed to handle the passenger traffic on this extremely heavy route. This unit, built by the Cincinnati Car Company and equipped by the General Electric Company, is the first three-car articulated unit placed in service in this country and the first electrically propelled unit of this kind to be placed in operation in the world.

The decision to purchase and operate a trial unit of this type was based on a careful study to determine the most economical means of handling the increasing traffic on the Woodward Avenue line. Nearly two years ago the officials of the Department of Street Railways, realizing that the growth of traffic would require some modifications in the car equipment on the heavier routes, made a thorough investigation of the rolling stock available for mass transportation.

The Woodward Avenue line, which carries nearly 43,000,000 passengers annually and is now operated with motor-car trail-car trains on sixty-second headway during rush hours, was selected as typical of the heavier routes in Detroit. Studies were made on the basis of furnishing off-peak service with motor-car trail-car trains as at present and supplementing this service during rush hour periods with (1) additional motor-car trail-car trains; (2) three-car multiple-unit trains; (3) three-car articulated trains.

Rush-Hour Equipment Compared

Weights and seating capacity of the equipment considered for the rush-hour service are given in Table I.

TABLE I—WEIGHTS AND SEATING CAPACITY OF EQUIPMENT CONSIDERED FOR RUSH-HOUR SERVICE

	Present Motor Car and Single-Deck Trailer	Proposed Three-Car Multiple-Unit Train	Proposed Three-Car Articulated Train
Weight complete, train less load, pounds	74,000	120,000	75,000
Weight, motor car, less load, pounds	47,000	40,000	.....
Weight, motor car, seated, pounds	54,000	47,000	.....
Weight, trail car, less load, pounds	27,000	.....	.....
Weight, trail car, seated load, pounds	34,850	.....	.....
Weight, train, loaded (seated) pounds	88,850	141,000	94,600
Weight, train, loaded (standing) pounds	103,400	162,000	114,200
Seating capacity	106	150	140
Pounds per seat	700	800	536

It was estimated that to handle successfully the rush-hour traffic the carrying capacity should be increased 12,000 passengers per hour over that provided during the non-rush hours. The comparison shown in Table II on page 360 was made on the basis of continuing the present off-peak service with motor-car trail-car trains

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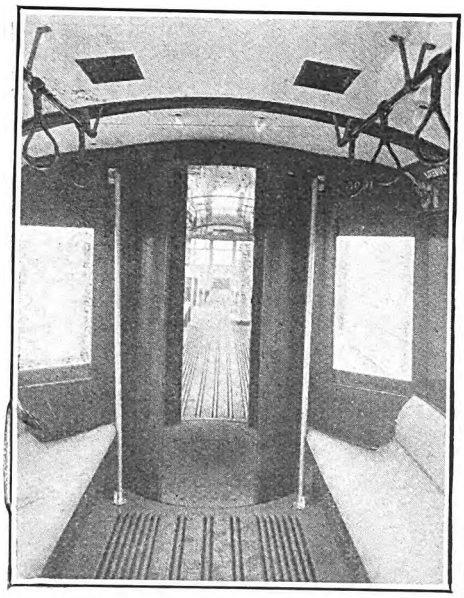
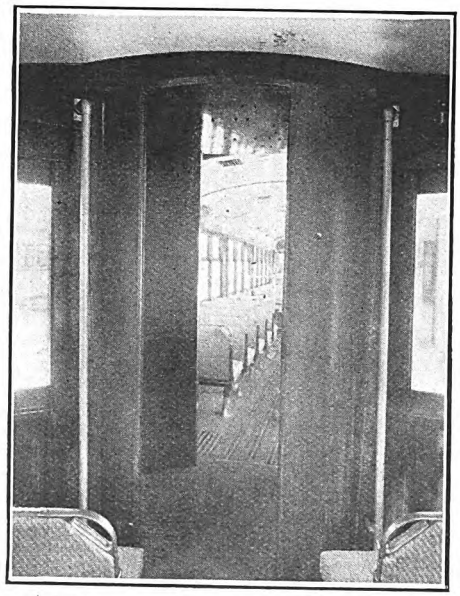
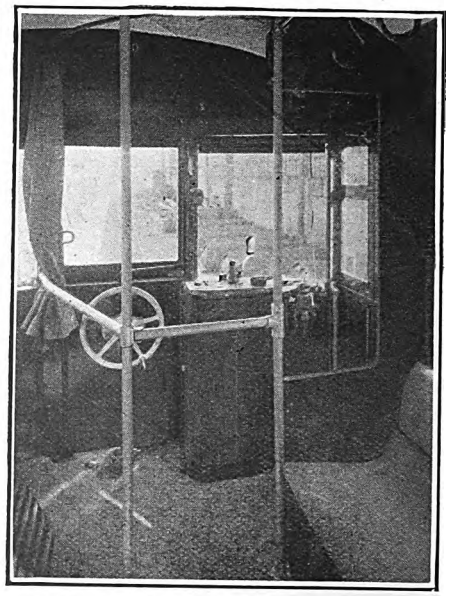


Interior View from Middle Car Toward Rear End Shows Position of Connecting Vestibule on Straight Track



A Full Connecting Opening Is Obtained Through the Vestibule, Even When the Train Is on a Curve



Motorman Located Right-Hand Corner of Leading Car. Brake Valve Piping Inclosed in Dash to Give More Knee Room

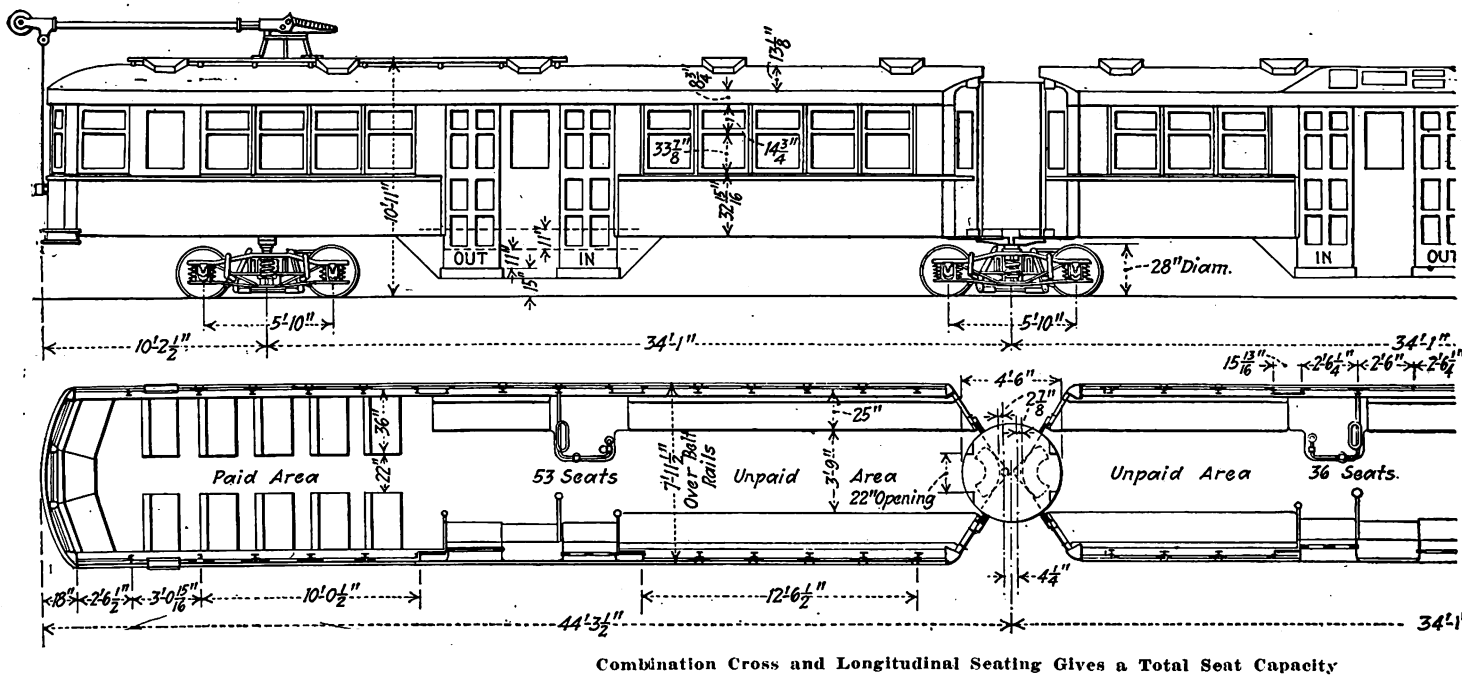
and adding additional service during rush hours to provide an additional carrying capacity of 12,000 passengers per hour, making a total carrying capacity during peak service of 16,200 passengers per hour.

The total expense for each type of equipment, including both fixed charges and operating costs, is given in Table III on page 360.

It is evident from this comparison that the three-car articulated train for the peak service shows lower operating costs, lower first cost and lower total annual charges than the other types of equipment considered. In addition to the advantages of lower weight, lower operating costs, and lower first costs for the articulated unit, the latter has the additional advantage of better riding qualities and, due to the available passageway between cars, it lends itself to a reduction in platform labor.

The improved riding obtained with this type of equipment is due to the fact that there is no overhang of the bodies beyond the trucks, adjacent ends of each body being carried on a center bearing on the truck bolster. When entering curves and passing over crossings, the greatest lateral movement on ordinary cars is at the ends overhanging the trucks. In an articulated train of this type there is no overhang at the adjoining car ends. Cars coupled in trains in the ordinary manner are subjected to lateral movement and have a tendency to roll on account of the oscillation transmitted back and forth between the different cars. In the articulated train this does not happen. Although each body is perfectly free to adapt itself to any curve or irregularity in track, there is no tendency to transmit rolling from car to car. In fact, there is a dampening action through the side bearings on the connecting vestibules which tends to check any rolling which may occur.

In analyzing the operating costs given in Table III, no consideration was given to a possible reduction in



Combination Cross and Longitudinal Seating Gives a Total Seat Capacity

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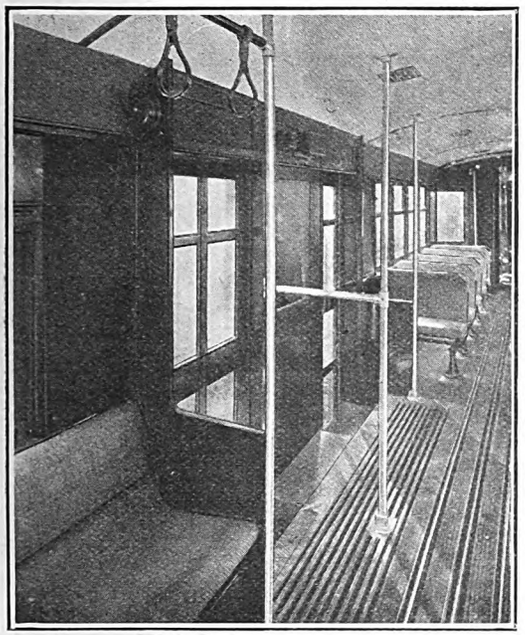
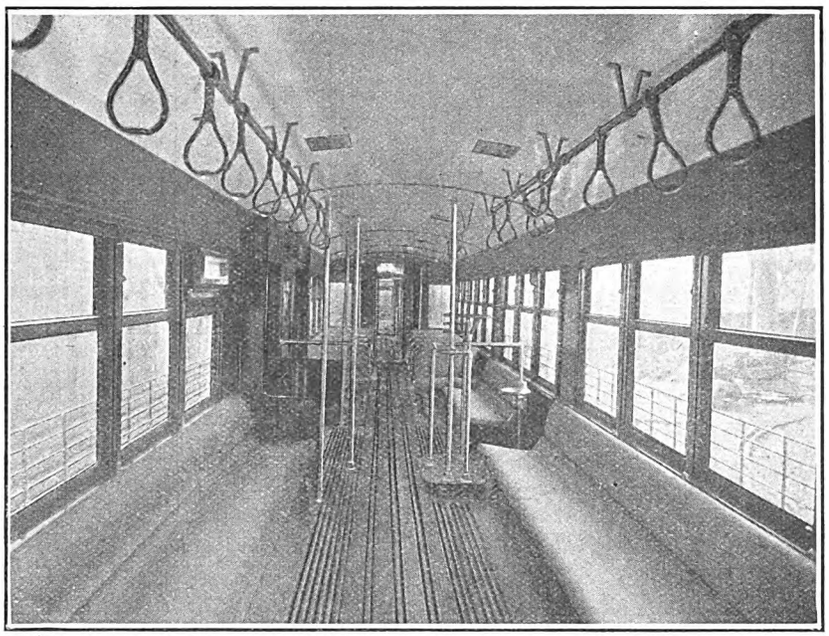


Stanchions Are Made of 1-In. Aluminum Pipe



Conductor's Position Is Opposite the Center Door

the platform labor by using the articulated unit. It was considered that the platform charges would remain the same for this as well as the multiple-unit train.

The train is composed of three center-entrance, center-exit, light-weight type car bodies mounted on four trucks. It is arranged for single-end operation. The general floor plan and elevation are shown in the accompanying drawings. The inside trucks are mounted at the junction and under the vestibule between the first and second, and the second and third car bodies, and are trailer trucks. The two outside trucks mounted under the front end of No. 1 body and the rear end of No. 3 body are motor trucks, each equipped with two GE-275, 60-hp. motors.

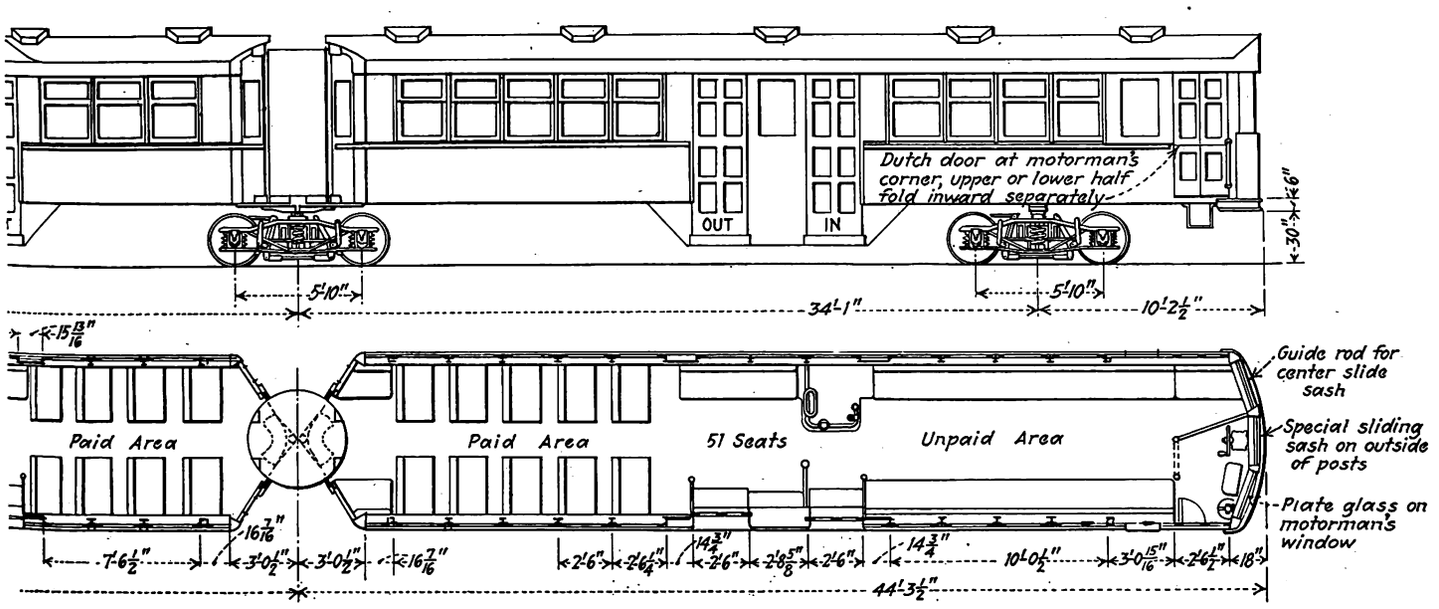
All four trucks are of a special passenger type arch-bar design with large helical springs mounted between the ends of the elliptics and with long helical springs carried in sockets cast on the sides of the journal boxes. They were built by the Cincinnati Car Company and have a wheelbase of 5 ft. 10 in., with 3¾-in. x 7-in. journals. The wheels are rolled steel of 28 in. diameter. The trucks are located so that there is a uniform spacing of 34 ft. 1 in. between their centers.

Distribution of the load on the four trucks is shown in the following table:

DISTRIBUTION OF LOAD ON TRUCKS

	No. 1	No. 2	No. 3	No. 4
Load on center bearing, pounds....	11,155	11,595	10,595	9,355
Weight of truck, pounds.....	5,725	5,425	5,425	5,725
Weight of motor, pounds.....	5,000	.....	.....	5,000
Load on rail, pounds.....	21,880	17,020	16,020	20,080

From this tabulation it is noted that 41,960 lb. or 56 per cent of the total weight when light is on the driving wheels. This provides a rate of acceleration with a loaded train of 1.5 m.p.h.p.s. with 16 per cent coefficient of adhesion, which is sufficient to insure good acceleration under almost any rail conditions.



of 140. Train Is Manned in the Congested Period by Four Men

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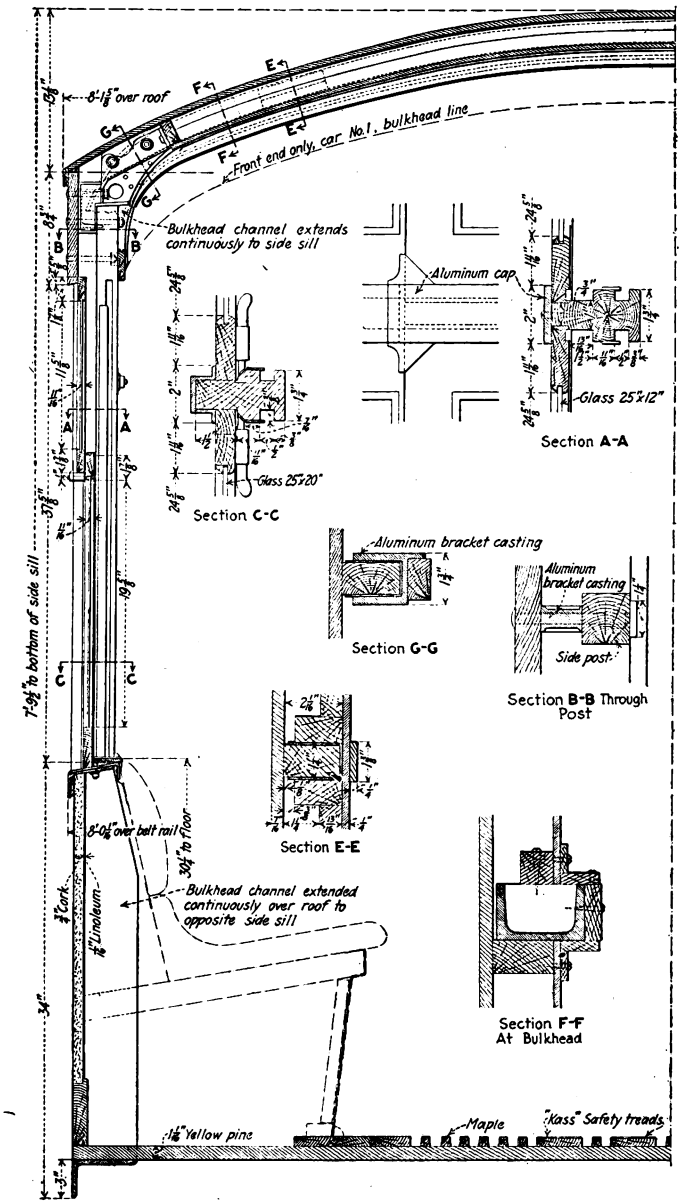

Cross-Section of Car Illustrates Use of Short Side Posts and Elimination of Top Plate

The general dimensions of each of the three cars comprising the new articulated unit are given in Table IV on this page.

The ends of the center car and the adjoining ends of the two end cars are supported on a special type of center bearing on each of the connecting trucks. The 5-in. x 3-in. x ⅜-in. side-sill angles are carried around the ends of each of these bodies and extend continuously around the entire body framing except at the side door openings, where they are fastened to the steel box piers which act as vertical compression members to reinforce the framing at the opening. Two pairs of diagonal channels of 3-in., 5.15-lb. material further reinforce the end framing, and the entire structure is tied together and stiffened by a No. 12 gage steel plate, 3 ft. 4½ in. wide.

To the end of this body framing is bolted a substantial steel casting, designed with a projecting nose that is carried directly in a cup in the truck center bearing. The adjoining body ends are each carried in a separate cup. The arrangement has a slight theoretical disadvantage in that the point of wearing is not at the true center of the truck, but this is overcome by allowing a slight additional clearance between the edge of the vestibule and the edge of the body flooring where it is cut out to allow rotation in going around a curve. This design of center bearing avoids carrying one bearing on top of the other and consequently does not require the lower bearing to carry the load of both cars with consequent more rapid wear.

Another feature of the center bearing which was given careful attention is that of lubrication. The parts are retained in place by a horizontal bolt passing through two ears on the lower bearing. This bolt extends between the projecting body noses. When the bolt is in place, a projecting shoulder on each nose prevents the nose from coming out of the socket, and at the same

TABLE II—COMPARATIVE DATA ON THE THREE METHODS CONSIDERED FOR INCREASING SERVICE

	Motor Car and Single-Deck Trail Car, Both Average and Rush	Motor Car and Trail Car in Average Service and Three-Car Multiple-Unit in Rush	Motor Car and Trail Car in Average Service and Three-Car Articulated Train in Rush
Headway, average service, seconds	180	180	180
Headway, rush service, seconds	47	60	57
Units required for average service	32	32	32
Additional units for rush service	91	64	71
Total units required	123	96	104
Seats per hour in regular service	2,100	2,100	2,100
Carrying capacity, rush service:			
Motor-trail car units	4,200	4,200	4,200
Additional units	12,100	12,000	12,000
Total of line	16,300	16,200	16,200
Annual Car-miles:			
Motor trailer	59,000	59,000	59,000
Rush-hour units	22,000	22,000	22,000
Operating costs, cents per car-mile:			
Motor trailer	31.2	31.2	31.2
Rush-hour units	31.2	43.8	37.4
Annual operating costs per train:			
Motor trailer	$18,400	$18,400	$18,400
Rush-hour units	6,860	9,650	8,228
Total annual operating costs based on number units required:			
Motor trailer, average service	$590,000	$590,000	$590,000
Rush-hour units	625,000	620,000	584,188
Total	$1,215,000	$1,210,000	$1,174,188

TABLE III—COST OF OPERATING UNDER THE DIFFERENT METHODS

	Motor Car and Single-Deck Trai. Car, Both Average and Rush	Motor Car and Trail Car in Average Service and Three-Car Multiple-Unit in Rush	Motor Car and Trail Car in Average Service and Three-Car Articulated Train in Rush
Expenditure for rush-hour units:			
Ninety-one motor trailer trains at $23,000	$2,093,000	.....	.....
192 multiple-unit cars at $15,000	.....	$2,880,000	.....
Seventy-one 3-car articulated trains at $25,000	.....	.....	$1,775,000
Fixed charges at 13 per cent	272,000	374,000	231,000
Total annual operating costs and fixed charges	1,487,000	1,584,000	1,405,188

TABLE IV—GENERAL DIMENSIONS OF EACH CAR IN THREE-CAR UNIT

General Dimensions	Car No. 1	Car No. 2	Car No. 3
Length over all	43 ft. 10½ in.	33 ft 3 in.	43 ft. 10½ in.
Length over dash	42 ft. 8 in.	31 ft. 2 in.	42 ft. 8 in.
Length over body	37 ft. 3 in.	28 ft. 0 in.	37 ft. 3 in.
Rail to top of trolley boards	10 ft. 11 in.	10 ft. 11 in.	10 ft. 11 in.
Rail to underside of sill	33 in.	33 in.	33 in.
Extreme width	8 ft. 2 in.	8 ft. 2 in.	8 ft. 2 in.
Width at side sill	7 ft. 11 in.	7 ft. 11 in.	7 ft. 11 in.
Rail to first step	15 in.	15 in.	15 in.
First step to second step	11 in.	11 in.	11 in.
Second step to platform floor	11 in.	11 in.	11 in.
Door openings (center entrance)	30 in.	30 in.	30 in.
Door openings (motorman's door)	30 in.	30 in.	30 in.
Door openings (vestibules between cars)	22 in.	22 in.	22 in.
Diameter of vestibules	4 ft. 6 in.	4 ft. 6 in.	4 ft. 6 in.
Window post centers	30 in.	30 in.	30 in.
Truck centers	34 ft. 1 in.	34 ft. 1 in.	34 ft. 1 in.
Wheelbase	5 ft. 10 in.	5 ft. 10 in.	5 ft. 10 in.
Size of wheels	28 in.	28 in.	28 in.
Width of longitudinal seats (side wall over edge of cushion)	25 in.	25 in.	25 in.
Distance between seat cushions	45 in.	45 in.	45 in.
Seating capacity	51	36	53
Total length of train (over buffers)		122 ft. 8 in.	
Total seating capacity of train		140	
Radius of shortest curve—inside track		35 ft. 0 in.	

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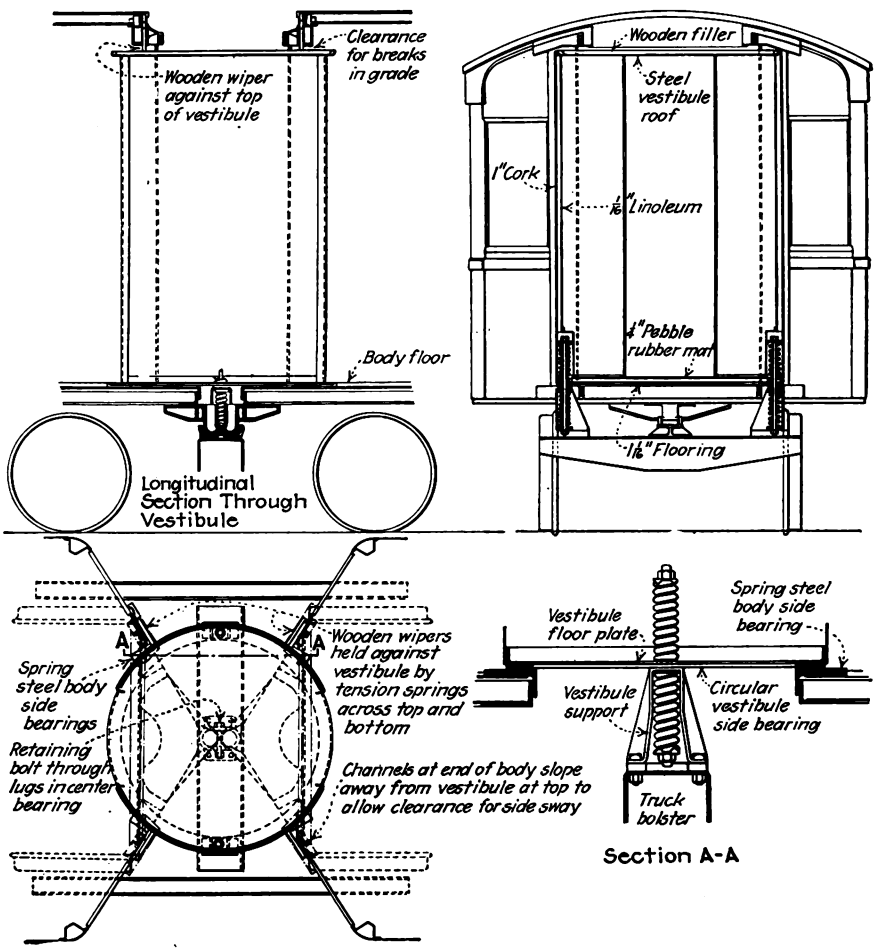
time allows free pivotal motion in any direction. In this way, no bolt holes are required in the sockets, and retention of oil is assured. Each body nose casting is cored out to form a chamber for oil and waste packing.

BOTTOM OF VESTIBULE FORMS SIDE BEARINGS

The bottom frame of each vestibule is reinforced with a substantial steel ring extending completely around its circumference. This ring is fastened to built-up side supports on the truck bolster by long bolts passing through compression springs above and below, and provided with shims or washers for adjustment. Thus each vestibule is supported entirely on the truck and simply extends into the opening between the posts at the end of each adjoining body. The vestibule floor ring extends above and rests upon the body framing, and the body floor is cut out in an arc so that each body is free to swing on its center bearing, while the vestibule remains stationary relative to the truck.

As the body tends to roll from side to side due to track inequalities, a flat steel rub piece on each side of the framing comes in contact with the steel ring under the vestibule and forms a side bearing. The load is transmitted through the vestibule ring to the spring supports on the truck which resist the rolling and tend to dampen it. In effect, therefore, the side bearings in this construction are up against the bottom of the vestibule rather than down against truck supports, as in the usual design.

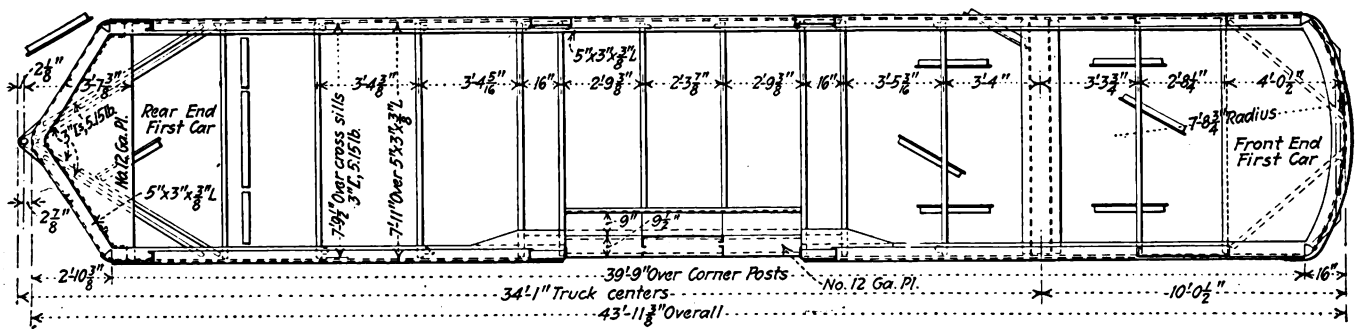


The Vestibules Are Carried Directly on the Trucks and Form the Side Bearings for the Adjoining Bodies. Each Body Is Supported in a Separate Cup in the Truck Center Bearing

Clearance is allowed between the body end posts and the vestibule. As shown in the accompanying photographs and drawings, these posts are sloped away from the vestibule at the top to allow for rolling. In addition, clearance is allowed between the top of the vestibule and the body header. This is required to take care of vertical breaks in grade. As designed, the train will not only negotiate a 35-ft. radius curve, but also has clearance for a 10-deg. break in grade at the same time. The openings between the bodies and the vestibules are inclosed by wood wipers mounted in slides on the ends of the bodies and held against the vestibules by tension springs. This construction is clearly shown in accompanying photographs.

The vestibules are cylindrical in shape and are made of No. 14 gage sheet steel. They are of 54-in. diameter and are 6 ft. 6½ in. high inside, with a steel floor and top plate riveted to the cylindrical shell. The openings for the passageway are cut into the portion of the shell which extends into the car body. These openings are 22 in. wide and provide a clear passageway between the cars when the unit is operating on a track curve of 35-ft. radius.

Attention was also given to the problem of making the top of the vestibule weatherproof. The steel top is depressed 1 in. and is fitted with a wood disk 1 in. thick with an inverted bevel edge. The disk is made approximately 2 in. smaller in diameter than the steel top, so as to form a gutter between the rim of the depressed plate and the wood filler. This gutter collects any rain or moisture which may penetrate under the wiper board above the vestibule. Tubular grab handles extend full



Underframing of Front Car Shows Construction for Carrying the Body on the Pivot Truck

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length on each side of the vestibule interior and these are connected to the gutter above so as to act as down spouts.

A layer of ¾-in. cork, covered with linoleum, is applied to the vestibule interior to deaden sound and give heat insulation. The same material is also used in the interior of the body, below the belt rail.

The side framing of the cars is of the straight plate girder type made of No. 14 gage sheet steel. The belt rail consists of a formed steel angle covered with a pressed channel which overlaps the outside of the girder sheet. Vertical stiffeners or fins are riveted to the side sheets at each window opening, but the ash side posts extend only from the belt rail to the letterboard. These short posts are held in aluminum socket castings by short heat-treated bolts.

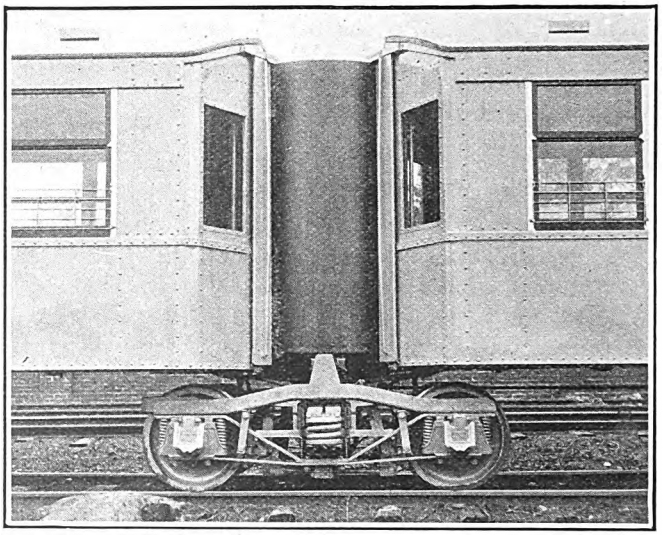
Cross sills made of 3-in., 5.15-lb. channel are spaced so as to support the car flooring. These are riveted to the underside of the side sill angles. The framing at the side door openings is reinforced by channels, plates and angles, to form the inside steps to the level car floor.

Cherry is used for the inside trim and is rubbed to a dull natural finish. The headlining is ¼-in. Agasote, curved to the contour of the roof. Railings and stanchions are made of 1-in. aluminum pipe.

In the two side front windows of the leading car the glass is framed in permanently. The glass in front of the motorman is ⅝-in. plate. This is used to give good vision and also to retard the formation of frost. The center front window is fitted with a specially designed sash which fastens tight against the outside of the posts, and is arranged so that it can slide sideways outside of, and in front of the left-hand window. A two-part folding dutch door is installed in the right-hand corner adjacent to the motorman's position. The upper half is glazed and the lower half paneled solid. Both the upper and lower halves of this door fold inwardly, thus making it convenient for the motorman either to make observations along the side of the train or to get out to throw switches, etc. Additional knee room for the motorman is obtained by running the air piping from the brake valve inside the dash structure.

K-35-JJ single-end control is used. The brake rigging is installed on the first and last car and is applied to the four trucks just as is done in an ordinary two-car installation. A brake cylinder, reservoirs and a GE-CP 127, 20-cu.ft. compressor are mounted under the front car, and a second brake cylinder and a pair of reservoirs are mounted under the rear car.

A standard Detroit five roll sign has been placed in the front hood. A similar sign is mounted on the side, over the door of the center car. This standard sign has proved particularly efficient in conveying sufficient information without the necessity of dash or auxiliary signs.



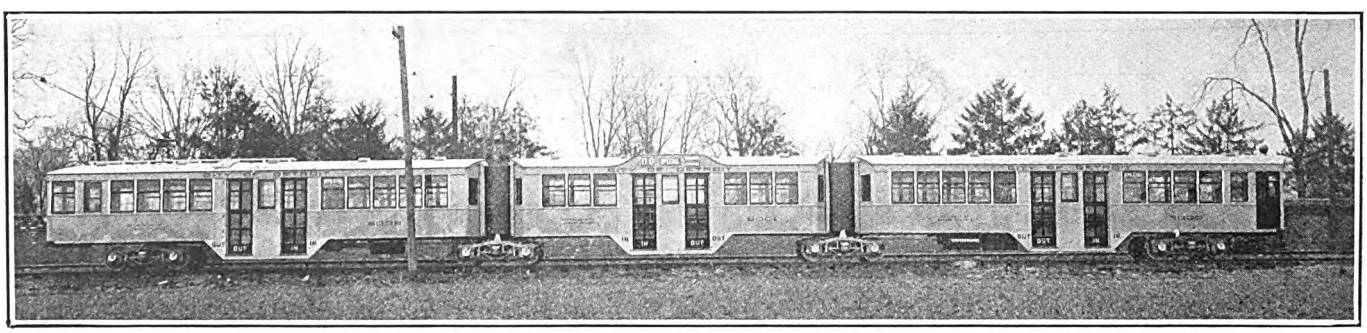
This View of One of the Connecting Vestibules Shows Its Mounting on the Truck, and Also the Center Bearing Castings for the Two Adjacent Bodies

The following material and equipment was used in the construction of the train:

Motors G.E.-275	Heaters.... Gold Car Heating & Lighting Co.'s nickel chromium wire
Air compressor..... C.P.-127	
Signals ..... Farraday	
Control K-35-JJ	Headlights .....
Curtain fixtures	....Electric Service H. D. B
....Curtain Supply Ring 88	Paint..Pratt & Lambert enamel
Curtain material.....	Sand valve and traps.....
.....Pantasote double face	.....Ohio Brass
Destination signs	Seats .....
.....Hunter Detroit Special	Cincinnati Car rattan covered
Fare boxes .....Cleveland	Safety treads .....Kass
Fenders.....H. B. Lifeguards	Trolley catcher ....Ohio Brass
Gears and pinions.....	Trolley base.....Ohio Brass
G.E. long and short addendum	Ventilators .....Nichols-Lintern
Hand brake .....Cincinnati	Headlining .....Agasote
Thermostats ...Railway Utility	

As articulated trains have been given serious consideration by a number of street railways for reducing the weight, first cost and operating costs of units on lines of very heavy traffic, the operation of this unit will be watched with considerable interest.

The Milwaukee Electric Railway & Light Company rebuilt some of its older type equipments into two-car articulated trains. These have been in operation for a number of years and have been very successful. The Brooklyn-Manhattan Transit Corporation has placed in operation a two-car articulated train made from some of its existing equipment. As both of these installations utilize existing rolling stock, it is thought that full advantage of articulation could not be obtained. The Great Northern Railroad of England has operated articulated units in steam service for a number of years with very successful results. The unit placed in operation by the Department of Street Railways, Detroit, however, is the first electrically propelled unit in which full advantage of articulation is utilized.



The Cylindrical Connecting Vestibules Between Cars Are Clearly Seen in This Broadside View

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Traffic and Financing Topics of Midyear Meeting

St. Louis Gathering One of Largest Ever Held by American Electric Railway Association, Some 750 Attending the Dinner—Morning Session Devoted to Relief of Street Congestion, and Afternoon Session to Improved Financial Condition of Electric Railways—Many Committee Meetings Were Held

FROM all quarters of the country railway and supply men gathered at the Chase Hotel, St. Louis, on March 4 for one of the largest Midyear Meetings the American Electric Railway Association has held. The conference was primarily one of gathering information on two important subjects—street congestion and finance. The papers were very well received. Particularly timely were the papers and discussion on traffic, and great interest was shown in the subject. The papers at the afternoon session were devoted particularly to the reasons for and evidences of improving conditions in the industry. The banquet was attended by about 750, tickets having been sold for 769 places. Many of the delegates arrived on Sunday night and Monday morning, as Monday was occupied all day by numerous committee meetings. The convention was thus practically a two-day affair.

President Britton I. Budd, president Chicago Rapid Transit Company, presided.

Rolla Wells Welcomes Delegates

In the absence of Governor Hyde the address of welcome was given by Rolla Wells, receiver of the United Railways of St. Louis and former Mayor of the city. He spoke of early experiences in transportation in the city. Formerly the railways sized up the public, he said, in order to obtain all from the public they could, but now the tables are turned and the public is sizing up the railway to get as much out of it as possible. The changing spirit of the times, he said, is reflected in the increasing tendency of the public to go into a copartnership with the electric railways and thus help them out in carrying their burdens.

President Britton I. Budd quoted figures to show the increasing importance of the electric railway industry, and the need for new capital that always exists if the industry is to progress. This year, he stated, there is needed from $200,000,000 to $250,000,000 additional capital. Part of this may be secured by what he characterized as public ownership of the best kind—the ownership of the company's junior securities. The appeal should be made to the users of the service that they must become partners in the business and supply their share of the capital so that they may continue to get the kind of service they desire. There are now nearly 2,000,000 stockholders in the electric light industry, indicating what can be accomplished along this line.

The White House
Washington

Feb. 28, 1924.

My Dear Mr. Sawyer:

You are very thoughtful to remind me of this next meeting of the American Electric Railway Association which you are holding at St. Louis on March 4. My recollections of last year's gathering, when I had the privilege of addressing one of the sessions of the convention, are so pleasant that it gives me added satisfaction to ask you now to present my compliments and good wishes to the members of the forthcoming meeting. I have noted some gratifying evidences of expanding prosperity in your industry in the last season, and hope it may be further emphasized in the coming year.

Very truly yours,

Calvin Coolidge.

Letter Addressed to W. H. Sawyer, Chairman Committee on Arrangements at the St. Louis Meeting

According to Mr. Budd, one of the companies of which he is president has recently put out 7 per cent "prior lien" stock to cover about one-half of the new capital requirements. Of a total of $1,500,000 of this stock about a million has been sold to users of the service.

Congestion was felt by Mr. Budd to be a serious problem, not alone of the street railways, but of the public as a whole. If congestion continues to increase, it may result in a need for grade separation to make it possible to pass traffic. Such changes as surely should not be the burden of the electric railway, inasmuch as they are an improvement for the entire community.

The motor bus is not regarded as a problem by Mr. Budd. Within a decade or a half decade he feels that every motor bus that is operating on schedules in this country will be operated by an electric railway. The manufacturers appreciate that the largest field for the bus is with the electric railway companies, and that they are the logical and the only agency for co-ordinating transportation.

Three situations confront the electric railway today. First is the problem of finance, which must be solved in the interests of those identified with the property, and which will also be in the best interest of the public. Next the fact must be appreciated that the motor bus is an adjunct that can be used for the advantage of the industry. Lastly, a program of modernization must be carried to completion. If these three things are followed through there will not be any serious problem.

Mr. Budd's speech is printed in full elsewhere in this paper.

Street Congestion Features Morning Session

The theme of the morning session was street congestion. The general problem, with specific reference to St. Louis, was presented in a paper by Harland Bartholomew, city plan engineer of St. Louis. In this paper the need for decentralization of the business district was urged as the real solution of the congestion problem. This paper was followed by a discussion from the standpoint of Los Angeles, by G. B. Anderson, manager of transportation Los Angeles Railway; Cleveland, by J. J. Stanley, president Cleveland Railway (read in his absence by Paul E. Wilson); Chicago, by R. F. Kelker, Jr., Kelker, DeLeuw & Company, consulting engineers; Boston, by John H. Noyes, chairman street commission city of Boston. Abstracts of the first four of these papers are printed elsewhere in this paper.

The traffic problem in our modern cities was not slow of development, but was an acute attack following shortly after the advent of the motor vehicle, according to Mr. Noyes. Local conditions are in each case responsible for the traffic difficulties, so that it is difficult to generalize.

The street area in Boston is greater than that in many other large cities, but on account of the peculiar layout the streets are not so good for traffic movement. This, Mr. Noyes said, requires particular care in handling the local congestion problem. He is engaged in making a survey of the automobiles that are parked on the streets of Boston. From this he will determine which persons are using the streets for unnec-

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essary parking and will request them to leave their cars at home and patronize the street railway. This will be possible, he believed, inasmuch as Boston is one of the few cities where there is close co-operation between the railway company and the city authorities.

Mr. Noyes agreed with President Budd that some person should be in authority to make the proper recommendations for traffic regulation and to enforce them.

Financial Problems Discussed

The afternoon session was devoted to the subject "The Improving Financial Conditions of Electric Railways." This was presented in the form of a symposium, the subject being treated from the viewpoint of the investment banker by J. K. Newman, from the viewpoint of the economist by Richard T. Ely, and from the viewpoint of the holding company by B. C. Cobb. These papers are abstracted elsewhere in this issue.

The theme developed by Mr. Newman was that the public must be given more knowledge of the gains made by the industry in the recent past, and the outlook for still further improvement. He called attention to the fact that electric railway securities are now being considered as sound investments where the conditions warrant.

Speaking from the viewpoint of the holding company, Mr. Cobb pursued a similar line of thought, and he too was agreed that the industry has taken an upward trend in the security market.

Professor Ely laid particular stress on the point that there has not been sufficient attention paid to the question. Taxes have been increasing in all civilized countries for a hundred years and more. We are living under a law of increasing public expenditure, he said. This has resulted in a spread in the activities of government, so that now one dollar out of every seven earned goes to taxes of one form or another. For this reason he feels that we must all get a broader view of taxation. Education of the public was also urged by Mr. Ely. This is necessary to make effective any campaign of publicity designed to instruct the public in the necessity for a more tolerant attitude toward utility problems.

Following the presentation of these papers, on the motion of J. N. Shannahan, a vote of thanks of the association was given to the committee on meetings and subjects, to the committee on general arrangements for the meeting, and to the committee on local entertainment.

Features of the Dinner

The Midyear dinner held on Tuesday evening at the Hotel Chase was marked with great enthusiasm. President Budd presided as toastmaster. During the course of the dinner he read a message from President Coolidge, which is printed elsewhere.

The address of welcome was given by Mayor Henry W. Kiel of the city of St. Louis. He said that if the companies give service they will come out of their difficulties all right. The public doesn't know what it wants, and for that reason the management can do a great deal in influencing public opinion the right way.

The speaker of the evening was Hon. Eliot Wadsworth, Assistant Secretary of the Treasury. He gave an excellent talk on the value of thrift and honesty in public business, which is printed elsewhere in this issue.

A defense of the Constitution and its provisions was made by Hon. B. F. Brough, Mayor of Toledo. He did not see any advantages in municipal operation of utilities, but felt that work of this character should be left to private enterprise.

Some Sidelights on the Convention

One feature of the St. Louis convention was the fact that every detail of the arrangements had been carefully worked out and all requirements of delegates anticipated. Under the direction of General Chairman W. H. Sawyer, president East St. Louis & Suburban Railway, the Birney Club of St. Louis and the Electrical Board of Trade were particularly responsible for these things. Transportation and guides were available all the time to show delegates anything they wanted to see. Quite a point was made of providing every possible personal service. A Fageol bus chassis with an American Car Company body and a Yellow Coach Manufacturing Company chassis with a St. Louis Car Company body were placed in the hands of the Birney Club for carrying delegates between station and hotel and for special trips.

A feature of interest to the visitors was a display of various types of street railway equipment. Alongside a bobtail car with a "hay motor" and one of the original drivers, who is still in the employ of the United Railways, was one of the latest cars of the same company and one of the new cars built for the Brooklyn City Railroad. Both of these cars were described in recent issues of this paper. These cars were placed on a side track adjacent to the Chase Hotel, and attracted much attention from the many delegates who visited them. The coaches which were in service transporting visitors were also a part of this exhibit.

Care was taken that the local people were informed through the newspapers that the meetings were open to the general public, and the subjects were announced with the comment that they would be treated from a viewpoint broader than the railway interest. At the banquet arrangements had been made to broadcast the speeches from station KSD, St. Louis *Post-Dispatch*. The careful planning was also reflected in the unusual seating list and menu, and the very attractive floral decorations. Three quartets, one of which was the Louisville Railway inspectors' quartet, helped to entertain.

*Electric Railways on Firm Basis**

By BRITTON I. BUDD
President American Electric Railway Association
President Chicago Rapid Transit Company

THE MAGNITUDE of the industry, the increasing ratio of annual rides per capita, the improvements being carried out, the greatly improved public relations inspire unbounded confidence in the future of the electric railways.

THIS annual Midyear Conference of executives of the electric railways of the United States has met to consider two main problems which confront us. These are, first, the financial condition of electric railways and the necessity for new capital in the industry; and, second, the traffic problem in our large cities, which is steadily growing worse and causing great inconvenience to our citizens. I trust that our deliberations here may be helpful in the way of pointing to a solution of both problems.

We are on the threshold of an era that will demand a very large increase in our urban and interurban transportation facilities. To meet this growing demand, a steady flow of capital into our industry must be provided. We are here to discuss ways and means of stimulating this flow of needed capital. We cannot wait for others to solve these problems for us. It is up to this industry to lead the way to a solution. I shall not attempt to go into details of either of the subjects before us for discussion. These subjects have been assigned to experts, so that I shall confine myself to a brief outline of the importance of their solution.

More than 16,000,000,000 passengers were carried on the electric railways of the country in 1923. That is a considerable increase over the best previous year, and there is no doubt in my mind that each succeeding year will show a still greater increase. You electric railway executives are responsible for the safe and speedy transportation of this vast army of riders, an army outnumbering by more than 145 times the entire population of the United States.

For the services they performed the electric railways of the country last year were paid $1,100,000,000, a sum nearly equal to 2 per cent of the entire production of the United States. That gives some idea of the importance of our industry in the life of the nation.

The magnitude of the electric railway industry may be more readily appreciated when compared with other

*Address before Midyear Meeting of the American Electric Railway Association, St. Louis, Mo., March 4, 1924.

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great public utilities. Our gross revenue last year was only slightly less than that of the entire electric light and power industry and vastly greater than the income of the gas, telephone or telegraph industries.

The electric railways last year employed 302,000 persons, or 50 per cent more than were employed by the electric power and gas industries combined. The investment in the properties which we operate is approximately $6,000,000,000, a sum greater than the investment in gas, telephone and telegraph companies combined.

I have quoted these figures to show the magnitude and importance of our industry and to give some idea of the amount of capital that must flow into it in the future.

On a conservative estimate the traffic of the electric railways of the country will increase to the extent of 500,000,000 passengers a year. This will add to gross revenues more than $35,000,000 a year, and to produce that additional revenue will require new capital to the amount of $175,000,000 a year.

Customer and Employee Ownership

Where is this new capital to be procured? Most of it must come from the public using this kind of service through what is known as the customer-ownership plan. The electric light and power industry has now more than 2,000,000 stockholders, a very large percentage of whom have become stockholders in the last few years. If it can be done in other industries, it can be done in ours, and it is up to us to see that it is done.

About three months ago we started the sale of stock to customers and employees on one of the electric railways with which I am connected. At the present time 70 per cent of our employees are shareholders, or are acquiring stock on the monthly payment plan. The selling campaign is still under way, and the latest reports show that we have upward of 3,000 stockholders living in the communities served by our railroad. A majority of them are paying on the monthly installment plan. The average number of shares to a subscriber is between three and four. That shows how widely the stock is being distributed, and the wider the distribution the more friends the company makes and the better are its public relations. Our employees have sold all this stock, and while selling it to their friends and acquaintances, they have sold the company to themselves.

Compared with some industries ours is youthful in point of years. It has had its trials and tribulations. The supreme test came during the World War, and the fact that our industry survived through that trying period and emerged from it vigorous and healthy is the best evidence of its stability.

But as we grow older it is obvious that we must keep pace with the spirit of progress. Worn-out policies and methods of operation must be discarded. The equipment of the electric railway of twenty years ago is rapidly being discarded in favor of modern equipment. This is evidenced by the large number of new cars that were placed in service last year and the number ordered for this year.

For a number of years everything that ran on rubber tires was regarded as a bugbear by the electric railways. Experience has demonstrated that for mass transportation the gasoline-driven vehicle cannot supplant the electric car. We have very properly accepted the motor bus as one of the necessary adjuncts of our transportation business. We are rapidly becoming acquainted with its uses as one of the tools of urban and interurban transportation, and are co-ordinating it with our electrically propelled cars.

The general public is no longer looking to the individual, the often irresponsible operator, for bus service. It is looking for bus service to the well-established and responsible electric railway company.

The automobile is doing much to advance the comfort and convenience of the people. It is revolutionizing their habits, making it easy for them to move about, with the result that they are traveling more than ever before. The electric railways are profiting by this change of habit. The more the people move about, the more we carry on our electric railways. This is evidenced by the steadily increasing per capita rides in our metropolitan centers.

In another way the automobile has changed the habits of our people. It has taught them how they may travel in ease and comfort and with speed. Our aim must be to approximate that speed and comfort. We must provide more comfortable and attractive equipment than was considered necessary a few years ago. The electric railways that are providing these improvements are succeeding.

Increasing use of gasoline-driven vehicles has brought to our large cities serious traffic problems which our industry must help to solve. The great mass of the people ride on the electric railway and will continue to do so. They will not tolerate much longer the endless delays caused by the small minority riding in automobiles. Neither can the automobilists themselves afford to put up with the numerous delays they daily encounter. A solution of the problem must satisfy the users of both kinds of transportation service.

The answer in many places will doubtless be along the line of separation of grades, allowing the electric railways to give a rapid transit service. Such a solution will be economically possible only in the very large cities because of the enormous capital expenditures involved. I am told that General Butler, without a great deal of experience in the handling of traffic affairs, has, in a few weeks, brought about marked improvements in Philadelphia. These improvements have benefited the automobilist as well as the car riders and pedestrians. If General Butler can do that in Philadelphia, the trained and experienced executives of the electric railway industry, working in conjunction with city authorities, should be able to work out a solution in other congested centers.

The opportunities for the electric railway executive of tomorrow are infinitely greater than were the opportunities of the executive of yesterday. A few years ago it was enough that a successful operator should know how to handle men and motors. The successful executive of today must know a great deal more. He must have a thorough comprehension of public relations, of how to gain and hold the good will of the public. He must understand the modern value of advertising and proper publicity. He must know not only how to supply transportation service but how to merchandise it, for merchandising methods are as essential to the electric railway company as they are to the dry goods merchant.

Good public relations must be based on good service. The best selling methods will not succeed unless the goods are salable. The railway executive must give the best service that is possible, then tell the people what he is doing.

Much has been accomplished in this direction within the last two or three years. There is no doubt that the public is today much better informed on our business than it ever has been in the past. Through the educational work which our association and the individual companies have carried on, the public has come to understand the essentiality of our service. The public is today much more interested in the things we are doing to improve service than it is in the rate of fare. If we continue to make improvements and to tell our customers of the things we are doing for their greater comfort and convenience, they will be with us in anything we may undertake.

Our industry is one which requires the best management that can be obtained. Some industries, due to the peculiar characteristics of their business, may succeed with average managerial talent. The electric railway to succeed must have exceptionally qualified and capable management. The field offers bright prospects for the many young and capable men who are entering it as their life work.

As I travel around the country I see more and more electric railway companies putting new and attractive cars into service, cars equipped with every modern improvement for the safety and comfort of the public and for economy in operation. I see the remarkable growth in the freight handled by our interurban railroads. I see the demands of the public for improved service being met on many interurban lines with parlor and dining cars, and even sleeping cars on some lines. And I feel that an earnest effort is being made by our executives to perform the obligations which the nature of our business imposes upon them.

As I see the improvements we are making, the increase in the number of passengers we are carrying, the better understanding of our problems on the part of the public, and as I try to visualize the magnitude of the industry in which we are engaged and its future possibilities, I am inspired with unbounded confidence in the future of American electric railways.

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Decentralization a Real Answer to Street Congestion*

By HARLAND BARTHOLOMEW
City Plan Engineer, St. Louis, Mo.

FROM a purely theoretical standpoint we could conceive of a city planned for an ultimate population, wherein a balance might be struck between the capacity of streets in the business district and that of approach thoroughfares. In this city effective separation of street car and automobile traffic might be accomplished, either by subways or by separate streets for each class of traffic, and wherein traffic space, including sidewalks, might be apportioned to building heights and character of property use. But this is purely speculation today, for we cannot limit the size of cities. It is more or less impossible also to readjust satisfactorily the streets of existing cities. Palliative devices such as subways and elevated roads are expensive and public opinion has not reached the point where it appreciates the relation between building heights and street congestion.

The average American city hesitates to strike directly at the basic causes of street congestion. City councils will refuse to enforce low building height limitations, because such structures are viewed as characteristics of provincialism and such regulations as an unwarranted interference with business opportunity. Apparently not until the economic waste of street congestion assumes appalling proportions will the community act in self-interest to solve this phase of the problem.

Street congestion is an economic problem and must be so approached. The losses due to traffic blockades and sluggish circulation touch every individual in the city. Living and business are both affected. Transportation costs rise. Movement from place to place becomes practically impossible. Property values which depend upon circulation become unstable. It is roughly estimated that the impedance to traffic in the central business district of Chicago due to parking alone causes an economic loss of $60,000,000 a year. This is a super-tax upon all citizens equal to one-third of the regular taxes levied by the city itself, It is obvious that such excessive and unnecessary charges, if long continued, will have serious results. Expenditures upon devices which offer only temporary relief merely postpone the day of reckoning.

All action and all expenditures should aim at a permanent solution of the traffic problem. The logical mode of attack should be by the following steps: (1) To secure the maximum use of existing street space; (2) to reduce the volume of non-essential traffic in congested centers and expedite the movement of that which remains; (3) to increase the amount of street space when economically justifiable.

EFFORTS MUST BE MADE to obtain maximum use of street space, to reduce non-essential traffic in congested centers, and to increase street space where essential. Many plans proposed for relief may result only in increased vehicle traffic. Decentralization does not involve economic waste.

Neither of the first two suggestions above need involve anything but minor outlays of public funds. Both would seem to be natural means of approach to the problem of street congestion. Certainly all possibilities of this sort should be exhausted before the city undertakes an ambitious program of street improvements.

USE OF STREET SPACE FREQUENTLY IMPROVIDENT

Street space was originally intended and designed as a means of access to and egress from private property. It was never intended for private use nor for the conduct of private business, including storage. Often where street space is not needed it may be leased for private purposes, usually for a fee. There is no more reason why street space should be given over to the parking of automobiles than there is for granting the wholesale grocer right to use part or all of the sidewalk and street space in front of his building for the storage of his commodities. Street space should be reserved for moving traffic wherever such space is so needed. The parking of automobiles is not a public responsibility and public funds should not be expended for this purpose. Automobile storage should be taken care of on private property, through private initiative, as other forms of business are conducted.

Some figures illustrative of the improvident use of street space may be of interest:

The streets of the business district of St. Louis with few exceptions are 60 ft. wide and have a normal capacity of four lines of vehicles. On these streets 2,500 cars may be parked. On an average day from 13 to 15 per cent of the number of standing vehicles are commercial. Pleasure cars alone occupy approximately 20 per cent of the street space. At a normal hour during the day moving street cars, providing transportation service for the general public, occupy but 1.5 per cent of the street space.

During the rush hour, when every available square foot of roadway ought to be devoted to movement, parked cars still absorb 20 per cent of the roadway. The vehicular flow, thus restricted and confined to narrower channels, slows down to such an extent that from 50 to 100 more street cars accumulate in the district than should be there according to schedule. Two thousand vacant standing automobiles cause the street cars, carrying 75,000 or more persons home from work, to lose from five to fifteen minutes of scheduled time. It is estimated conservatively that parking during rush hours reduces the efficiency of streets in the business district to 36 per cent. This is a matter which cannot much longer be disregarded. The conditions of the rush hour today will be normal conditions a few years hence.

Something over 52,000 vehicles entered the business district of St. Louis daily in an eleven-hour period in 1922. During the maximum hour by actual count 9,843 vehicles entered the business district, whereas there was only a total area available for parking 2,500 cars, or somewhat less than 25 per cent of the maximum hour arrivals. There is a parking limit of one hour in the St. Louis business districts. Even if this regulation were strictly enforced during the eleven-hour period but half the cars entering could be parked for the hour. As the volume of traffic increases, which is apparently a continuous process, and parking time is reduced, the proportion of parked vehicles to the total will become correspondingly less. Manifestly it is impossible to provide parking space in the streets of the business district of any moderate-sized city for the accommodation of all vehicles. Street space, therefore, should be put to the service of the greatest number. In Chicago it was found that passenger automobiles formed 51.3 per cent of the traffic volume entering the Loop on a normal weekday, but carried only 18.9 per cent of the passengers. Street cars formed only 2 per cent of the traffic and carried 74 per cent of the passengers.

As cities increase in size and traffic increases in even greater proportion merchants will find that an ever decreasing percentage of their customers are dependent upon the automobile for access to the shops and stores. And for even this decreasing number there

*Abstract of a paper presented at the Midyear Meeting of the American Electric Railway Association, St. Louis, March 4, 1924.

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will be less and less unlimited parking space in nearby street areas. The demands of circulation will have to be met and can only be met economically by withdrawing the general storage privileges previously granted. It should be obvious that this is a measure to which all cities eventually must turn.

Roadway Widths Should Be Chosen for the Traffic

The city, however, even with its streets practically free for moving vehicles, still has another means of lessening congestion and making streets safer. Roadways should be designed for the specific traffic service expected of them. Roadway widths have usually been and still are largely determined in an arbitrary manner by consigning a proportion of the total street width to roadway space. All roadways for modern traffic should have widths based upon the number of lines of traffic to be accommodated. Failure to adapt paving designs to the changed demands of vehicles has cost many millions of dollars in taxpayers' money and introduced unnecessary complications into the traffic problem. In one moderate-sized city of the Middle West the city engineer is still laying 30 and 40-ft. pavements in residence districts when 26 and 36-ft. would accommodate respectively three and four lines of vehicles just as well.

In the last five years the excess pavement charge against that city is estimated at no less than $125,000. Excess pavement, while not of serious importance as far as traffic in residential districts is concerned, becomes a great annoyance in congested centers. It invites disregard of parking rules and is a frequent cause of traffic accidents. It also reduces sidewalk space unnecessarily. A roadway which is really only wide enough for four lines of vehicles seems to be capable of carrying five or accommodating parked cars at all angles to the curb. The uncertainty which results from such conditions hinders the enforcement of proper traffic rules.

Careful study of roadway widths in congested centers will frequently show that a slight change here and there, either in parking rules or in the roadway itself, will make an appreciable difference in the flow of traffic. The pavements in the business district of Chattanooga, Tenn., were not designed for angular parking, but practically every street was so used. Vehicular movement was seriously impeded and traffic conditions were intolerable. Market Street, with a double-track car line and which should be a commodious six-line thoroughfare, was reduced to a two-line street, automobiles of all kinds and street cars using the line occupied by the rails. The introduction of parallel parking has cleared the street car right-of-way and opened up two new channels for other vehicles. Broad Street in the same city, a 126-ft. street, has a 96-ft. roadway and is theoretically capable of carrying ten lines of vehicles. Unsystematic parking on sides and center, however, has reduced this street to a two-line thoroughfare. Chestnut Street, with a four-line roadway, because of careless angular parking, at times becomes so badly blocked that automobiles must be moved upon the sidewalks to clear the street.

These are cases in which roadways properly designed for certain use become extremely inefficient through misuse. In the case of the Washington Avenue pavement in St. Louis, laid when the street was recently widened, it was found that a 50-ft. roadway with a double-track car line, while theoretically and actually capable of accommodating six lines of traffic, did so at such a loss of speed as to affect seriously the capacity of the street as a carrier. In order to reduce the hazard of passing between parked vehicles and street cars and thus to increase the traffic flow the curbs were set back 3 ft. on either side. The 56-ft. pavement now passes approximately twice the number of vehicles per hour.

Suggestions for Traffic Relief

It is impossible to provide sufficient street space for all automobiles.

The provision of parking space in city streets is not a public obligation.

The parked vehicle must give way to the moving vehicle.

Curbs should be so adjusted as to permit maximum use of roadway space based upon lines of traffic.

Every city should have a comprehensive city plan.

The volume of traffic should be reduced by excluding passenger automobiles from certain streets or from all streets in areas where congestion is most acute.

Building heights should be rigidly restricted.

Street widening, subway construction, arcading or elevated sidewalks do not in themselves constitute a solution of street congestion and should be undertaken only where economically justified.

Improper Transit Routing May Cause Trouble

The improper routing of transit lines is a common source of trouble in congested centers. Left-hand turns are frequently made directly across the flow of traffic on the busiest street. The delays thus caused react unfavorably upon all traffic on that street and upon cross streets. A slight change in routing which would not inconvenience the riding public would entirely eliminate many of these left-hand turns at strategic points and bring the remainder at corners not so important.

In Toledo the transit routing plan prepared for the city proposed the removal of car lines from alternate parallel streets in the business district so that each type of carrier might have its own thoroughfare. The movement of both the automobiles and street cars through the congested center would thus be greatly facilitated from the standpoint of improved transit service and relief of congestion. Such a separation of street car and automobile routes is highly desirable and should be undertaken at every opportunity. It is practically impossible to make effective use of street space so long as the flow of traffic is unsystematic.

One great contributing factor in street congestion is the unscientific street plan possessed by most cities. Unsystematic routing of traffic is frequently due to the lack of suitable streets. The automobile seeks direct routes and few of these are available in the average city. Even more difficult than the unscientific apportionment of roadway spaces in relation to lines of travel is the unscientific width and arrangement of streets that might be expected to afford a satisfactory scheme of circulation in any given community. A study of the traffic problem, even in small communities, usually discloses certain street openings, cutoffs or widenings, often inexpensive, whereby new routes of travel might be opened that would afford considerable relief throughout the whole city.

The development of a city plan is absolutely essential to any study of street congestion. While it is beyond the scope of the present paper to discuss the character and extent of a comprehensive city plan, suffice it to say that this embraces a street circulation scheme usually characterized as a major street plan, routing of transit lines, study of the railroad situation involving location of freight and passenger terminals and separation of grades at prominent street crossings, determination of size and location of recreation spaces and regulation of the use, height and size of all buildings, generally known as zoning.

It has been observed that as fast as new streets are opened they are generally used very nearly to capacity within the course of one year. This would seem to represent something more than the average increase of vehicular registration in the city and supports the theory that the more street space provided the more traffic is invited. This, of course, solves no problem and bears out the contention that it is impossible to provide sufficient street space for the movement of all vehicles, at least within a limited time, such as rush hours. The problem therefore resolves itself into one of whether there may be sufficient economic justification for any given expenditure. Within limitations that may probably be determined more or less accurately in any given case, remedial measures involving expense

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may be undertaken. In the St. Louis plan, for instance, most of the street widenings have been accompanied by increases in property values sufficient to pay for those widenings and benefit assessments have been levied approaching the total cost of improvements.

Limiting the Volume of Traffic

Statistics recently prepared show that of 152,339 vehicle movements in the business district of Baltimore only 21,036 were street car movements, while during the rush hour the 131,303 vehicles handled only 11 per cent of the total passengers carried, while the street cars handled 89 per cent. At the three most important street crossings in Montreal there were 75 per cent more vehicles than street cars, but these vehicles carried only 7 per cent of the passengers carried by the cars.* An examination of Table I indicates that the great bulk of vehicle movements in any business district consists of individual passenger automobiles that have little relation to the business of the district. The commercial vehicle traffic that undoubtedly does have relation to the transaction of business is less than 50 per cent of the total.

The passenger automobile causes most of our street congestion because of its great preponderance of numbers. It is therefore suggested that passenger automobile movement in congested districts be entirely restricted, or at least confined, to certain streets so that so much street space as may be necessary can be made available for the commercial vehicles that have most direct relation to business, and for street cars that carry by far the greater bulk of people.

Increasing Street Space a Difficult Task

Problems connected with the actual physical increase of street space should be solved through study of the city plan. Some relation should probably be worked out between the vehicular capacity of the business district and that of approaching thoroughfares. This is a difficult, but not impossible, matter of determination.

It is an obvious impossibility to widen streets in the existing business district. This is the condition that obtains in most cities of approximately 500,000 population or greater. In these larger cities measures for the relief of congestion have been suggested. Removal of street cars from the surface of the streets by building subways has been proposed, as well as the arcading of sidewalks, elevation of sidewalks and similar palliatives that do not of themselves constitute a solution of the problem of street congestion. They are mere makeshifts to relieve a temporary condition, and by their very nature will invite more traffic and consequently a pyramiding of problems, physical and financial.

Obviously the construction of subways, the arcading of sidewalks or the elevation of sidewalks cost considerably more money than the advocates of these proposals realize. Few cities, for instance, can afford subways in business districts or rapid transit lines outside the business districts. Table II has been prepared to show the approximate present costs of subways and the necessary riding which must take place in order to produce sufficient revenue to justify the expenditure. The figures are prepared on a basis of present prices and under conditions that obtain in St. Louis as regards fares and construction costs. From this table it has been estimated that St. Louis can scarcely afford rapid transit construction on the basis of present riding, and this is the condition that will generally be found to obtain in all but a very few largest cities.

The writer knows of no existing condemnation precedents by which anything approximating accurate estimates of costs for sidewalk arcading can be made. It is obviously an expensive process. The same is true of sidewalk elevation. With these, as with subway construction as means of relief from street congestion, one continuously reverts to the question previously implied in this paper as to why we should invite or undertake costs for those necessarily expensive projects when they do not constitute a real solution of the problem of street congestion. There is only one possible justification for any such measure, which in itself is not necessarily sufficient. This is that if in any particular instance where an extremely aggravated condition of congestion occurs, one of these several measures might properly be undertaken. This would not necessarily justify wholesale adoption of such measures for the relief of all street congestion. For example, it has been estimated that the value of time delays to individual vehicle movements justifies a capital expenditure of $6,000,000 for the double-decking of Michigan Avenue in Chicago, a notable improvement recently completed. The Michigan Avenue project cost approximately $15,000,000, of which $6,000,000 was attributable to double-decking, indicating that in this particular instance the large extra expenditure was justified. A peculiar condition obtains here, however, for Michigan Avenue is the most favored entry for automobile traffic to Chicago's Loop district from the north, the direction of the heaviest travel, and this traffic was formerly seriously impeded by cross-traffic between the business and wholesale district west of Michigan Avenue and the large freight house district east of this thoroughfare. Here was a special condition justifying the double-decking of the street that will probably not obtain at any other point in that great city.

Figures compiled by the same authority show that in the proposed South Water Street improvement, estimated to cost $22,000,000 and which involves double-decking similar to the Michigan Avenue improvement, $11,000,000, or approximately 50 per cent of the total cost, is directly chargeable to double-decking, whereas, on the basis of time delays to individual vehicle movements,

To Reduce Street Congestion

The city plan should include a major street plan providing for ample traffic circulation between all parts of the community, with streets of sufficient number and width to constitute balancing of traffic movement and prevention of overconcentration at any one or more points.

Separation of commercial traffic from that of the pleasure automobile type is desirable and should be secured where possible.

No street should provide for more than eight lines of traffic. This does not imply that streets eventually intended to accommodate rapid transit lines should not be of sufficient width. Where possible this width should be 100 ft. for subways and not less than 200 ft. for elevated lines.

Safety isles should be provided at crossings for all six or more line roadways.

By-pass streets should be provided on all sides of the business district.

All approach streets to business districts hould be carried through the district.

*From article by J. Rowland Bibbins, published in ELECTRIC RAILWAY JOURNAL, Nov. 10, 1923, page 813.

TABLE I—RELATION OF VEHICLES REGISTERED IN FOUR AMERICAN CITIES TO DAILY TRAFFIC

City	Population 1920	Total Autos Registered 1923	Number Vehicles Entering Business District Daily: Passenger Autos	Auto Trucks	Horse-Drawn	Total	Number of Passenger Autos Entering Business District per 1,000 Population	Per Cent of Vehicles Which Are Commercial
Chicago	2,701,705	260,393	42,130	17,180	14,500	73,810	15.6	43.0
St. Louis	772,897	92,714	33,253	10,780	2,805	46,838	43.0	29.0
Pittsburgh	588,193	.....	32,416	20,554	7,545	60,515	55.0	46.3
Minneapolis	380,582	60,000	61,181	11,012	1,223	*77,727	162.0	20.0

*Error in addition in press copy received.—EDITORS.

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TABLE II—COST PER MILE OF ROADWAY AND TRACK STRUCTURES NECESSARY FOR DIFFERENT KINDS OF URBAN TRANSPORTATION FACILITIES*

Kind of Transportation	Cost per Mile	Passengers per Mile to Pay Fixed Charges
Motor Bus	Cost per mile indeterminate because not furnished by the operating company, but by the municipality through direct and special taxes on other industries and individuals.	
Trackless trolley	$5,200	9,000
Single-track light traffic line	32,000	46,000
Double-track light traffic line	61,000	88,500
Single-track heavy traffic line	92,000	133,300
Double-track heavy traffic line	194,000	282,000
Two-track elevated, all-steel construction	540,000	486,000
Two-track elevated, steel and concrete	1,060,000	1,305,000
Double-track subway	4,800,000	5,570,000

* Estimates prepared for this article by W. E. Bennett.

the maximum justifiable capital expenditure was estimated at $3,000,000.* South Water Street is Chicago's principal produce center and naturally a busy and congested traffic center. If double-decking falls so far short of economic justification in a district of that kind, how much more unjustifiable it would be in other parts of Chicago's Loop and, for the same reason, unjustifiable in the business districts of other cities.

Decentralization Does Not Involve Economic Waste

The suggestions here made that we could secure maximum use of present street space and then reduce the volume of traffic by excluding unnecessary vehicle movements and supplementing these by relatively small improvements, the immediate cost of which would be justified, can properly be criticised as not in themselves necessarily constituting a final solution of the problem of street congestion in any given city, and increased per capita ownership of automobiles will sooner or later result in business districts becoming fully as congested with exclusively commercial traffic as they are now congested by other vehicles. There can be no answer to this criticism so long as we permit cities to concentrate business in a relatively small area served by a limited number of narrow streets where buildings of greater and greater height are permitted.

It is believed that the suggestions above offered will constitute a solution of the street congestion problem for a considerable number of years and do not involve economic waste. Beyond that point there is but one conclusion that can be reached—either our congested, overcentralized cities will eventually become victims of economic strangulation, or business must be decentralized. This may come about in several ways. There may be an ever-increasing number of business centers developed in various parts of the city's area, constituting a city of metropolitan organization composed of small communities, each with its own center. Or the huge central business district must be flattened out by rigid height restriction and spread over an increasingly greater area. Each of these things is taking place in certain cities today in a more or less haphazard manner. The community developments and business centers in the great metropolitan districts of New York and Chicago are almost as well known as the huge business and theatrical centers; even in St. Louis there are five or six rapidly developing business centers in different parts of the city.

In some cities also height limits for buildings have been established under zoning ordinances, but there are often more compromises between what should be a reasonable height limit and the unlimited freedom for skyscrapers desired by avaricious land owners, ambitious architects or sentimental enthusiasts. Not the least of contributing causes to our present chaotic situation is the tax assessor who continuously increases assessments, thereby causing property owners to resort to measures inimical to the city's interest. We need more scientific tax assessment methods co-ordinated with more scientific city planning and vigorous curbing of the practices which directly or indirectly contribute to the present problems of cities.

The writer recently had the great pleasure of participating in a study being made under the auspices of the Committee of the Plan of New York and Environs. One of the many considerations involved was approaches to Manhattan Island, with special reference to the Hudson River crossing. One vehicle tunnel is now under construction, a bridge and three additional vehicle tunnels are under consideration, estimated to cost something in excess of $200,000,000. This condition strongly emphasizes the ideas conveyed in this paper. If this bridge and the three tunnels across the Hudson are constructed, who will pay the $200,000,000? After they have been constructed how many more will be necessary? Would they solve any problem? It is the writer's contention that if they were all built and opened tomorrow, each would be crowded a week later and traffic congestion on Manhattan Island would be twice as bad as today. If, on the other hand, sufficient time and study were given to the computation of the necessary amount of intercourse between Manhattan and the Jersey shore, a definite amount of vehicle space might be determined upon and probably found to be easily justified, and a reasonable method of financing arrived at without the blind piling up of debt that now appears inevitable for want of a well-defined policy.

The matter of traffic regulation, while important, has not here been considered. This is a regulatory matter rather than one of fundamental principle in the broad problem of street congestion. Certain phases of traffic regulation might be mentioned in connection with this discussion, however, but in order that this paper may not be unduly prolonged, these may be stated briefly in connection with certain other conclusions as follows:

It is impossible to provide sufficient street space for all automobiles.

The provision of parking space in city streets is not a public obligation.

The parked vehicle must give way to the moving vehicle.

Curbs should be so adjusted as to permit maximum use of roadway space based upon lines of traffic.

Every city should have a comprehensive city plan.

The volume of traffic should be reduced by excluding passenger automobiles from certain streets or from all streets in areas where congestion is most acute.

Building heights should be rigidly restricted.

Street widening, subway construction, arcading or elevated sidewalks do not in themselves constitute a solution of street congestion and should be undertaken only where economically justified.

The city plan should include a major street plan providing for ample traffic circulation between all parts of the community, with streets of sufficient number and width to constitute balancing of traffic movement and prevention of overconcentration at any one or more points.

Separation of commercial traffic from that of the pleasure automobile type is desirable and should be secured where possible.

No street should provide for more than eight lines of traffic. This does not imply that streets eventually intended to accommodate rapid transit lines should not tbe given sufficient width, and where possible there should be 100 ft. for subways and not less than 200 ft. for elevated lines.

Safety isles should be provided at crossings for all six or more line roadways.

By-pass streets should be provided on all sides of the business district.

All approach streets to business districts should be carried through the district.

Unsatisfactory handling of traffic problems today is due to the lack of a centralized authority having complete responsibility in the matter of street congestion. The whole problem has virtually been thrown upon the police department as the agency best suited to cope with the situation. It would seem that for the establishment and enforcement of permanent policies there should be created a separate department or commission or agency which should at least be charged with the duty of studying the problem and which should probably also be charged with full responsibility in handling traffic. Street congestion is not necessarily a police matter. The problem is sufficiently great to warrant separate consideration and a separate authority. Just as we have developed health departments with a uniform force to supervise health matters, a fire department to handle fire and a police department to keep public order, it would seem that there should be a traffic department to cope with congestion and with the many other problems arising out of the universal use of the automobile.

*Estimates furnished through the courtesy of Jacob L. Crane, Jr., municipal engineer, Chicago, and C. D. Hill, chief engineer Board of Local Improvements, Chicago.

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The Business of Government*

By ELIOT WADSWORTH
Assistant Secretary of the Treasury,
Washington, D. C.

BUSINESS MEN have direct interest in securing competent administrators of government business and should make that a part of their own affairs. Active support of Mellon plan of taxes urged. Street railway has shown enormous vitality. Relations with government better as understanding of business improves.

THIS convention is typical of hundreds of others. You meet here to exchange ideas as to the most up-to-date methods and practices of your profession—the management of street railways. There are conventions for the same purpose of nearly every known profession, trade and business to which people travel thousands of miles each year for the purpose of keeping themselves and their business up to date.

There is one line of business in the country which holds conventions, but not this kind—the business of government. With a gross annual income from taxes of $7,750,000,000, federal, state and local government make our greatest business operation. This is $72 a year per person or $288 for a family of four, which is a substantial item in any family budget. The amount of taxes collected in 1922 was three times the collection in 1912. This business of government has grown at no mean rate. The one way available of meeting its increasing expenses is by making heavier demands upon the taxpayer.

How Government Affects Business

It is safe to say that this money is all expended, and in addition one to two billion more borrowed each year to be expended on buildings, institutions, roads, schools and otherwise. The administration of these government units, from Washington to the smallest village, is in the long run the foundation upon which our entire business structure rests.

You have been talking all day of the problems of the street railway. I am going to talk of the government, using that term to include federal and local organizations. I want to point out how much government affects business and how the business of government could be benefited by the active attention of men who have business training and instincts.

As an official of the United States Treasury, I have seen something of the federal organization which expends over $3,500,000,000 a year. Taking a broad view, that much-talked-of government bureaucracy is a fairly effective machine and carries on with remarkable success and continuity. The employees, if at times underworked, are also in many cases underpaid. You who manage the street railways of the country come in contact with government officials from every conceivable angle. I have a feeling that you will concur, in a general way, with that statement when speaking of state, city and county governments.

You will get my meaning, perhaps, if you ask yourselves how often there is a breakdown in the water supply, the sewage disposal plant, a failure of the fire department to respond to a call, or a tardiness of the postman. You might add to that survey by thinking how often your tax bill has failed to arrive on time. At the same time you would not call these government operations strictly snappy and up to date. There are obvious reasons why this is the case which need not be enlarged upon.

Efficiency Depends on the Man

The efficiency of every organization depends upon the type of men who run it. As a life occupation, government employment has not been able to compete for the highest ability with the super-call of money making. Public interest in government can improve this situation by making government jobs more attractive and honorable.

As civilization becomes more complicated, government in one form or another assumes greater control of the individual and takes over more functions of the community. Each year sees our daily lives more closely guided by law and regulation, more dependent upon the operation of community property by government officials. Governments regulate food supply, traffic, hours of labor, dictate health measures and operate everything from a baby clinic to a graveyard.

The street railway offers a good example of increasing government regulation. Look back on the happy-go-lucky horse car, the service almost without schedule, the capitalization only limited by the sky. It is not necessary to point out how this has changed. You know too well. All the ingenuity available in state commissions, legislatures, city councils, county commissioners, not to speak of citizens with ideas, has been expended in trying to make the street car a limousine for the passenger and fool-proof for the lame, the halt or the blind, on foot, on horseback or on flivver.

The street railway has shown enormous vitality—its managers great ingenuity. The one-man car, light car and motor bus feeder have helped to win in a life or death struggle for existence. The street railway still runs, carrying more people today than ever before in spite of public and private motor competition. It is a remarkable record.

But the regulation has come to stay and you are constantly considering problems of your business with government officials or commissions as intimately as though they were your partners. I am sure you will agree that just so far as these government representatives have an understanding of business, your relationship with them is more satisfactory, their regulation of you is more reasonable, and the results for the company and the public are better. That condition applies to every other industry touched by government regulation, and there are very few which are not.

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Eliot Wadsworth

When it comes to managing community operations, federal or local, the same type of ability is needed which makes a success in business.

Difference in Appointment of Manager

After all, there is little difference, from the community point of view, between the management of a corporation providing electric light, gas or transportation, under strict regulation, and the management by community of sewers, waterworks, schools and highways. There is a marked difference in the kind of men that do the managing. On the board of directors of the public service corporation there are always prominent business men of the community who serve without pay, attend regular meetings and give their time freely when called on. Hundreds, perhaps thousands, of stockholders of the public utility watch the financial returns and take a continuous interest in the welfare of their company. Effective management means regular dividends.

The general managers of the government business are appointed on election day, for a term sometimes as long as six years, with little chance of being discharged for inefficiency. Boards of directors, in the form of city councils, state legislatures and Congress, are also elected. The furious efforts of candidates for office stir a momentary interest among business men in these important selections. The bigger a man's business the less time he usually has for political activity, and yet the greater stake he has in the efficiency of government management. It is rather the usual attitude of business men that they cannot participate in

*Address presented at the Midyear Dinner of the American Electric Railway Association at St. Louis, March 4, 1924.

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what is called politics, but which really is the management of community affairs. He hesitates to join the precinct, ward or state committee of his party, or to give some time to administrative work in the government. He pleads lack of time or that he is no good at that sort of work. Perhaps there is a little feeling that other business men will look askance at any one supposed to be "dabbling in politics," a phrase seldom used except in a slightly critical tone.

There should not be this difference. The government organization needs the methods and standards of successful business to yield dividends in the form of lower taxes and better service to the community.

Once in a while, some unusual occurrence focuses attention upon governments and their officials, a war, a financial panic, a police strike. People who have hardly thought of their government or its affairs for years suddenly realize their utter dependence upon the men whom they have in a most casual way elected to positions of authority.

Intense interest has been aroused in government affairs by the universal discussion of taxes and the Teapot Dome leases. The need of business men and methods in government was never more strongly brought out.

Tax Matters

The so-called "Mellon Plan" of tax reduction has focused public attention on a complete demonstration of the old saying that economy in government brings direct benefit to the taxpayer. This is not a new subject for orators, but it is seldom that the cause and effect are clearly associated in every mind. There may be a debate as to how taxes should be reduced. There is no question in any mind that the reason they can be reduced is because the federal government has cut expenses, shown a surplus each year and paid off part of the national debt. The figures should be repeated over and over again. They are the foundation of the Mellon tax plan.

THE NATION'S EXPENSES

Fiscal Years Ending June 30

		Surplus
1921	$5,500,000,000	$87,000,000
1922	3,800,000,000	314,000,000
1923	3,700,000,000	310,000,000
1924 (estimate)	3,600,000,000	330,000,000
1925 (estimate)	3,300,000,000	396,000,000

NATIONAL DEBT

Aug. 31, 1919	$26,596,000,000
Mar. 31, 1921	23,980,000,000
Jan. 31, 1924	21,842,000,000

A reduction of the nation's debt of $4,750,000,000.

This is all the result of good business management. In its operating departments the federal government has been given the greatest polishing and speeding up of its life. It has been done by business men. General Dawes and the crew he brought with him were all business men. They, together with the members of the Cabinet, have worked early and late to cut out useless activities and make more efficient those which are essential.

There is a dividend, in the form of lower taxes, coming to every citizen as a result of that work. Congress, as the board of directors of the nation, is now busy debating what form the dividend shall take. The people are anxiously pressing for action.

The so-called "Mellon Plan" for declaring that dividend was worked out by experts who have studied for months to determine the fairest and most constructive program for the good of every one. In advocating that plan, Mr. Mellon is not trying to dictate what should be done, but is seeking to show his reasons for considering that plan as the best. There has been no careful reasoning put forth in support of any of the other suggested plans which makes them appear better or more effective.

Need for Business in Government

When, in your business, you determine upon some new construction, some new service or financing, you ask experts to work out a plan, consider that plan from all angles, and then, if it looks sound and practical, carry it out. That is the business way—the best way. President Coolidge and Secretary Mellon, in insisting upon the Mellon plan, are only taking that same course. They consulted experts. They have considered the plan presented not only with those experts, but with thousands of citizens. They find an extraordinary feeling in its favor. They are fighting to have it enacted into law. If you want to help in that fight there is plenty to do.

The events connected with the leasing of the Teapot Dome have also centered attention on the government. I will not discuss them here except to say this: The President, Calvin Coolidge, has said that he would see justice done—the guilty punished according to the law, and the rights of the people protected. I, for one, am willing to trust his word and depend upon him to fulfill that statement to the utmost limit of his power.

But the facts disclosed cannot fail to emphasize the heavy responsibility resting upon executive officers. The enormous aggregate value of our national property is vividly demonstrated by the appraisal of this item, which is only one of many. The future of the country depends, in no small measure, upon the wise management of these great community estates.

Government Is the Business of the Voters

If it is so, and I firmly believe it is, that public attention is riveted on the problems of government, and the acts of its officers, what effect will this have on the elections of next autumn? Will the voters realize that the national and local governments are their own business, spending the money which they provide, managing the property which they have inherited and will in turn hand on to the next generation?

I should like to feel that this extraordinary situation would call for an unusual vote next November and that the measure applied to the candidates for office, from the President down, would be their fitness to manage honestly and efficiently the business of the nation. Is it too much to believe that the voters can supply the same standard of judgment, in selecting a public official, either as an executive or a lawmaker, that they would in selecting a trustee for their own estate or a guardian for their children?

This is not a new suggestion. It is as old as the hills, but I want to point out as clearly as words can why it applies particularly to the present conditions in America.

If the business community, and that means the storekeeper, salesman, farmer, laborer, clerk and banker, feel as strongly as I think they do on this question of government management, what can they do about it? Clearly they cannot all run for office, but they can vote and in other ways have an influence in politics. The political party is built up on a series of committees, beginning in the precincts, wards, villages and counties. These local committees largely control the type of men who become candidates and go to state and national conventions.

These committees do the political work of the community, just as a small group manages the affairs of every lodge or social club. By taking an interest and doing a little work, they are in a position to decide what shall be done and who shall do it. A strong man, serving on such a committee, particularly when not seeking office for himself, can multiply his influence many times by becoming part of the power which runs and directs the so-called political machine, of which we hear so much.

Industry Needs Efficient Government

The training and initiative which business experience alone can give must be made available to the management and building up of the organizations, which handle the all-important business of our governments. When it becomes as honorable to serve on these committees as it is to be a director of the chamber of commerce, the first national bank or the electric light company, business men will really make themselves influential in government affairs. In that way alone can government be put on a business basis and kept there.

We have object lessons enough in Europe of what a bad or weak government can do to its people. In the family of nations the United States stands out as a shining example of the benefits of sound management at a time when the older nations of Europe are tottering or have fallen from their foundations.

Public credit depends upon the ability and honesty of those who manage public affairs. Your industry—every industry—is dependent, in the long run, upon a stable and efficient government.

There are thousands of conventions like this held each year, all for the improvement of business methods, standards and profits. If the management of government is as important a factor in the business world as I believe it to be, then those conventions could well allow in their programs time for a discussion of government problems. Partisanship might be avoided, but if it could not, no harm would be done. The point is to focus attention on a business which is costing the people of the country $7,750,000,000 a year and improve its operation for the benefit of all.

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Traffic Relief in Los Angeles*

By GEORGE BAKER ANDERSON
Manager of Transportation, Los Angeles Railway

THE TRAFFIC PROBLEM in this city results from the lack of usable street room. Suggestions for relief include rigid restrictions on vehicles in the central district, separation of street car and vehicle traffic, abolition of synchronized traffic signals and barring through commercial vehicles from the business district. Height limitations for office and mercantile buildings are proposed.

LOS ANGELES has now more than 1,000,000 inhabitants, and the Los Angeles Automobile Club's estimate of the number of automobiles in the city on Feb. 19, 1924, is 327,000. On the same date in 1918 the number was estimated at 81,500, showing an increase of 300 per cent in six years. During this same period the number of street car passengers has increased more than 100 per cent.

The city suffers greatly in comparison with other large cities in lack of roadway. The proportion of the business districts devoted to roadway in various cities is as follows: Washington, 44 per cent; San Diego, 41 per cent; Cleveland, 39.5 per cent; Seattle, 37.5 per cent; St. Louis, 37 per cent; San Francisco, 34.5 per cent; Pittsburgh, 34.5 per cent; Portland, Ore., 34.5 per cent; Minneapolis, 30.5 per cent; Detroit, 29.5 per cent; Chicago, 29 per cent; Denver, 27.5 per cent; Salt Lake City, 25.5 per cent; Toledo, 24 per cent; Los Angeles, but 21.5 per cent.

The city blocks in the business district measure 660 ft. north and south. These streets, curb to curb, average but 54 ft. in width. Some of the cross streets are too narrow to permit the movement of automobiles except on the car tracks if cars are parked, and there is a great insufficiency of alleys.

On account of the great area of the city—approximately 300 square miles—the average length of haul, 4½ miles, is greater than that in most cities.

In congestion by automobiles is found the most serious cause of delay to all forms of traffic. A check of the central business district, covering approximately ninety blocks, showing the movement therein of all classes of vehicles from 6 a.m. to 6 p.m. on Dec. 19, 1923, an average day, shows 263,110 automobiles, 48,556 trucks—a total of 311,666 automobiles of all classes—and 12,025 street cars. From 5 p.m. to 6 p.m. there was a total of 34,449 automobiles and trucks and 1,436 street cars. The average street car load for this period was 77.7 passengers and the average automobile load 1.67 passengers, including drivers.

During the twelve-hour period each person traveling in an automobile occupied in linear feet 14.3 times as much space as each passenger carried by street car. At 1.67 passengers per auto, to carry one average rush hour street car load of 77.7 passengers would require forty-seven automobiles, which, in solid line of contact, would occupy 660 ft., while a street car occupies but 45 ft. on the average. Two and one-half moving automobiles of average length occupy space of the same length as that of a street car, but the street car averages in the rush hour twenty times as many passengers.

Automatic traffic signals are located throughout about 50 per cent of the most densely congested district. The system consists of semaphores, one on each corner of the intersection, synchronized, and operated electrically from a central station. Under this system, as on Michigan Avenue in Chicago, much time is lost to all classes of traffic daily through holding up the flow in one direction when there is no traffic ready to move on the cross street.

Parking of automobiles is prohibited in the congested district from 4 p.m. to 6:15 p.m. only. During the remainder of the business day forty-minute parking is permitted.

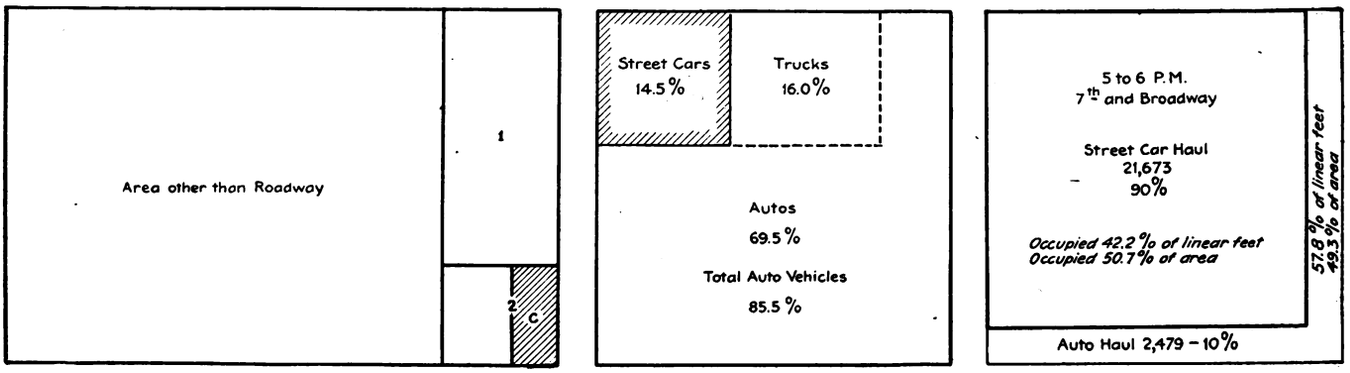

Fig. 1. The main rectangle illustrates the total area checked in the business district. 1, 2 and C represent the area of the total roadway, or 21½ per cent of the area district. 1 shows the roadway devoted exclusively to auto traffic, i.e., not street car tracks. This amounts to 76.1 per cent. 2 shows the roadway open to both autos and streeet cars, 23.9 per cent. C shows the proportion of roadway occupied by street cars in transit, allowing 4 ft. outside of the outer rails for clearance. Forty-one per cent of the roadway, or 9.8 per cent of the roadway area in the entire district, has car tracks.

Fig. 2. This chart shows the apportionment of roadway in the entire district occupied by moving street cars, automobiles, trucks, from 6 a.m. to 6 p.m. on Dec. 19, 1923.

Fig. 3. Comparison of passengers carried, linear feet occupied and area occupied on one of the downtown lines by street cars and automobiles during the rush hour from 5 to 6 p.m. on an average business day.

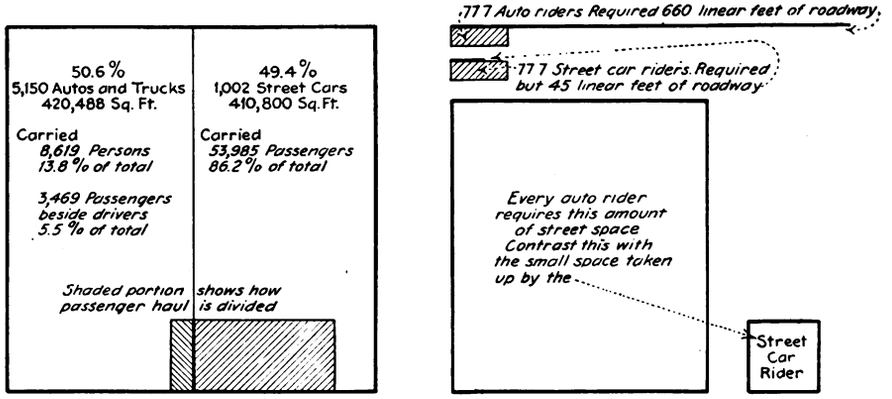

Fig. 4. Comparison of roadway space occupied and passengers carried by street cars and autos on the Seventh Street and Broadway Line from 3 p.m. to 6 p.m. on Nov. 13, 1923.

Fig. 5. This chart is based on traffic north and south on Broadway passing Seventh Street between 5 and 6 p.m. Nov. 13, 1923, when 209 street cars carried 16,219 passengers and 735 automobiles carried 1,202 persons.

To carry 77.7 passengers by street car required 45 linear feet of roadway. The same number of passengers (including drivers) was carried by autos requiring 660 linear feet.

These Charts Have Been Used by the Los Angeles Railway to Illustrate the Relative Merits of Street Cars and Automobiles for Mass Transportation

*Abstract of paper presented at Midyear Meeting of the American Electric Railway Association, St. Louis, March 4, 1924.

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In Los Angeles our big problem, so far as mass transportation is concerned, involving both street car and automobile traffic, lies in the lack of usable street room. The suggestions for relief that follow are based upon the conviction that in most cities transportation will continue to be conducted for a long time to come upon the surface, on account of the time required for the planning of a definite project acceptable to all interests and the tremendous capital investment required for the construction of adequate subway or elevated systems, or, as probably will be found advisable in Los Angeles, a combination of both.

PROPOSED REMEDIAL MEASURES

First—Separate the two classes of traffic in business districts. Either (a) set aside certain streets for the exclusive use of automobiles and other streets for the special or adequately protected movement of surface cars; or (b) set aside a portion of all streets on which there are car tracks for the exclusive use of each class of traffic so that there will be no unnecessary interference between the two. This would be a chief measure of relief for the heavily traveled business district.

Second—Separate traffic outside of the business area as far as practicable by providing numerous boulevards for automobiles exclusively. On streets equipped with tracks for main car lines confine automobiles to the area outside the tracks, and as far as practicable restrict the use of this space to automobiles whose destination is on such street and those needing to cross it. Allow right angle crossings and right turns only so far as practicable.

Third—Separate automobile traffic into two classes, slow moving and rapidly moving vehicles, and keep the slow moving vehicles as close to the curb as practicable. Prohibit the use of streets in the central business district by trucks, delivery wagons and horse-drawn vehicles during the hours of the heaviest mass transportation. Prohibit parades of all kinds at all hours within the confines of any business district. Establish a maximum speed for slow moving vehicles and a minimum speed for fast moving vehicles traveling on boulevards set aside for the use of such vehicles.

Fourth—Protect main trunk line boulevards and main avenues occupied by car lines by the boulevard stop system. Ohio designates all streets and roads used by electric railways as main thoroughfares, gives vehicles and street cars using these thoroughfares the right-of-way over those entering intersections. An editorial in the ELECTRIC RAILWAY JOURNAL of Oct. 6, 1923, on this matter is very much to the point.

Fifth—Establish raised loading platforms in all sections where traffic is most heavy. They should not be closer together than 660 ft. on the average and should be established without specific relation to street intersections where necessary to secure fairly even spacing, making permanent the skip stop. The erection of these platforms would permit automobiles to keep moving when street cars stop. Prohibit automobiles from driving to the left of the safety platforms in congested districts, thereby permitting cars to berth and unload passengers at these points without interference from automobile traffic.

Sixth—Abolish parking of automobiles in the congested district from 7 a.m. to 7 p.m. every day, with the possible exception of Sundays and legal holidays. Elimination of parking is the cheapest way to provide additional roadway space. In outlying districts prohibit parking for at least 30 ft. back of street car loading zones. In the business district prohibit the stopping of automobiles to take on and discharge passengers at least 20 ft. back of loading zones. This would prohibit United States mail wagons from collecting mail at corners and would automatically result in the changing of the location of mail boxes to other points.

Seventh—Abolish all synchronized automatic crossing signal systems. Where it is found advisable to control the flow of vehicular, street car and pedestrian traffic at an intersection with the aid of mechanical devices such as semaphores, place the control in the hands of a traffic officer, who will operate the mechanism controlling one or more blocks as the needs of various avenues of traffic demand. The flow of pedestrian traffic at all points where mechanical signaling devices are installed, or where a traffic officer is stationed, should move in the same direction and at the same time as other classes of traffic.

Eighth—Prohibit left turns at all points in the heavily congested district, including turns out of alleys, garages, oil stations, parking places, etc.

Ninth—Limit the width of commercial vehicles of all classes.

Tenth—Route outside of the congested district all commercial trucks having no collections or deliveries to make in that district.

Eleventh—Route police and fire machines where possible by flasher signals.

Twelfth—Limit the height of office and mercantile buildings, thus avoiding a measure at least of the danger of overcrowding any section. Had no limit been placed upon the height of buildings erected in Los Angeles, long before this we would have been faced with the necessity of forcing a very generous staggering of business closing hours.

Thirteenth—Secure statutory enactment providing for the examination of applicants for drivers' licenses, requiring all applicants to show that they are over eighteen years of age, understand the important features of the traffic laws, have reasonably correct sight, are of sound hearing, of sound mind and are in generally proper physical condition to operate a car with safety.

Accompanying this paper will be found a set of charts based on the traffic survey made in Los Angeles Dec. 19 and 20, 1923.

*Suggestions for Relief of Street Congestion**

By R. F. KELKER, Jr.
Consulting Engineer, Chicago

Chief causes of congestion in all cities outlined—Prime factor in present congestion is traffic to and from high buildings—Building heights should be limited as measure preceding rapid transit, and parking should be prohibited—Elevated or depressed sidewalks, one-way streets, traffic signals, etc., do not provide major relief.

UNTIL recent years street congestion has not assumed sufficient importance to warrant a thorough investigation, consequently many superficial plans of relief have been suggested and put into effect. Those who have had the opportunity to study the situation more closely have come to realize that an effort must be made to strike at the fundamental causes of street congestion. It therefore seems appropriate to set out briefly the chief causes that underlie the conditions which are found in all our cities from coast to coast.

1. Centralization of commercial, civic and social activities which result in (a) construction of excessively high buildings within comparatively small areas, and (b) the overpopulation of these areas through business hours.

2. The astonishing increase in motor vehicles in recent years, which has been without parallel in any other form of unit using the streets.

3. Inadequate width of roadways, rendered so by the volume of motor vehicle traffic, which could not have been foreseen at the time of dedication.

4. Deficiency of through streets and alleys because of vacations of public property at a time when value was low, and lack of co-ordination of subdividers at time dedications were made.

5. Interference with circulation by railroad terminals and yards, by rivers and other unfavorable topography.

6. The attempt to move all classes of traffic—freight, passengers and pedestrian—upon a single traffic plane.

7. Unrestricted parking of vehicles, which results in devoting a considerable portion of street space for the purpose of storage of privately owned vehicles.

8. Failure to adjust street car routing to meet present traffic conditions in so far as service conditions may permit.

9. Infractions of traffic regulations.

The principal effect of traffic congestion is economic loss and, as has

*Abstract of paper presented at the Mid-year Meeting of the American Electric Railway Association, St. Louis, March 4, 1924.

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been pointed out by Mr. Bartholomew, this loss in a congested area of Chicago is roughly estimateed at $60,000,000 per annum. Add to this loss similar losses in other large cities and we have a tremendous loss for the nation. Beyond this loss, however important it may be, we must also measure the inconvenience, and at times hardships, to which the public is subjected by traffic congestion and its effect upon health, as well as the thousands of hazards that it creates. The story is the same in all cities and there are few civic matters which are more in need of thorough investigation.

In Chicago we have in the Loop district about 300 sq.ft. of private occupational area for each 100 ft. of roadway space, exclusive of sidewalks. Consequently this 100 ft. of roadway space would in all probability adequately serve 1,500 sq.ft. of building area, as measured by the number of floors.

Many approximations of the relation of traffic demand and population have been made, and it is generally conceded that the increase in traffic demand varies between the first and second power of the increase in population. These powers at least seem reasonable limits.

Assuming as a normal condition 100 sq.ft. of roadway space, five-story buildings and 1,500 sq.ft. of occupational area, then we may estimate the equivalent traffic values for floor space for buildings of greater height, by using the powers representing traffic demand. The following table shows the traffic demand on this 100 sq.ft. of roadway for buildings of various height:

Number of Floors	Equivalent Traffic Demand — 1st Power	1½ Power	2nd Power
5	1,500 sq.ft.	1,500 sq.ft.	1,500 sq.ft.
10	3,000 sq.ft.	4,250 equivalent	6,000 equivalent
15	4,500 sq.ft.	7,800 equivalent	13,500 equivalent
20	6,000 sq.ft.	12,000 equivalent	24,000 equivalent

The average height of buildings in the Loop district in Chicago has been estimated at ten floors, which I believe is rather in excess of the fact, but we know that the traffic congestion resulting from buildings of this average height has produced extremely unsatisfactory conditions. By referring to the table we see that the traffic demand of ten-story buildings on the basis of the first power has been doubled and on the basis of the second power has been quadrupled. Therefore there should be no reason for surprise if congestion exists. For twenty-story buildings, which are permissible in the central district in Chicago, the volume of traffic would lie between four and sixteen times the normal loading, or, expressed in square feet, between 6,000 and 24,000. These figures show that the percentage of roadway area, considered from the point of view of traffic demand, is so small as almost to vanish. Consequently, it is certain that the prime factor in present street congestion is the traffic that flows to and from our high buildings, and the cost that the general public bears through loss of time and inconvenience is enormous.

The solution applied in New York by building rapid transit lines to reduce street congestion brought about by the erection of high buildings, aside from other very definite benefits, has not been of marked success, and the overburden of the enormous cost of rapid transit construction is appalling, particularly in view of the fact that the congestion still persits. I do not take the position that rapid transit construction is not worth while; it is vital to the well being of any large city. But I believe that in order to prevent unusual and disastrous congestion the limitation of the height of buildings must be made effective before rapid transit on a large scale is undertaken.

Therefore, I believe that the first step to prevent the increase in congestion, which is inevitable by reason of the growth of vehicular traffic and of improved transportation facilities, is strictly to limit the height of buildings and to make this limitation as low as is consistent with the height of existing structures and street spaces available for traffic purposes.

Prohibition of Parking

In regard to the present moment, the most convenient way to bring about relief is to prohibit parking where it interferes with the proper movement of commercial and passenger carrying vehicles. The annoyance to which street car riders are subjected in all cities is great, and I have never been able to understand why the street car patrons do not support prohibitive parking measures. It seems unreasonable that a comparatively few people can utilize the most valuable street space in our cities, practically at will, for their own pleasure and convenience and to the serious inconvenience of thousands of their fellow citizens.

Many cities have adopted restrictions more or less drastic in their nature which have had certain beneficial results. The difficulty of enforcement is one of the chief troubles with parking prohibitions, and it has been found that limiting the time of parking to a half hour or to an hour does not do away with the nuisance. The construction of public garages by the city has been suggested many times, and I see no reason why cities should not build enormous garages for storage at the taxpayers' expense and make no charge at all for the service, as this would be entirely consistent with maintaining unlimited parking space in the most valuable streets in the city.

The statement has frequently been made that the prohibition of parking is unjust because it is a type of class legislation. This, I believe, would be a statement of fact if in the central areas of our cities all of the cars in the district could be parked and everybody would have a fair chance. In the Loop district in Chicago there is, roughly, space at the curb to accommodate about 3,300 cars, and there are more than 250,000 cars in Chicago and the immediate suburbs. For the reasons above stated I believe the prohibition of parking in the central business districts during all of the business hour of the day is the most effective means of obtaining immediate relief, and without cost.

If any city adopts this principle for its central district it then should be applied in any other part of the city where the passenger carrying vehicles are delayed by parked cars. There are thousands of feet of curb space everywhere adjacent to main arteries, car line streets and business areas which are open to the automobile public for the purpose of parking. For a person to walk a few hundred feet is not a hardship, but when his activities delay the movements of hundreds or thousands of people he then should be compelled to make this contribution to public welfare.

The work that has been done by planning commissions and planning engineers throughout the country has been very commendable and the opening up of new major arteries, widening of streets, removing various classes of restrictions, together with planning for future traffic movements, has been and will be of great benefit in many cities. All of this work, however, will be rendered partly valueless unless the building limitation situation is taken care of and prohibitive parking legislation adopted and enforced. There are enough vehicles now in any city to completely fill the streets in the business district from curb to curb and there is also enough land to be improved to accommodate high buildings that will destroy the benefits of city planning.

We are all familiar more or less with the various expedients that have been suggested for congestion relief, such as sub-surface sidewalks, elevated sidewalks, bridges, subways, etc., all of which are supposed to remove the pedestrian from his present hazardous location. Their utility depends wholly upon the establishment of a transportation plane with reference to a traffic plane. If elevated sidewalks are adopted for pedestrians then other forms of public passenger carrying vehicles should move on the same plane, if any real benefits are to be derived. Similarly, if sub-surface sidewalks are to be utilized they will be effective only when they are made an integral part of an underground transportation system. Further, the methods of financing such improvements should be very carefully considered prior to their adoption.

Regulations which provide for one-way streets, prohibition of left-hand turns, etc., installation of traffic signals and the like, may prove desirable in controlling traffic movements where unusual conditions exist, or at special locations where control is necessary. Such attempts for relief do not strike at the root of the matter and cannot be considered properly as major measures for relief.

In order to correct congestion which arises from unbalanced traffic conditions the provision of one-way streets is desirable. At certain intersections the prohibition of left-hand and sometimes right-hand turns will prove worth while, provided, however, that there is adjacent street space eventually to handle the increased mileage. Traffic signals afford the maximum benefit to the pedestrian, and there are locations where, in the interest of his com-

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fort and in the interest of safety, they should be installed. It must be borne in mind that the control of traffic by automatic signals will reduce speed, and consequently their operation causes the motorist to contribute to the general welfare of pedestrians on the streets.

To sum up, permit me to suggest that support be enlisted everywhere to secure a reasonable limitation of building heights and to the prohibition of parking where the interests of thousands are sacrificed by the convenience, real or imaginary, of the comparatively few.

As further aids for unusual conditions, the adoption of appropriate regulations is recommended, and above all, support should be given to the enforcement of all sound traffic regulations which are adopted in the interests of safety and general welfare.

*Improving Traffic Conditions in Cleveland**

By JOHN J. STANLEY
President Cleveland Railway

THE lamentable facts concerning the whole matter of traffic congestion are that it has taken so long to awaken business men to its ill effects, and that the situation has been permitted to reach a critical condition before any active interest has been shown by communities as a whole. The problem divides into two distinct parts: (1) The adoption of laws, restrictions, etc., which will remove, as completely as possible, any causes increasing and intensifying the situation; (2) the adoption of measures both regulatory and constructive which will relieve if not solve the problem as it is today.

The handling of this matter by one centralized authority, as recommended by Mr. Bartholomew, is to be commended. Such authority may be in the form of a commission or may be an individual, but it should be solely responsible for the handling of all traffic problems as related to the congestion of streets and to the transportation of passengers from one section of the city to another.

I wish to express my approval of Mr. Bartholomew's views on decentralization. This only will succeed in reducing the rate of increase of congestion. While automobiles and high buildings are the main causes of traffic difficulties, there are other contributing causes which are by no means negligible. Greater spread of a business district of any city requires many people to travel greater distances between their homes and offices and between offices in the course of a day's business.

The second division, to which the great majority of traffic students have been giving their attention, is the relief of existing congestion. Before taking up any detailed points concerning this I wish to set forth one warning, namely, that this is not a mathematical problem which once solved is always solved. Constantly changing conditions, many of them beyond the control of the city planners, alter the situation and its intensity. These changes cannot be accurately forecast, therefore plans which may be made for the relief of congestion should be so formulated and carefully laid out as to co-ordinate with probable future requirements. This will be possible only through an authority which has the power and ability to handle the problem as a whole.

REGULATORY MEASURES to relieve the existing conditions of street congestion should be enacted, but the underlying causes should be removed by suitable laws and restrictions. Synchronization of traffic, prohibition of parking, one-way and restricted streets are among remedies proposed for immediate adoption. The writer holds that traffic will have to be limited in future as population grows.

BOTH LEGISLATION AND ENGINEERING PROGRESS CAN REDUCE CONGESTION

In taking up some of the methods which have been advocated for the relief of existing traffic congestion, I wish to divide them into two general classification: (1) Those which are confined to ordinances, regulation and enforcement and do not require any physical changes or engineering construction; (2) those based largely on engineering projects.

Under the first heading will come all laws relating to parking, synchronization of traffic, the prohibition of either truck or pleasure vehicles on all or certain of the streets of congested districts, enforcement of majority as well as seniority rights for street cars, the adoption of arterial highways and boulevard stops, the staggering of store, office and factory hours, the rigid prohibition of careless driving, rigid enforcement of all laws and the education of the traveling public. All of these are forms of relief of existing traffic conditions. They have been the subject of considerable thought by city authorities, street railway men and others.

There are some points which Mr. Bartholomew has mentioned which require comment. First, with regard to parking. From the standpoint of street railway men parking is one of the most serious handicaps to good service. The advantages of strict enforcement of no-parking ordinances has been clearly illustrated in Cleveland during the present year. With the inauguration of the new city administration under the manager plan, the authorities started an immediate campaign for improvement of traffic conditions, and called a conference of citizens including representatives of all organizations interested in the traffic situation. As a result of this conference and at the instigation of the Cleveland Railway orders were given to the traffic department of the police force to enforce rigidly all existing traffic ordinances.

One of these ordinances concerned parking on Euclid Avenue, the busiest street in the city. The ordinance permitted one-hour parking during the base hours of the day, but prohibited parking on the inbound or north side of the street from 8 to 9.30 a.m. and on the south or outbound side of the street from 4.30 to 6.30 p.m. in the congested district. The effect of the enforcement of this ordinance on the operation of the Euclid Avenue cars was immediate and gratifying. Cars which had been reaching the end of the line in the evening rush hour fifteen or more minutes late lost comparatively little time. The same result was apparent in the morning but to a lesser degree, because the morning rush is not so marked as that in the evening. The Cleveland Railway has for a long time advocated no parking on the downtown streets on which car lines are operated, but up to the present the city administration has not been impressed with the necessity for this move.

PARKING SHOULD BE PROHIBITED

The reduction of the time limit for parking has been the subject of much discussion. Many cities are reducing the time limit to less than an hour and in one case ten minutes has been suggested. I realize that there are several points of view on this subject and am, personally, firmly convinced that parking should be prohibited at all times in the terminal districts of the larger cities. A careful analysis of automobile collisions on some of the busy thoroughfares of Cleveland indicates that 80 per cent are directly or indirectly caused by the automobile being permitted to park. If parking is permitted at all, from the standpoint of street railway operation I believe that all-day parking is preferable to short time-limit parking. The latter means many entries and exits from any one parking space. At each entry or exit other machines operating in the street are delayed or forced onto the car tracks, with resulting delay and danger of accident.

Mr. Bartholomew has suggested the rerouting of street cars so as to eliminate left-hand turns. Where no traffic officer is stationed right-hand turns are less conducive of congestion than left-hand turns, but careful analysis shows that the difference is not great, if we consider street cars only. On the other hand, the routing of loop lines so that the majority of turns are right-hand requires one left-hand turn and a crossing of the lines themselves.

*Abstract of discussion presented at the Midyear Meeting of the American Electric Railway Association, St. Louis, March 4, 1924.

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The separation of street car and automobile streets would greatly facilitate traffic and from the standpoint of the street railway operator is a decided benefit. In fact, if it can be carried to the extreme and all automobiles kept off of the streets designated for street car use, it is equivalent to the grant of a virtual private right-of-way to the transit company.

Much more probable of adoption is the one-way street system, concerning the advantages of which there is considerable difference of opinion among traffic students. Most of our large cities have adopted one-way streets to a greater or lesser extent. Philadelphia and Pittsburgh are notable examples of cities in which some of the principal retail business streets are designated as one-way streets.

It seems certain that the volume of traffic in the business districts of our great cities must be limited by some means in the near future. This limitation is to some extent automatic. In small cities of less than 100,000 population a large proportion of automobile owners drive to work. As the population increases this proportion decreases, due to the limitation of space available for all-day parking, and to the exasperation and danger from accident connected with driving in the congested district. These tendencies are favorable, but further limitation must be provided.

Prohibition of Certain Vehicular Traffic May Be Necessary

Of the four forms of traffic using the street space between curbs, viz., street cars, passenger automobiles, trucks and motor delivery wagons, and horse-drawn vehicles, it has been suggested that two may be prohibited, at least during congested hours. Mr. Bartholomew has suggested the prohibition of the use of streets in the congested district to passenger automobiles, and Barron Collier has suggested that trucks, delivery and horse-drawn vehicles be excluded during day hours.

The rights of building owners must not be overlooked when considering no-parking or no-stopping ordinances, one-way streets and prohibition of the use of streets to any type of traffic. It is doubtful if a law prohibiting the stopping of automobiles in front of any property would stand the test of a court action if the building owners should attempt to enforce their rights. This, then, resolves itself into a question of to what extent property owners consider that the prohibition of parking and stopping benefits or harms their business when the results, as a whole, are taken into account.

From the standpoint of the street railway operator, subway or elevated construction is far more desirable and effective than street widening because it provides a private right-of-way totally free from the interference of any other form of traffic. The construction of subways and elevateds, the arcading of buildings and the widening of streets are very expensive and should not be attempted unless economically justified. The question of the dollars-and-cents justification of subway and elevated lines is very difficult to determine. Experience has shown that within a very short time after a new street or rapid transit line has been opened it is used to capacity. Does not this in itself prove that it was justified? Even though a great deal of the traffic was invited traffic and perhaps not essential, has the improvement not been justified?

In computing the additional rides necessary to pay the cost of subways and elevateds it does not seem wholly fair to base the computation on the prevailing rate of fare on the surface lines. The relief of street congestion, greater operating efficiency, relief from delays, higher average speed of operation and better service in general are worth something, and I believe that the public is becoming sufficiently enlightened to pay willingly for such additional benefits.

As a general thing subways enhance property values, elevated lines depress values. Enhanced property values to some extent will help pay for subway construction, but the excessive cost of subways as compared to elevated lines per unit of length (approximately four times) in many cases warrants the construction of the latter even though property damages may be considerable. The present and probable future type of district must be considered in rendering a decision as to which type of construction is desirable. It must be remembered, in considering subways and elevateds, that it is not always possible to remove all cars from the surface of the street.

In any discussion of traffic questions the problem of maximum allowable speed as related to congestion should not be overlooked. It is evident that as great speed as is consistent with safety is desirable. Just what limit of speed will give the desired results is dependent upon local conditions and cannot be determined except by studies of these conditions. The adoption of the lane method of segregating traffic will materially improve the situation.

Educate the Average Citizen

One objective toward which we should all direct our endeavors is the education of the average citizen as to his own personal loss, even though it be only a matter of time, due to traffic conditions and to his responsibility in the relief of the existing conditions. The Cleveland Association of Building Owners and Managers has taken a forward step in this direction. As a result of the conference called by W. R. Hopkins, City Manager of Cleveland, a committee of this association has made careful surveys of traffic congestion. This organization has approached the subject with a broad and unselfish attitude. In its report it has emphasized that the streets were not designed for their present purposes, and that the immediate problem is to fit the traffic to the street. It states that all-day parking should be prohibited on all streets in congested areas and that limited parking of not more than one hour be permitted in such built-up districts, except that parking should be entirely prohibited on narrow streets and alleys. The committee recommends the appointment of a traffic commissioner with the necessary assistants who should devote their entire time to the study and improvement of traffic conditions.

The results of such an attitude by this body should be far-reaching. Complete realization by business men and the traveling public of their own part in the traffic problem and co-operation on the part of all would improve the situation immensely.

Many Committees Hold Meetings at St. Louis

IN CONNECTION with the Midyear Meeting of the American Electric Railway Association at St. Louis this week a number of important committees held sessions. These included the American executive, subjects and meetings, convention date and location, company and associate membership, insurance valuation, Transportation & Traffic executive, traffic congestion, automatic substations, purchases and stores, co-operation with manufacturers, Claims executive. Reports of these meetings are given below.

American Executive Committee

The executive committee, American Electric Railway Association, held a regular meeting at St. Louis on March 3. Members present were President B. I. Budd, Secretary J. W. Welsh, Gen. George H. Harries, W. V. Hill for Paul Shoup, W. H. Sawyer, C. E. Morgan, R. P. Stevens, J. N. Shannahan, C. L. Henry, J. H. Hanna, Harry Reid, F. R. Coates, L. H. Palmer for C. D. Emmons, H. A. Johnson, E. M. White, E. F. Wickwire, H. D. Shute, J. G. Barry, A. A. Hale and C. R. Ellicott.

Mr. Stevens reported for the finance committee. For the policy committee, Mr. Shannahan reported on the request of the Claims Association for the employment of a safety engineer for the headquarters staff. He said the budget this year does not provide for this expense and that it is the feeling that the association is not warranted on present revenues in taking such a step. He thought also that the present staff is better able to do this work than was thought by the Claims Association. President Budd commented that he doubted the wisdom of the association starting on a program of hiring specialists. The request was disapproved by the committee.

Mr. Henry reported for the committee on national relations. He spoke of the introduction of House Bill 7040 which would create a 2½-cent coin and providing that one-third of the number minted would be Roosevelt coins, one-third Harding coins and one-third in memory of Wilson. Mr. Henry desired to know the position of the committee with respect to this bill. After some discussion it was decided to refer the question to the policy committee for study and report at the next meeting.

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The demand for these coins rises from the Women's Roosevelt Memorial Society and it has no business backing, it was said.

The membership, subjects and meetings, publicity and midyear dinner arrangements committees reported briefly.

Mr. Shannahan presented the recommendations of the committee on location and date of the next convention, that the convention be held at Atlantic City during the week of Oct. 6, and with exhibits. The executive committee adopted these recommendations with the proviso that they were subject to the ability of the entertainment and exhibits committees to come to a satisfactory agreement with the Atlantic City people.

E. M. T. Ryder appeared before the committee to secure approval for expenditure of the money appropriated for building a rotary joint testing machine, in making tests of another nature. The engineers had questioned whether the machine would provide reliable data, and it cost too much to build. The committee did not approve the recommendation.

Mr. Wickwire told of the latest efforts of the committee on co-operation of manufacturers and emphasized the need to keep up the work and to persist in the publicity work. Mr. Budd reinforced this by saying that any company that was not doing its part in publicity and education work was derelict in its duty to the industry and to itself. He said every railway executive ought to demand from his board of directors an appropriation for publicity and advertising purposes.

The next meeting will be held in New York on April 11. The meeting after that was tentatively set for May 8 or 9 at Cleveland in connection with the meeting of the U. S. Chamber of Commerce.

Insurance

A meeting of the committee on insurance was held on March 3, at St. Louis. Those attending the meeting were: J. T. Staub, chairman; O. H. Bemd, G. H. Bourne, B. J. Denman, C. H. Fahrney, C. E. Morgan, C. B. Scott and Paul E. Wilson.

The minutes of the meeting held in New York on Dec. 14 were reviewed. Substantial progress was indicated by the reports of the sub-committees and it is believed that a report of much value to the industry will result from the committee's work.

Automatic Substations

A meeting of the special committee on automatic substations was held at St. Louis on March 3.

Members present were: W. E. Bryan, chairman; E. H. Scofield, A. Hughes, Jr., F. W. Peters, C. A. Butcher, R. H. Rice and L. D. Bale. L. N. Van Hook later represented W. E. Bryan.

Mr. Bryan called the meeting to order and after a brief summary of the work of the committee up to date was compelled to leave due to serious illness in his family. L. D. Bale then acted as chairman pro tem.

Messrs. Scofield, Rice and Bryan presented discussions pertinent to the report. Each of these discussions was covered in detail by the committee.

During the lunch period, the committee visited the Maple and Evans Avenue automatic substations of the United Railways of St. Louis, which have just been placed in operation.

Claims Executive

President W. H. Hyland presided at a meeting of the executive committee of the Claims Association at St. Louis on March 3, at which the following members and guests were present: L. F. Wynne, J. S. Kubu, S. J. Herrell, G. T. Hellmuth, C. B. Proctor, C. B. Hardin, G. C. Hecker, T. C. Neilson, S. G. Shaw and F. H. Warren.

A letter from Mr. St. Clair of association headquarters on the subject of preparing a safety code book was read. The committee voted to approve its preparation and recommended that the parent association assign the different parts of the work to the various affiliated associations for the preparation of their respective parts of the material in such form that it could be combined, edited and published by headquarters.

It was decided to discontinue the question box as a part of this year's annual convention program. Mr. Hecker suggested that manuscripts of papers and discussions sent to authors for editing be cut to the valuable essentials in order to reduce the cost of the final proceedings. Mr. Hellmuth reported that the request of the association for the appointment and assignment of a special safety engineer was transmitted on Jan. 11 to the executive committee of the parent association, and President Hyland stated that the executive committee had decided not to make the appointment.

A motion was passed providing that the committee on subjects consist of three members, and that they be appointed for one, two and three years respectively, but giving the president power to reappoint a retiring member when necessary.

Co-operation of Manufacturers

Steps which can be taken by the manufacturers in co-operating on publicity was the subject of the discussion by the committee on co-operation of manufacturers of the American Association at the meeting held at St. Louis on March 3. In addition, new subjects for the extension of the "Traction Tom" posters for use by railways, and the posters for use by both co-operating manufacturers and railways, were discussed.

It was reported that the list of co-operating manufacturers had been increased from 137 on Jan. 11 to 157 at the present time. In approaching the manufacturers in a given community it was suggested that they could be effectively reached by the local member of the committee in some cases through luncheons at which they could be addressed collectively.

The possibilities of special publicity addressed to the local business men in a given city who are directly affected by railway operation, as for example real estate dealers, were outlined by Mr. Wickwire. This it was thought, could be very effectively handled by a co-operating manufacturer. In addition it was also pointed out that a member of the committee could frequently be instrumental in obtaining the assistance of sectional manufacturers' associations in securing fair treatment of the railways by regulatory commissions.

Purchases and Stores

The meeting of the committee on purchases and stores of the Engineering Association held at St. Louis on March 3 was attended by J. P. Dick, chairman; C. A. Harris, Harry Lloyd and W. N. Ford.

Of the three subjects assigned to this committee for study, that of determining the proper place of the purchasing and stores department in an operating company's organization was submitted in tentative form for inclusion in the committee's report.

C. A. Harris reported for the subcommittee on the preparation of a standard method of classification and sale of scrap materials. This work was carried out to fit the requirements of the average sized property. It was felt that such a classification should be made as simple as possible and should be subdivided only to the extent necessary to take advantage of price differentials on those materials which accumulate in carload quantities within a reasonable time. As a result the committee was able to prepare a tentative classification of approximately forty-five different kinds of scrap.

It was agreed that with such a classification as a working basis, the smaller properties would be able to cut down the number of items in accordance with their conditions and the very large roads would make such additions as were required to cover materials handled in sufficient volume to justify further separation. The sub-committee decided, however, to include in the report a list of the principal items of scrap materials coming under each of the classifications.

As the sale of scrap without agreement regarding time and point of final acceptance frequently leads to controversy and serious loss through rejection after loading or shipment of material, the committee was agreed that inquiries should require inspection of material before bid is made, and that such acceptance should be included as a part of the contract at the time it is signed.

Company and Associate Membership

This committee met at St. Louis on March 3 and laid preliminary plans for bringing into the association railways not now members. The work will be divided among members in various parts of the country and a mail campaign supplemented by personal solicitation. Members present were R. P. Stevens, chairman; K. A. Simmon, E. P. Waller, E. M. Walker, John Dewhurst, F. C. J. Dell and Harry L. Brown.

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Valuation

The committee on valuation of the American Association held a meeting at St. Louis on March 3. Those present were F. W. Doolittle, acting chairman; W. B. Tuttle, L. R. Nash, E. J. Bechtel, W. H. Maltbie, Frank Silliman, Jr., F. M. Brinckerhoff, T. E. Francis, Mr. Bennett and E. J. Murphy of association headquarters.

Mr. Francis presented a report as chairman of a sub-committee on terminology, in which it was pointed out that there are several ambiguous and unfortunate terms in use that should be standardized. It was stated that further study will be given this subject.

It was reported by Mr. Maltbie that he sees no reason for changing the practice in reporting court and commission decisions.

A preliminary report written by Dr. Conway was read by Mr. Nash of his sub-committee, giving methods that should be used in assisting courts and commissions toward arriving at a fair idea of what should constitute a rate base.

Subjects and Meetings

This committee met at St. Louis on March 3, for the purpose of drawing up a tentative program for the next annual convention. The members present were Britton I. Budd, chairman; Frank R. Coates, Gen. George H. Harries, Edwin C. Faber, J. W. Colton, Harry L. Brown, H. A. Johnson, J. W. Welsh.

Subjects which will probably be parts of the program are customer ownership, traffic congestion, value of the railway to a community, modernization, bus and rail co-ordination, publicity. These subjects, if they remain on the final program, will be treated from a different angle than heretofore.

Convention Date and Location

Meeting at St. Louis on March 2, this committee thoroughly canvassed the situation and decided to recommend to the executive committee that the next annual convention be held at Atlantic City during the week of Oct. 6 and that exhibits be held. This recommendation was made subject to the ability of the exhibits and entertainment committees to secure satisfactory terms. This choice of the committee reflected the sentiment widely expressed throughout the country.

The members present were J. N. Shannahan, chairman; J. W. Welsh, F. C. J. Dell, Col. A. T. Perkins, W. H. Heulings, Jr., Paul Wilson, C. E. Morgan, L. W. Shugg, J. H. Hanna, C. L. Henry, J. C. McQuiston, H. L. Brown and Mr. Royal.

Transportation and Traffic Executive Committee

This committee met at St. Louis March 3 with First Vice-President T. C. Cherry presiding in the absence of President Punderford. Other members present were G. H. Clifford, J. V. Sullivan, E. M. Walker and Samuel Riddle. It was decided that hereafter questionnaires should be submitted to the executive secretary before being sent out, to prevent duplication. Approval was given to a proposal that a book covering recognized safe practices for the industry be prepared. President Punderford will be asked to appoint a committee to work with representatives of the other associations in the selection of material. Four committees reported progress. Their completed programs must be in the hands of the secretary before July 1. The committee recommended that in printing discussions of committee reports and papers at the annual convention they be briefed with the idea of saving space in the proceedings. It was also agreed to continue the practice of distributing in advance printed copies of reports to be read at the annual convention.

Relief of Traffic Congestion

The committee on relief of traffic congestion of the Transportation & Traffic Association met at St. Louis March 3 with the following present: Paul E. Wilson, chairman; D. L. Fennell, George B. Anderson, W. E. Thompson, W. H. Maltbie, H. O. Butler and J. V. Sullivan, sponsor. The traffic situation in various cities was discussed at length and all felt that this was one of the most pressing problems for practically all companies. A form of inquiry was decided upon, this to be sent out at once so that replies could be tabulated in the near future with the idea of then agreeing on recommendations. The committee was aided in its appreciation of the problem by the discussion at the session of the Midyear conference the following morning.

City and Interurban Operation

The committees on city operation and interurban operation met jointly as the guests of Harry Reid, president Interstate Public Service Company, on March 1. The meeting was held on one of the company's new dining-club cars, which was operated out of Indianapolis, luncheon being served en route. The car was then run onto a siding near Franklin, Ind., during the meeting, afterward returning to Indianapolis.

Those attending the meeting were, for the interurban committee, Harry Reid, chairman; V. W. Berry, John Bleecker, Samuel Riddle, G. W. Welsh, H. A. Mullett, C. E. Thompson, J. C. Schade and Frank Blanchard; for the city committee, R. F. Carbutt, acting chairman; R. W. Emerson, F. C. Chambers, C. D. Porter, W. E. Wood, E. J. McIlraith and R. N. Graham representing C. S. McCalla; joint members, W. V. Hill, E. F. Wickwire and G. C. Hecker, secretary; guests, Charles L. Henry, J. P. Stewart, M. B. Lambert, James W. Welsh, Morris Buck, Bert Weedon and L. M. Brown.

Chairman Flowers of the city operation committee was unable to be present, and at his suggestion Chairman Reid presided over the joint meeting. Mr. Flowers also had designated Mr. Carbutt acting chairman of the city committee. Announcement was made of the addition of D. W. Snyder, Jr., to the interurban committee as a member-at-large.

A new assignment by President Budd was announced, to review each year the developments and improvements in equipment that the studies have indicated would be helpful to the industry.

Replies were received from several Canadian companies indicating a desire to co-operate in the work of these committees. Mr. Lambert suggested that three members-at-large for Canada be added to each committee to recognize the Canadian members of the association for the balance of this year, and to formulate a plan for properly including the Canadian territory next year. The suggestion was approved. A letter was read from the Honolulu Rapid Transit & Land Company also agreeing to co-operate. This territory was added to Mr. Hill's assignment.

It was the sense of the meeting that wide publicity should be given the work of the committees, and that arrangements be made to publish reports prior to the annual convention.

Progress reports were made by the regional vice-chairman of the committees of visits to properties in their respective territories. A number of them already have made such visits and have found practices worthy of note, covering a wide range of subjects. Personal visits were felt to be necessary to secure the desired results. It was found that there is considerable lack of knowledge on the part of operating men of the information available at association headquarters and in the technical press.

Mr. Carbutt reported that he has found it of advantage to prepare what he terms an operating handbook, containing an outline of the committee work and the general subjects to be considered. He has the intention of sending to a property in advance of his visit a sufficient number of copies, so that each operating official may have one. These men will be requested to prepare one-page statements of any developments considered of outstanding interest or value to the industry. This will save a great deal of time, and he will then be in a position to determine what further detailed studies may be necessary on any property. Mr. Carbutt stated that he had had a conference with the editors of ELECTRIC RAILWAY JOURNAL and that he had prepared a classification based on the subject index published semi-annually in this paper.

Some question was raised as to the scope of the committees. It was felt that no encroachment should be made on the work of other committees, but that the principal value of this investigation consisted in finding practices of outstanding merit and broadcasting them to the industry.

Mr. Henry stated that he was pleased with the work of the committees thus far. He felt that the main thing now is to prepare a means for co-ordinating and disseminating the information developed. Assurance of the assistance of ELECTRIC RAILWAY JOURNAL in this was given by Mr. Buck, who said this paper would be glad to publish any suitable material and to prepare for publication more detailed information on particularly interesting features.

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The Improving Financial Condition of the Electric Railway Industry

This Subject, Which Was the Topic of the Afternoon Session of the St. Louis Meeting, Was Discussed from the Viewpoints of the Investment Banker, the Economist and the Holding Company

THE afternoon session took the form of a symposium, the topic being the improved financial condition of electric railways. J. K. Newman, from the standpoint of the investment banker, urged greater publicity to tell the public what has been accomplished in the way of progress and to dispel many false notions that have been accepted by the public. Prof. Richard T. Ely, one of the most noted economists in this country, pointed out the large ratio of investment to revenue, and the difficulty of reducing costs. He felt, however, that there is a decided change in the attitude of the public and of the industry, and that if the industry keeps on with its program of modernization it will come out all right. The holding company's position was outlined by B. C. Cobb, who showed how the securities of the railways have fallen from the favor of the public, and how they are even now establishing a better credit basis. All of the speakers expressed faith in the future, feeling that the industry is fast approaching a period of continued prosperity.

Investment Banker Sees Prospect of Better Financing*

By J. K. NEWMAN
Newman, Saunders & Company, Inc.
New York

THERE are cycles of activity for securities of various classes. When the cycle of activity is strong for a special class of securities, a buying fever may spread like an epidemic and likewise run its course. If the investing public is not interested, it is difficult to dispose of any securities.

When we think about the present inability of street railways to dispose of their securities, it would seem that the principle of cycles of activity and the principle that the price of commodities averages a reasonable profit over a period of years are in danger of being disproved. For years, there has been practically no offering of exclusively street railway securities by investment bankers. Looking back into the palmy days of street railway financing, it will be recalled that good street railway securities were absorbed freely and the cycle of activity lasted for years. The question is, when will the cycle return? The public is not concerned whether street railway securities can be sold or not, though it is dependent on such sales for efficient service. It must be made to understand this and also many of the street railway conditions, good and bad, before confidence in such securities can be restored.

The present state of mind of investment bankers and private investors shows many false notions against street railways. These are based on fear, with more than a sprinkling of ignorance, and with some absence of vision. It will be helpful to enumerate these indictments, as follows:

1. Franchises with low fixed fares are known to be unprofitable.
2. Service-at-cost or other form of eliminating a fixed fare is considered only a temporary expedient.
3. Resistance to increased fare is a popular issue for political exploitation.
4. The menace of jitney competition still lingers in the minds of investors.
5. Bus systems are feared as a substitute for street railway systems.
6. The growth of private automobiles is believed to be reducing car riding.
7. Numerous receiverships and reorganizations have made investors skeptical regarding street railway securities.
8. Inability of street railways to sell additional securities or refund maturities has produced a lack of confidence in existing securities.

In the early days, investment bankers would not entertain the purchase of street railway securities unless the franchise contained a fixed fare, usually 5 cents. The fare provision, however, was the one condition above all others which caused the serious setback to street railway securities. The cost of operation soared and the 5-cent fare became unprofitable; and yet the public clung to it with a fury that equaled the determination to win the war.

Although bankers were keen to buy railway securities and the companies enjoyed what they supposed were satisfactory profits, the 5-cent fare was never really profitable, taking the business as a whole. The street railways were then placed in a position somewhat similar to that of a manufacturer who had sold his output for a period of years at a fixed price and who found that his business was being ruined by it. The manufacturer had to submit to his loss, and often bankruptcy resulted.

Unlike the manufacturer, the street railways could not go out of business without injuring every other kind of business within the territory served. Yet they were compelled to have profits which would permit the property to serve the public efficiently and permit the raising of new capital for expansion. There was only one solution, which came through the wisdom of state governments in creating public utility commissions, which adopted the practice of first determining a fair valuation or rate base. With the value or rate base determined, the regulatory bodies have allowed a fair return, which varies, though it is never too high. In some instances, and properly so, the rate of return went up as the fares went down, or an incentive in some form for good operation was granted. While those decisions by the commissions forced the street railway to live on a restricted diet, nevertheless this policy gave a stability which should be and will be the foundation of a cycle of activity for the securities of street railways.

If the public is to become interested in utility securities, it is necessary that there should be greater publicity by the street railway companies to ex-

GREATER PUBLICITY is urged as a means of telling the public of the improved status of electric railways as investments. The public has several false notions detrimental to the industry that should be removed. No better evidence of improving conditions can be given than advanced prices for securities already issued, and better terms on which new issues have been floated.

*Abstract of paper presented at the Midyear Meeting of the American Electric Railway Association, St. Louis, March 4, 1924.

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plain these economic changes and the stability produced by a fair return on a fair valuation. The public must know that this adjustment is a permanent one, and supersedes the fixed fare.

The effective impression made by demagogs who still believe they can get political support by clamoring for a 5-cent fare is a serious handicap. These demagogs, with few exceptions, know that a 5-cent fare is no longer possible, but they hope to fool the public for their own ends. Publicity should persist on the part of the railway until the public learns that it is getting the fairest deal in America from street railways generally.

The efficiency and the practical use of jitneys have been largely exploded. It is gratifying that in many cities the people have voted against jitneys and eliminated them. However, it will take some time yet for investors to forget the menace of jitneys and to realize that jitney competition is unfair and has about reached its end.

Some investment bankers and public investors fear that bus systems will supplant street railways. This is possible only if the cities enjoying street railway systems are willing to cause one of the greatest financial disasters this country has ever experienced. Think what it will mean if the six billion dollar investment in street railways is to be destroyed, for there would be little salvage from the property. Aside from this investment loss, what would be the financial effect on the cities if street railways were discarded? Street railways pay taxes varying from 5 to 10 per cent of their gross receipts, and in addition, for a vast amount of paving. Many cities would face serious financial problems or disaster if they could not collect these taxes and besides had to pay for and maintain the paving now paid for and maintained by the street railways. Furthermore, the public would have to pay fares considerably in excess of the present charges, because buses cannot operate so cheaply as a system of street railways. If the proper explanation of the competing bus system with its higher fare and low taxes and no paving obligations is fully explained to the public, these competing systems will not be permitted.

The bus manufacturers realize that their best customers are the street railway companies. These manufacturers do not desire to put in competing systems or to help others do so, but they have buses to sell and they look to the street railways to be the buyers.

The private automobile has undoubtedly affected street car receipts. However, the large increase in privately owned cars has not been without its advantages to street railway systems. The number of passengers carried by street cars for the last ten years clearly indicates there has been a large and steady increase, but for the last two or three years, this upward trend has flattened considerably, though it is still climbing. The private automobile, to some extent at least, helped the street railway companies to avoid expansion for which money could not be obtained and from which there would have been no profit over the cost if obtained.

Street paving required of street railways already has been mentioned. Under present conditions, private automobiles are dependent upon this paving and they should pay for it to some considerable extent. They can do so through taxes.

The public is beginning to realize that the private automobile should not be permitted to interfere with street car traffic. Regulation is growing stricter and more efficient from day to day.

Receiverships and reorganizations have made investors skeptical, but it is not generally appreciated how helpful is the law of receiverships. Street railway companies during the war were in many instances handicapped with two forms of contract impossible of performance. The one was the fixed fare, the other the contract with security holders where the capitalization was not predicated upon the basis of restricted net earnings. Receiverships were naturally forced upon the companies by these conditions, and with the property in the hands of the courts increased fares were granted to offset increased costs.

These receiverships also enabled the companies to change their financial setup. Reorganizations followed, bonded debts were adjusted to a sound basis and stock capitalizations were rearranged to make securities safe and dependable. Receiverships are terminating rapidly and the companies are going back into normal operation greatly improved from the experience.

Publicity is all-essential. This publicity, primarily, must be conducted locally and must be comprehensive in its educational scope. Street railway companies have resorted to publicity, but not sufficiently so. However, this local publicity must be handled carefully. It is not only necessary that it should be absolutely honest; it must be tactful and intelligent. Unfortunately, there are not many trained publicity experts in this business such as are found in the department stores.

As publicity grows and its results are observed, it will expand of its own momentum. Naturally, there are degrees of publicity required according to times and conditions. Until the public knows the real story of the street railways, a super-effort is necessary.

Therefore, reach out for a larger fund to supplement local publicity and for a national program. The result then will be quicker, and in two or three years homeopathic doses will answer; a major operation is required now.

Street railway financing is on the way and the outlook is hopeful. With few exceptions commissions have given final valuations and have allowed fares which will insure a sustaining return. Jitneys are fast becoming a thing of the past. Bus systems can be made an asset instead of a menace. Private automobiles will be regulated and taxed and thus be a medium of getting relief for the street railways from the paving burden. Receiverships have made it possible to eliminate impossible fare conditions. Reorganizations will result in the issuance of better bonds and the elimination of over-capitalization. Lastly, and best of all, two large issues of street railways bonds have been successfully floated by investment bankers within the last two months. Investment bankers are like sheep, though never sheepish; they follow the leader. No better evidence of the improved conditions of street railway investments exists than the advanced prices for bonds and stocks already marketed.

*Economist Sees New Era Ahead for Electric Railways**

By RICHARD T. ELY

Director of the Institute for Research in Land Economics and Public Utilities, and Professor of Economics in the University of Wisconsin

IT CANNOT be overemphasized that the point of view of an economist is the public or social point of view. His objective is promoting the general welfare. Since my subject is the financial condition of electric railways: I therefore necessarily consider that condition in its relation to the financial and industrial structure of the whole country, for unsound financial conditions in one or more basic industries may disturb our entire prosperity as a people. Does not agriculture today afford ample proof as well as illustration?

First of all, what do we mean by the financial condition of any business? The financial condition of any business or of an industry is a result of the relation of expenses to income in that business or industry for some extended period of time. The net income is thus the dominant single fact behind which are assembled all the causes that affect favorably or unfavorably any enterprise.

SOME CONSEQUENCES OF BAD FINANCIAL CONDITIONS

When net revenues decline so that they barely cover interest and taxes no capital is available from the industry itself. Moreover, its power to draw funds from the outside at reasonable rates of interest disappears. As the margin of revenues over expenses becomes even smaller, less and less is set aside for depreciation, because that constitutes one of the expense elements that can be deferred. There soon appear inevitable concomitants of such financial conditions. Service deteriorates and the public begins to grumble. Necessary improvements are not made, so that the property begins to look run down at the heel. Capital for extensions it not available, and hence the property fails to keep pace with

*Abstract of paper presented at the Mid-year Meeting of the American Electric Railway Association, St. Louis, March 4, 1924.

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the needs of the community. In this way inadequate financial resources make it impossible for an industry to supply the services for which the social economy has intended it. Other industries dependent upon its buying power suffer and languish proportionately. In truth, economically as well as morally speaking, we are all members one of another. This is the principle of social solidarity, one of the profoundest and most pregnant of all social principles and one which has daily increasing significance as economic evolution proceeds. Yet the crux of the whole matter for our present discussion lies in the relation of expenses to income. The situation can be relieved only by increasing the income or reducing expenses or both.

Present Condition Resultant of Complex Historical Causes

The existing financial condition of the electric railway industry has been the result of a long development. The causes are not all to be found in the war period, but must be traced in the history of the industry and in the history of regulation. Historical analysis must be made of the difficulties in order to disclose where, when and how remedies can be intelligently applied. Unfortunately, the electric railway is first of all a local public utility and hence has its economic roots in local soil. This gives the problem great variety and complexity. It has certain general aspects, it is true, especially as the area of operation expands, but real understanding can only flow by taking into account primarily local conditions and variations.

But the financial condition of electric railways is improving. While we cannot say that the dark clouds all belong to the past and sunshine only is promised for the future, I do believe it safe to say that the period of the greatest difficulty appears to have been passed. As Mr. Budd has indicated, the progress is reflected by increased riding on both urban and interurban lines and by great gains on interurban freight business. Yet the lessons will have been in vain unless the experiences gained are consolidated. One result should be a quickened interest in and response to proposals for the scientific study of public utility problems, for the active encouragement of both the collection of facts and their wide dissemination through scientific agencies. After all, public education and self-enlightenment are the best insurance policies against social calamities.

Certainly prior to the summer of 1919 agriculture and transportation were receiving relatively little consideration, and they were the subject of very little public concern. Yet these are the two industries that have suffered most from the war and post-war conditions and have constituted the greatest menace to the financial stability and prosperity of the whole country. Curiously enough, the prime cause of the financial difficulty in the two industries has been of an opposite character: In the case of agriculture we have an industry of extreme individualism, in which competition controls and individual productive effort is unregulated and undirected. In the case of the transportation industry, and more particularly in the case of the electric railways, we have an industry which has been subject to extremely rigid and sometimes unwise regulation. So far as popular clamor of that sort is concerned, generated by ignorance on the one hand and demagoguery on the other, it is hard to say which has been the more fruitful field, but I think that electric railways will have to yield to agriculture in this respect.

HIGH FIXED CAPITAL and large proportion of labor expense are distinguishing features of railway operation. Sound franchises and sufficient revenue must be provided if the industry is to grow and prosper. The author holds that the present new era in economic evolution necessitates a complete overhauling of our ideas of taxation.

If we were to analyze the conditions that, more than any others, determine the relation of income to expenses, we should want to present them under these headings:

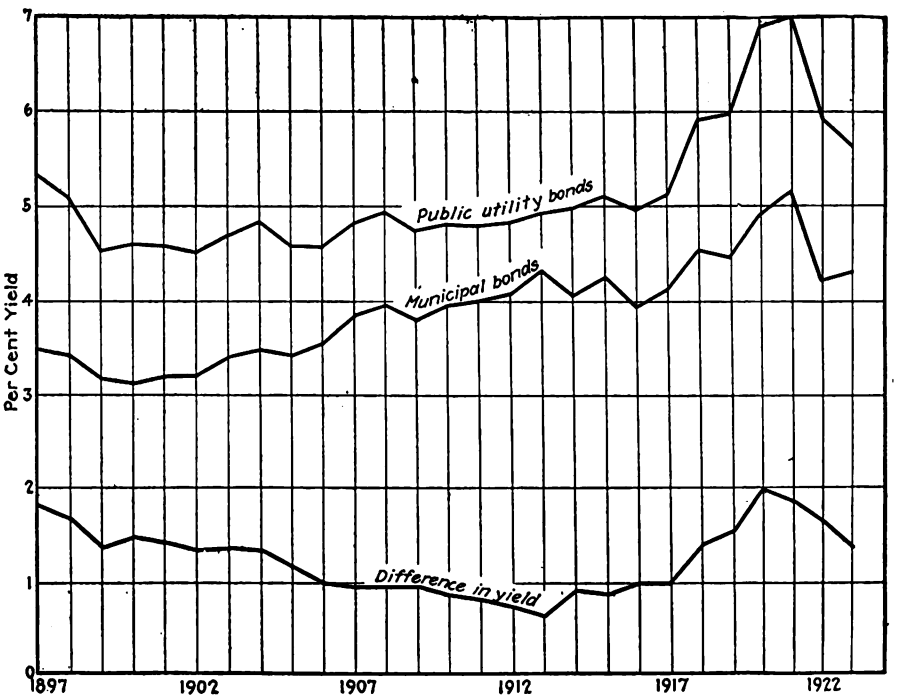
1. *Economic Conditions Inherent in the Nature of the Industry.*—Here and now I want to call attention to the relatively large investment of fixed capital, carrying along with it a very large and relatively fixed overhead. Operating expenses are the chief item here. As they are relatively constant, a situation arises in which net income varies sharply with the ebb and flow of traffic. This makes the industry peculiarly susceptible to changes in business conditions and to the inroads of competition.

In the case of growing prosperous companies, points are reached in their development when additional capital expenditures become necessary in order to provide additional plant capacity. These are always periods of economic storm and stress.

Another inherent characteristic to which attention would have to be directed is the large proportion of the wage element in the annual expense account, and the inherent inability of the industry to economize in this type of expenditure by substituting for it a capital charge. Wages constitute in the neighborhood of 46 per cent of all electric railway operating expenses. This was shown to be a peculiarly vulnerable point during the recent period of rapid and substantial wage increases. Incidentally it may be observed that electric light and power companies are in a far better position to reduce labor cost by capital expenditure and so are steam railways.

A table prepared from census figures gives some indication of the changing magnitude of supply of electric railway facilities as shown in miles of single track operated, the changing magnitude of traffic flow as indicated by revenue passengers and the degree of economic utilization as shown by passengers per mile of single track. The statistics are characteristic of industries where the supply of facilities has outrun existing or potential demand. The practical cessation of expansion since 1912 is gradually bringing about a situation of equilibrium.

The development of the private automobile has undoubtedly been the reason why potential demand as shown by population growth failed to materialize. The situation promises to



Comparative Average Yield and Difference in Yield Between Twenty-five Public Utility Bonds and Fifteen Municipal Bonds, Average of Four Months—January, April, July and October, Annually, 1897-1927

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CHANGING MAGNITUDE OF ELECTRIC RAILWAY OPERATIONS
U. S. Census Returns

Year	Miles Single Track	Revenue Passengers	Revenue Passengers per Mile Single Track
1890	8,123	2,023,010,202	249,047
1902	22,577	4,774,211,904	212,217
1907	34,375	7,441,114,508	216,522
1912	41,033	9,545,554,667	232,556
1917	44,808	11,304,660,462	252,323
1922	43,905	12,665,300,050	288,471

stabilize itself by making the electric railway in urban centers an agency for mass transportation, with the motor bus giving supplemental service.

There is no basis for the suggestion that one often hears that the electric railway is a "dying industry." While motor bus traffic will increase, the comparative costs and convenience of the two types of conveyance are not such as to justify the prediction that the one will supersede the other.

2. *Management of the Individual Business Unit.* — Under this heading would have to be put the sum total of the devices and policies the management adopts in order to make a given expenditure bring the maximum of return in service units. The stress of circumstances has certainly furnished an incentive to all manner of economies. Criticism from within and without the industry, combined with a final break-up in the cake of custom that was threatening to encrust the industry, has brought on a new spirit among those manning these enterprises.

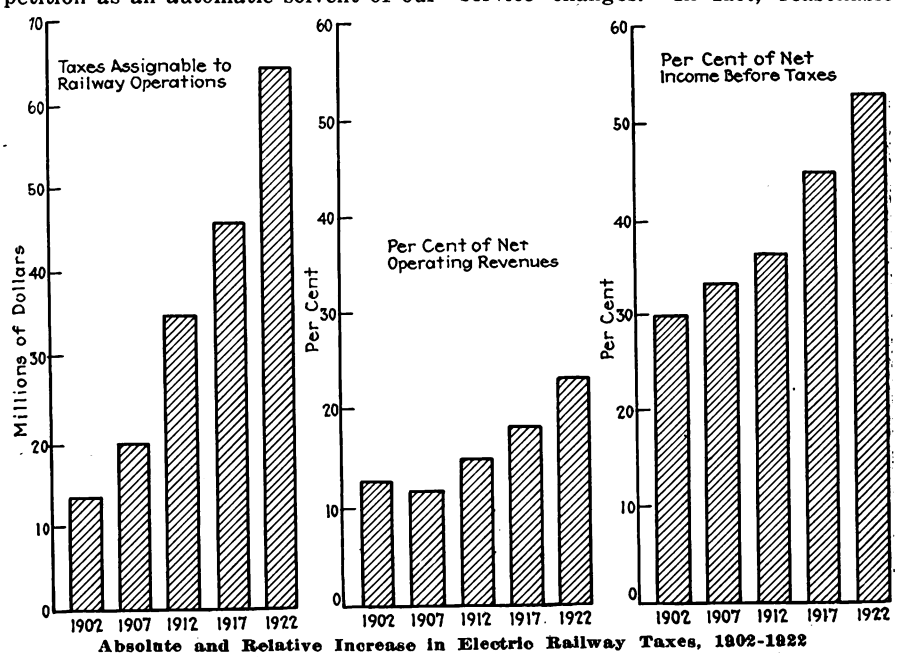
3. *Legal Requirements that Condition Income and Outgo.*—You have all been painfully aware of the fact that the industry in which you are associated is one in which prices are controlled by public authority. This has deprived you of a desirable flexibility in adjusting your price schedules to what you might otherwise have regarded as good business. You have been fortunate if you were able to bring your case to the attention of a regulating authority with the power to make necessary adjustments. In many cases you may have been face to face with inflexible rate provisions in franchise contracts entered into at a time before the recent price revolution. Other difficulties of the same general origin may have arisen because of the uncertain tenure of your franchises. The requirements of a public policy, deemed wise in the past, may have placed upon your properties the burdens of special taxes and special imposts. These legal requirements should not, in an enlightened community, be anything more than the sane premises in which the public interest in adequate service at reasonable rates finds its reconciliation with the private interest in an economic livelihood for each of the co-operating producers, as well as their joint interest in the financial health of the entire going concern. As in the case of policies of management, there is large scope here for the possibilities of working improvements in public policies of control.

4. *Conjunctural Elements Conditioning Income and Outgo.*—In economic life what we call conjuncture plays a large rôle, but it has not as yet received the scientific treatment that it deserves. Under conjuncture we understand what we may loosely designate as luck and chance. While we deal here with a group of causes over which we have little control, we may be able to soften down the effect of these causes and provide for flexible accommodation to them, thus escaping their baneful influence. The war emergency was such a conjunctural element, foreseen by no one, yet vitally affecting all. All economic activity was borne upon a crest of advancing prices which did not definitely subside until the spring of 1920, and then with disastrous effects. Minor disturbances, such as the influenza epidemic of 1918, may come in to add their share to your troubles. And in the specter of business depression and consequent unemployment you meet an old enemy whose coming is none the less uncertain, though you have met him often. Last, but not least, is the gradual conjunctural change which has been quietly shifting the entire basis of your business, namely, the perfection of automotive equipment, so that there stands at your elbow all of the time the possibility of competition from substitute service. This is a form of competition against which no certificate of convenience and necessity can or should afford protection. It is one of the risks inherent in all enterprise. Yet proper public policy and flexible management policies can do much to help even here.

Outstanding Remedies

Among the remedial conditions which past experience has suggested, two stand out above a host of others. The first concerns the conditions under which the utility is operated. If the mistakes of the past have made clear one thing, they have shown that competition among like or substitute agencies of transportation must be eliminated. We have as a people become so accustomed to look upon competition as an automatic solvent of our economic problems that we cannot readily accept the thought that monopoly operates as a beneficent principle of organization, making possible on the one hand the conservation and marshaling of productive capacity and on the other hand the governmental limitation of profits to a reasonable amount. In fact, instead of less monopoly we should introduce more monopoly, even to the point where we get complete integration of the supply of local transportation, by whatever agency performed. Strict and detailed regulation must accompany such monopolistic grants. Wherever possible the grants should be, like the character of the function performed, indefinite in duration, with public ownership and operation as a permanent possibility under conditions protecting vested property rights. The operating agreement contemplated between the city of Milwaukee and Milwaukee Electric Railway & Light Company is one that strikes out along these lines, and is worthy of close study by members of this association.

The second remedial condition relates to the instrumentalities by which prices are adjusted. There can be no flexible accommodation to causes over which management has no control, unless there is adopted the principle of what we economists call the necessary supply price. This means that we must so adjust rates and charges as to produce in a free community the service desired. Enough must be paid to purchase labor, skill, talent and capital for the type of service demanded. If extensions are desired, revenues must be sufficient to secure needed capital and other requisites in the open market. We cannot get something for nothing. Even where the adjustment of rates is avowedly based upon the necessary cost of the service, as in certain service-at-cost contracts, there must be an unflinching application of the principle as was done in Boston, and was not done in Cincinnati, in order to bring the individual plant into an economic position where it may fulfill its social function. Prices must change as the reasonable cost of rendering adequate service changes. In fact, reasonable



Absolute and Relative Increase in Electric Railway Taxes, 1902-1922

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cost under monopoly, where the service rendered is a necessity, is the only basis left for price adjustment. This result can best be obtained under flexible rate franchises or else by the method of continuous regulation by commissions.

With these remedial conditions in effect, any urban electric railway will have gone a long way to bring about that reasonable balance between income and outgo which alone can establish sound financial conditions. That there is promise of a return to good financial conditions is shown by the credit standing of public utilities in general, as well as of electric railways in particular.

Studies of the Institute for Research in Land Economics and Public Utilities in the credit of electric railways show that the price of electric railway bonds increased more proportionately from 1922 to 1923 than those of any other class of utility. This is shown in the accompanying chart.

The weighted average yield, based on offering price, of substantially all security issues by electric railways, exclusively, was 6.40 per cent for 1922. In 1920 the average weighted rate was 7.92 per cent for exclusively electric railway companies. Railway and electric company securities issued in 1920 were offered at a weighted average yield of 7.82 per cent. In 1922 the comparable figure was found to be 5.91 per cent.

Compared with the rate at which the largest cities can borrow, the credit of public utilities also has improved. In 1920 there was an average difference of about 2 per cent in yield, in 1923 the same bonds yielded less than 1.5 per cent more than the bonds (tax exempt) of our larger cities.

Within the recent past, two clouds have appeared upon the financial horizon of electric railways. The first concerns the very rapid and heavy increase in the burden of taxation, and the second is centered in the high cost of financing experienced by electric railways in the recent past with the prospect that future refunding operations will likewise increase the interest burden. While neither of these is by any means the largest element in the financial budgets of electric railways, the large public interest connected with them and their exposed position has made them the subject of a good deal of public comment. For these reasons the Institute for Research in Land Economics and Public Utilities has made them the subject of special research. While we have not as yet completed our work, certain facts are already beginning to stand out.

First, as to taxation, the accompanying chart and table based on census data show absolute and relative increase in electric railway taxes in the years 1902-22.

Comprehensive studies have been made of the burden of taxes upon electric railways in two states, New York and Wisconsin. The New York figures show the following:

RATIO TAX ACCRUALS TO NET INCOME (BEFORE DEDUCTION OF TAXES) FOR ELECTRIC RAILWAYS IN NEW YORK STATE*

	Per Cent		Per Cent
1912	31.11	1915	38.56
1913	35.55	1916	37.05
1914	36.64	1917	49.43

* Report of special joint committee on taxation and retrenchment, March, 1922, page 307.

The ratio of aggregate state and local taxes on electric railways in New York state to aggregate net income before deduction of taxes for the ten-year period 1911-20 was 56.5 per cent, as given in the report of the special joint committee on taxation and retrenchment.

The following table* shows per cent of income receipts from all sources devoted to taxes and dividends:

COMPARISON OF TAXES AND DIVIDENDS—PER CENT OF INCOME OR RECEIPTS FROM ALL SOURCES DEVOTED TO TAXES AND DIVIDENDS

	1907	1912	1917	1922
Taxes	4.6	6.0	6.3	Not available
Dividends	6.2	8.8	6.6	Not available

That is, stockholders very nearly shared half and half with the government.

But it must be clear that no conclusion can be drawn from the mere increase in taxes or even the relative increase of that as compared with other items. In the end the problem is one of equitably and scientifically distributing the burdens of government. Our constitutions generally require equalization, and our administrative commissions are making progress in this direction. But tax methods have been so variegated that it is difficult to get at the quantitative effect of the different plans. We are making such a quantitative study in Wisconsin and are getting some results which we already expected and some which we were not prepared for.

It is clear that if we wish the financial condition of electric street railways to continue to improve we cannot afford to neglect to consider the whole question of taxation, which has become so enormous a load that it is a crushing burden, unless every one bears his share. This is so large a subject that I can offer only a few suggestions. Let me state a general conclusion:

The present is a new era in economic evolution requiring an entire overhauling of our ideas of taxation and a new program with respect to the expenses and revenues of government. The magnitude of public expenditures in itself suggests that old methods are inadequate. When the expenditures of government were small and taxes were an almost negligible burden to the taxpayer rough-and-ready methods of raising revenue, while not satisfactory, did not involve intolerable burdens.

There was a time in American history, and that so recent as the latter part of the nineteenth century, when the disposition of surplus revenue constituted an outstanding problem of federal finance.

Instead we are now living in a period of heavy taxes and greatest public expenditures. Let me give the facts as succinctly as possible.

1. It has been estimated that as high as one-seventh of our income is paid out as taxes directly or indirectly[1].

2. Total per capita taxes have risen from around $23 in 1912-13 to about $80 in 1920-21[2].

3. The total ordinary receipts of the federal government have increased from about $700,000,000 in the years immediately before the war to over $5,500,000,000 in 1921.

4. Receipts of state governments have increased from a $300,000,000 level before the war to over a $500,000,000 in 1919 and probably to much higher figures in 1923[3].

An increased proportion of these tremendous'y increased revenues has been raised by direct taxation.

Statistics compiled by the Institute for Research in Land Economics and Public Utilities show that in 1910 only 3 per cent of our federal revenues was secured from the levy of direct taxes, whereas in 1920 approximately 60 per cent was secured by direct taxation.

Government Expenditures Increasing

The oldest man in this audience cannot think back to a time when he did not hear regularly in political campaigns the slogan, retrenchment and reform. Long before I was born candidates of political parties in state and nation regularly began to promise reduced public expenditures to be followed by reduced taxation, and without interruption the public expenditures have increased.

The true underlying cause of increased and increasing public expenditures is found in the development of state and nation as co-operative institutions for promoting the general welfare. More and more our wants are satisfied through public agencies, and to an ever-increasing extent there is a growing regard for the needs of the great masses of the people. The ordinary man, woman and child receive ever-increasing benefits from public agencies. Let us express this truth in these words: *The service idea of government is gaining ground day by day. It is coming to dominate all other ideas. It finds expression in public expenditures.*

*Taken from the Census Report, Electrical Industries 1917, page 64.

ABSOLUTE AND RELATIVE INCREASE IN ELECTRIC RAILWAY TAXES 1902-1922*

Year	Taxes Assignable to Railway Operations	Per Cent Increase	Per Cent of All Expenses	Per Cent of Net Operating Revenues	Per Cent of Net Income Before Taxes
1902	$13,078,899	....	5.95	12.4	30.0
1907	19,755,602	51.1	5.07	11.8	32.9
1912	35,027,965	77.3	6.68	14.9	36.1
1917	45,756,695	30.6	6.79	17.8	44.8
1922	64,788,315	41.6	6.53	22.4	53.2

* Compiled from reports of the Bureau of Census on Electric Railways.

[1]National Industrial Conference Board Report No. 55.
[2]Ibid. ($88.37 in 1922 Census Bureau, as stated in Chicago *Tribune*, Jan. 20, 1924.)
[3]In 1922 receipts of state governments were $867,468,000, an increase of 183 per cent over 1912—Census Bureau as reported in Chicago *Tribune* of Jan. 21, 1924.

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This great and ever increasing load of public expenditures requires an entire overhauling of our ideas of taxation. The burden is crushing, unless everybody puts his shoulder under the load and helps to carry it. The tendency in recent years, however, has been to concentrate the burden upon a portion of the community through direct property taxes and income taxes. Census figures show that in the case of the federal government the percentage of ordinary receipts from income and excess profit taxes increased from 3.10 in 1910 to 57.92 in 1921.

We have come to a time when, in the interest of the people, further progress must be met by indirect taxation, supplementing the direct taxes. It remains to work out in detail a system of taxation in which direct and indirect taxes will find their proper place, and in which the service idea of government will find its support in universal contributions to the burdens involved in the extension of the service that the government can render.

In a system of indirect taxes will be included certain sales taxes like the one on gasoline, which is as just and fair a tax as was ever devised. Amusements will be taxed; expenditures for tobacco and other superfluities will include contributions to the public purse—small in each instance, but aggregating large amounts. These taxes paid day by day in small sums will be an easy burden to bear. They will enter into the general expenses of living, and adjustments will be so made that no one will carry a too onerous burden. There will be no discontent, unless it is artificially aroused.

How Electric Railways Can Get Relief

In conclusion, just a few words more about remedies. Electric railways must be relieved from the competition of tax-exempt capital, and relieved further from the competition of other agencies of transportation publicly "subsidized" and not bearing comparable taxes, and, third, must be freed from competition of unregulated agencies of transportation. The one measure will make the future of electric railways more secure and certain, the second will result in a more equitable distribution of the tax burden and the third will make it possible for this industry to obtain capital at more reasonable rates.

But most fundamental of all is education for good will and knowledge, both within and without the electric railways. Those in the industry deserve praise for the masterly way many of the leaders are attacking these problems. They must continue what they have begun. Most difficult is their task, handling as they do the actual physical bodies of their patrons, often under most trying circumstances. They must be more than just and fair. They must put themselves always in the other fellow's place and must have, as an ideal of courtesy and consideration, the best manners of the best department store, engaged in fierce competition. It is the little things that count—manners more than money in getting rid of old ill will and building up new good will.

*Holding Companies See Progress in the Industry**

By B. C. COBB
Vice-President Hodenpyl, Hardy & Company, Inc., New York

YOU probably have already heard or have read that the electric railways bought more new equipment in 1923 than in any year since 1913; that approximately $282,000,000 was expended last year in the purchase of materials for maintenance, extensions and improvements. Of this amount about 64 per cent was used for new equipment, extensions and improvements. You have also probably heard that the estimates for expenditures of similar character in 1924 amount to approximately $262,000,000. The expenditures thus made and proposed are one reflection of the improvement that has been going on in the business in which we and the public are so vitally interested.

The 1923 annual reports of all companies are not available at this time, but preliminary figures indicate that the electric railway industry in 1923 practically succeeded in holding the gain in net earnings made in 1922—the best year it has had since 1916. Preliminary figures also indicate that nearly 16,000,000,000 passengers were carried, thereby smashing the previous high record of 15,337,000,000 made in 1922.

I suppose there are some who think net earnings in 1923 should have shown a gain over 1922 because of the increase in the number of passengers carried. While this would have been nice, and we all would have been pleased, still I am not in accord with the thought, nor chagrined that we did not come through, and I will tell you why.

At the beginning of 1923 there were prospects of another period of inflation. The trend of commodity prices was upward, feverish speculation in general building operations was going on, and demands for higher wages were being made on all sides. For a time it looked as if the old vicious cycle of advancing prices and advancing wages would soon again be in full swing. Fortunately this movement was partially checked before it got far out of bounds. Nevertheless, many electric railway companies found it necessary to make wage advances and in many ways increase their other expenses. Obviously these increases had an unfavorable effect upon operating costs and ate into the net earnings which might otherwise have been expected. Despite these additional handicaps the net earnings of the industry as a whole, as previously stated, were practically equal to the earnings shown in 1922. I consider this an accomplishment of which we may well be proud.

Another thing—and it is important enough to repeat—the electric railways not only carried more passengers in 1923 than in 1922 but they carried more passengers in 1923 than in any year since the industry was born.

THE ELECTRIC RAILWAYS are buying more materials for maintenance, extensions and improvements than in recent years. Preliminary figures indicate that more passengers were carried in 1923 than ever before and that riders who forsook the street car for other vehicles are now coming back. Attention was called to some recent successful electric railway financing.

It is significant that this record was made in the year that automobile production reached its highest point. It is doubly significant, for the 1923 record of the electric railways proves conclusively the economic need of the service rendered—the cheapest and most dependable form of public transportation that has yet been devised.

"High-sounding words," some of you may say, "but the amount of net earnings left after all charges are made is what interests us." Quite right, it interests me too, and I have spent many hard days and some sleepless nights in contemplating ways and means for increasing net earnings to a point where they would show a fair return on the value of the property used in serving the public. That is our goal, and we are going to reach it notwithstanding that at times it seems as illusionary and as far off as the mythical pot of gold.

When my mind goes back ten years and I picture the situation at that time, I recall that electric railways were in high favor with the public and their securities were in demand by investors. Why? Because the electric railways then had what was considered the exclusive right to carry on an indispensable form of public service, the charge for which was fixed for a long period of time. This was considered an advantage, for while operating costs might rise slightly, it was thought the growth of population would increase traffic to such an extent as to offset any serious inroads upon net earnings. Again, fixing the rate for a long-time period was supposed to protect the companies. It forestalled political interference and prevented enthusiastic rate regulators from making trouble. The situation was simplicity itself, and the operators as well as the investors felt little concern about the future.

*Abstract of paper presented before Mid-year Meeting of the American Electric Railway Association, St. Louis, March 4, 1924.

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Then came the war, inflated costs, and other difficulties. Don't shrug your shoulders—I am not going to drag you through that "chamber of horrors," but if any one had told us ten years ago what the electric railways were going to be up against I venture to say there are mighty few who would have thought the industry could survive. The fact that it has not only survived but has gone forward after all the hammering it has received shows the inherent strength of and the necessity for the business.

Every serious illness, unless death intervenes, is followed by convalescence. Then, if one's constitution is sound, comes full recovery. The more serious the illness the slower the recovery of the patient. The important consideration, however, at all times is whether progress is being made. So it is with the electric railway industry. It passed through its serious illness and recovery set in after 1918.

What one really wants to know about electric railway operation is whether the trend is in the right direction—I mean, is the trend toward increasing traffic and increasing net earnings; and if so, is this trend going to be permanent? This sounds so commonplace I suppose you think I am going solemnly to tell you next that "water is wet." From the variety of opinions I hear and read I sometimes wonder whether those people who bemoan the future of electric railways would not also try to prove that there is no moisture in water if the fact were not so self-evident.

I do not claim any gift of prophetic vision, nor do I pose as a soothsayer. Nevertheless, and notwithstanding numerous perplexing problems which are pressing for solution, I ask you in the name of common sense—is there any likelihood during the next ten years of a repetition of all the "hell" the industry has endured during the past ten years?

"Automobile," you say. All right! I grant that it has diverted a lot of passenger business and that it has financially crippled some electric railway companies, also that here and there it may do so again. It is my guess, however, that the worst effects from this form of competition have been seen.

Automobiles are going to be manufactured this year and the next and for many years to come. There seems to be no saturation point in so far as ownership of cars is concerned, but as I see it there is fast developing a saturation point of another character, viz., "road saturation point." Traffic congestion, with its ensuing delays, inconveniences, and increasing number of fatal accidents, has begun to restrict the heretofore indiscriminate use of passenger automobiles. As a result there is a growing tendency on the part of automobilists again to patronize the electric railways, especially that large class of car owners whose occupations do not make it necessary for them to use the motor car in the transaction of their daily business. It takes time for the habits of the public to change, but the fact remains, however, and it is common knowledge, that a change in the riding habit is now going on. People who formerly rode the electric railway and later on forsook it are now coming back.

The effect of this change on street car traffic is more evident in the larger cities, but the movement is spreading and is also becoming noticeable in the cities with populations of 50,000 and up.

The year 1923 was the biggest the automotive industry has ever seen. Approximately 3,650,000 passenger cars were manufactured, and there were more passenger car registrations than in any previous year. Coincidentally with this record output and registration the electric railways carried more passengers in 1923 than in any other year in the history of the industry. And all this happened without any considerable track and road extension. Here is what the record of automobile registration and passengers carried by electric railways shows since 1917:

Year	Passenger Automobile Registration	Per Cent Increase Over Previous Year	Passengers Carried by Electric Railways	Per Cent Increase Over Previous Year
1917	5,101,000	....	14,506,000,000	....
1918	6,064,000	18.8	14,243,000,000	—1.1
1919	7,539,000	24.3	14,915,000,000	4.7
1920	9,118,000	20.9	15,540,000,000	4.2
1921	9,345,000	2.5	14,574,000,000	—6.2
1922	10,863,400	16.2	15,337,000,000	5.2
1923	12,880,000	18.5	15,989,000,000	4.2

Is it not remarkable that in this six-year period passengers carried by electric railways have continued to increase in the face of an increase in passenger automobile registration of approximately 7,780,000?

"What about motor buses replacing the electric railways?" is another popular question. The passenger traffic figures I have just cited is one answer. Buses never can handle the volume of traffic which the electric railways are moving daily. Another answer is that in those cities where the public has tried both systems it has decided in favor of the electric railway. Is there any reason to suppose the experience of the citizens of Des Moines, Toledo, Saginaw, Bridgeport, and other cities, is not representative of the public feeling elsewhere? Akron has more recently tried and reached the same answer.

We all know that the motor bus supplies a very definite need. Be that as it may, it cannot supplant the service rendered by the electric railways. Experience has demonstrated that the bus is of more value to the public in supplementing electric railway service than in superseding it. The public is principally interested in cheap, dependable transportation, and it is realizing more and more that this can be furnished best by the electric railway. It is also realizing more and more that the unregulated operation of buses has an unfavorable effect upon local transportation service. Consequently there is more of a tendency on the part of public authorities in most sections of the country to give the electric railway companies a chance.

An outstanding feature in this connection is the experience of the street railway in Des Moines, Iowa, where the public has identified itself with the company's future by purchasing preferred stock on the "customer-ownership" plan.

Congestion of city streets is another problem, and the regulation of traffic to relieve this congestion is helping the railways to speed up their car movements and incidentally pick up more passengers. Parking of cars along the curb on city streets will soon be a thing of the past. It cannot go on unless the streets are widened, and this in many instances is impossible, at least not without great expense to and burden on the taxpayer. Years ago when we had cobblestone gutters and plank sidewalks the farmer was accustomed, on his weekly trips to town, to hitch his horses to iron rings placed in the wooden sidewalks along the curb for that purpose. As the cities grew and the march of progress demanded better pavements and better sidewalks, so passed the hitching rings and the parking of farmers' wagons. Thus it will be with automobiles if we are to keep our city streets open for the free and easy movement of traffic.

Relative Values of Street Occupancy

Much has been said about the ability of automobiles and motor buses properly to handle passenger traffic. Not yet, however, have I seen any practical demonstration or figures to prove these statements. In Baltimore, as perhaps some of you know, a recent count of downtown traffic conditions showed that five times as many automobiles carried less than one-fifth as many passengers as street cars; that 4,130 parked vehicles not only took up all the available space, retarding the use of other automobiles while the owners of the parked cars were transacting business, but in addition the parked automobiles lessened the width of the street about half and practically choked up all the main arteries in and out of the city.

In Grand Rapids, Mich., a recent check of the same character during the rush hour showed that in a certain period 119 street cars and 1,130 automobiles passed a given point. In other words, 9.53 per cent of the passing traffic was composed of street cars and 90.47 per cent of automobiles. The passengers carried by the street cars numbered 3,647 and the passengers carried by the automobiles 2,094, or 63½ per cent by street cars and 36½ per cent by automobiles. The space taken up in the street by the 119 cars figured 4,760 lin.ft. and by the 1,130 automobiles 15,820 ft. The street cars occupied 23 per cent of the space, the automobiles three and one-half times as much, or 77 per cent of the space. In other words, the automobiles took up three and one-half times as much space on the street and carried only a little more than one-half as many people. Figured in another way, the automobiles took seven times as much street space per passenger as did the street cars. And yet some people say that automobiles and auto buses alone without the street cars can properly take care of the traffic in large cities.

I hold no brief against the motor bus. On the contrary, I am strong for it in its proper place and have long been an advocate of its use in conjunction with

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the railway. Therefore, do not imagine that I am trying to prove with the few figures given that it has no place on city streets. I think it has, but not as a substitute for electric cars. The Grand Rapids figures are not by any means conclusive and the check included not only buses but all sorts and sizes of private automobiles. They are only given to show that the street car still occupies a prominent place in our daily life and is a necessity, not a luxury, nor a thing of the past.

If all of the 1,130 Grand Rapids automobiles had been full sized buses, they would have occupied 31,640 ft. of street space, and if fully loaded with sitters and standees they would have carried only approximately 45,000 people; whereas to carry the same number of passengers by the railway only 452 cars would have been required and only 18,080 ft. of street occupied.

The various factors mentioned are some of the reasons why the outlook for the industry seems more encouraging to me now than it has for several years. I do not mean to say that every individual company's troubles are over. Such is not the case, especially in those places where the local company has not received proper treatment in the matter of fares and relief from motor bus and jitney competition. Short-sightedness on the part of local authorities frequently is the reason for such conditions.

Outlook for Future Good

The improvement that has taken place in the industry since 1918 augurs well for the future. True, this improvement has not yet in many instances reached the point where the balance after operating expenses, taxes and a reasonable allowance for depreciation shows a fair return on the property investment. Nevertheless the net earnings trend is in the right direction, and the investing public has begun to take notice.

One year ago the average investor declined to even look at traction bonds. Now he is not only willing to look but willing to buy. His former fears about the economic usefulness of electric railway transportation are diminishing. Of course, the investor must continue to discriminate; he must pick and choose his traction bonds and securities in just the same way he picks and chooses when buying other classes of securities. This however, is not the important point I am trying to get across. What I want to get into your minds is that electric railway securities are now beginning to attract attention and many buyers, heretofore not receptive, are looking them up. Proof of this is shown by some of the electric railway financing done during the past year:

Market Street Railway of San Francisco.
United Railways & Electric Company of Baltimore.
Boston Elevated Railway.
Philadelphia Rapid Transit.
United Railways of St. Louis.

They have all been successful in selling their bonds and short-term notes on a basis of from 6.25 per cent to 7 per cent in a highly competitive market.

The success of these companies undoubtedly will encourage others to enter the market, and as the public becomes acquainted with the improved financial condition of electric railways the demand for their securities will increase. Is it logical that a railway bond issued by a road in a growing and prosperous community, one that earns more than two and one-half times its interest charges, should go begging? I say "no"; and when the investing public gets over its scare, it will not.

It may be necessary to give some companies a dose of physic. Such treatment has been administered to a few already and with good effect. I mean by this it may be necessary in some instances to make a new stack-up of the capital structure in order to save the company and its service for the people. I know whereof I speak, for frankly I have already sat in on one or two parties of this kind. Happily, the patients have lived and are now rendering good service.

I do not advocate stringent measures of this kind unless it becomes imperative to adopt them. If they are adopted it is well to keep down the bond issue; it always is a burden and sometimes a severe taskmaster. The amount of stock issued does not so much matter, for all we want and all we are entitled to is a fair return on a fair value of the property, and whether this return is divided over a larger or a smaller amount of stock makes little difference.

Right now, and to the country's detriment, the investment in tax-exempt securities amounts to more than $12,000,000,000. If Secretary Mellon's tax revision plan goes through there undoubtedly will be a large amount of capital released for investment in other classes of securities. This will be a good thing and of benefit to all.

The experienced investor who buys bonds in lots of $10,000 and over is going again to become a factor in the market. This type of buyer usually has no prejudices or sentiment about securities. Values are what interest him. He measures these values by the degree of safety and the return obtainable. Opportunities of this sort are to be found at present in bonds of those electric railway companies which during the past five years have earned their interest charges by an adequate margin. The ability to earn under the very difficult operating conditions which have prevailed is a real test of earning power, and this fact is now recognized more than at any other time in several years.

With a credit basis again established electric railway companies can more readily finance necessary extensions and improvements. This basis I think is fast becoming established. It is necessary if the companies are going to grow and prosper and properly serve the communities in which they operate. No community can grow and prosper that starves its utilities, and that is why I say in growing and prosperous communities the electric railways and other utilities will flourish and grow strong.

I have not stuck strictly to the text assigned me and I fear I have rambled far afield. But just the same it has been a privilege to be allowed to express my views on electric railways, and in conclusion I want to say that I still have faith in the future of the industry because I still have faith in the ultimate fairness of the American people and their good sense on all important matters which concern their welfare.

COMPETITION among like or substitute agencies of transportation must be eliminated. We have as a people become so accustomed to look upon competition as an automatic solvent of our economic problems that we cannot readily accept the thought that monopoly operates as a beneficent principle. . . . In fact, instead of less monopoly we should introduce more monopoly, even to the point where we get complete integration of the supply of local transportation, by whatever agency performed.—R. T. ELY.

(*See page* 312)

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Association News & Discussions

Bus Operation and Accounting*

By L. J. WERTZLER
Assistant Auditor of Passenger Accounts, Chicago, North Shore & Milwaukee Railroad

A REVIEW of present conditions indicates that bus service is to be a permanent part of the transportation service given by many electric railway companies, partly as a protection to their present business and partly for the purpose of securing new business. There is no apparent agency that can operate these bus lines in a more efficient and economical manner. The organization is already established, with departments in charge of executives familiar with the problems of passenger transportation. The traffic department exists for the solicitation of business, the transportation department for the operation of the buses and station facilities, the mechanical department for the maintenance of the buses, the maintenance of way department to assist if necessary in keeping the roads open in bad weather, the general offices for the accounting and administration and the storehouse for storing of repair parts. I do not mean that the various departments can shoulder this additional expense without feeling it, but obviously it can be done much more economically and efficiently by a railway than if an entirely new organization has to be established.

The same precautions must be exercised in providing clean, comfortable riding buses in charge of competent uniformed operators as in operating railway cars. Due regard must be given to schedules and station facilities to meet the requirements of patrons. Operators should be made to understand their responsibility of observing road rules, stopping at railway crossings and giving due respect to drivers of pleasure machines.

Establishment of Rates

Some of the state commissions require the filing of tariffs covering bus operation in the same manner as railroads, some require a schedule showing territory served only and in other states the commission has no authority regarding rates or schedules. It is to the advantage of the railroads for the state commission to have authority regarding the operation of buses and the filing of tariffs. The Interstate Commerce Commission apparently has no authority over the bus operations, as it does not require the filing of rates and its authority is not required for operating buses.

The North Shore Line has established some through rates covering combination of rail and bus transportation, and these rates are considerably lower than the sum of the locals. The revenue must be apportioned, however, to give the railroad the full tariff rate for its proportion of the haul. It was necessary to make these rates in order to meet competition to a certain large and well patronized summer resort. We also find it necessary in certain instances to provide transfer facilities from railroad to bus line and vice versa.

When our bus lines were first operated the rates were on the same basis per mile as on the railroad, but we soon found that this was not sufficient to meet operating costs. The rates were then revised so that the bus rates on one way and commutation tickets are 20 per cent higher than our rail rates, with the exception of our bus line between Waukegan and Kenosha, which serves the same towns and cities as the railroad, though operating 1 mile to the east. Here, the tickets permit passengers to use either bus or rail. Our minimum adult ticket and cash fare is 10 cents and passengers who fail to purchase tickets before boarding buses are required to pay the cash fare rate, which is 10 per cent greater than the ticket rate. We have ticket offices and waiting rooms at main towns and cities. Most of these are located in stores or refreshment parlors and are paid for on a commission basis.

On lines where the bus fare is higher than the rail fare a distinctive color of ticket is used for convenience of bus operators in detecting whether the passenger has paid the correct rate and is entitled to ride on the bus.

When we started operating buses the operator lifted and canceled all tickets when passengers boarded the bus, and he had no means of detecting overriding. Now, operators cancel and return the tickets to the passengers after noting the point where the passengers boarded the bus. The operator then lifts the ticket when passenger leaves the bus, and if there has been overriding, as shown by the destination on the ticket, an additional charge is made.

For cash fare collections we issue a receipt by means of the McDonald ticket box, the receipt showing whether half fare or adult fare is charged and the points between which passenger intends to ride. This receipt is surrendered by the passenger when leaving the bus and both portions are turned in to auditor for comparison.

A trip report showing date, run number, leaving time and starting point, arriving time, destination, mileage, number of tickets and cash fares for each individual trip and operator's name, together with time on duty, is turned in daily with both portions of the cash fare receipts. The cash receipts are checked to verify the rates collected and to see that all receipts are accounted for. The total of the cash fare receipts is compared with the total shown on the trip report of the operator. The ticket collections for each trip are turned in in separate envelopes properly marked. These tickets are counted and valued, and the total valuation is entered on the face of the envelope. A "recap" is made daily of all bus lines, with earnings distributed by divisions, and the cash remitted is checked against the amount due. Cash and ticket averages and shortages are also shown on the recap, the operator being charged for all cash shortages.

Accounting Practice

An individual account is kept for each operator. The bus operator in making up his trip report simultaneously by the use of carbon paper makes up a mileage stub, which is turned in to the transportation department. The accounting department makes use of the operator's recap sheet and the transportation department's daily mileage report in compiling a daily earnings statement, which shows the number of passengers carried, mileage operated, total revenue, revenue per car-mile and revenue per passenger, as compared with same information of the corresponding day of the previous year, with weather conditions also noted. A copy of this earnings statement is sent to various department heads and officials. At the end of each month a condensed statement showing total cash remitted, cash and ticket revenue and operators' unadjusted shortages is rendered the general accounting department of the controlling ledger. The total cash is balanced daily and monthly with the amount credited to bus operator's remittances by the treasurer.

The accounting for the motor bus business is carried through practically the same procedure as for the railway. In fact, the Interstate Commerce Commission's classification of accounts for electric railways was used as a basis for making the bus account classification. Only such changes were made as were necessary to adapt it to bus operation. The bus accounts classification that we use is the same as that adopted by the American Electric Railway Accountants' Association at its 1923 convention.

The investment account of the buses is kept in the railway investment account as an auxiliary investment. All other accounts are separate from the railway accounts.

An income and expense statement is compiled in the same manner as for the railway, the gross figures being included in the general income and expense statement through the auxiliary

*Abstract of paper presented at the meeting of the Central Electric Railway Accountants' Association, Fort Wayne, Ind., Feb. 29, 1924.

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accounts. The taxes of the bus operation are chargeable to railway taxes, through the provision of the Interstate Commerce Commission classification, under the heading of "auxiliary operations."

A tire reserve should be provided based on mileage operated unless the operating company has a large fleet of buses so that the renewals issued from the storekeeper keeps an average charge to expense. Other reserves, such as casualty, property damage, fire insurance and depreciation, should be provided, but the basis depends upon circumstances, which must be decided by each individual company.

We render both quarterly and annual reports of income and expense to the state commissions. These reports are practically the same in form as those rendered for railway operation.

The North Shore Line is now operating twenty-eight buses and no doubt will purchase additional equipment in the near future to meet the growing demands. Some of these are parlor buses, used for long trips and special parties. They are equipped with deep-cushioned movable chairs and compare favorably with the parlor car equipment on the railroads.

We have constant demands from lodges, societies, schools, etc., for chartered buses, for which a charge is made on a mileage basis, with an additional charge for waiting time.

Our traffic department is completing arrangements for tours covering periods from four to seven days, with rates which will include hotel accommodations and side trips, such as boat excursions at the various summer resorts, etc. Arrangements have also been made for reservations for these tours through the various tour agencies throughout the country.

It has not been my intention in preparing this paper to make it appear that the bus business is all velvet. We have new problems to solve and new conditions to meet when the motor power is gasoline instead of electricity and the right-of-way is the public highway instead of a smooth roadbed and steel rails.

Western Engineers Report on Chicago Transit Problem

ACCORDING to the report of the committee on local passenger transportation of the Western Society of Engineers, approved by the board of direction on Feb. 19, 1924, the particular development which seems likely to give the greatest relief is the co-ordination of the surface and elevated railways. This should be coupled with the extension of tracks and other facilities to serve the ever-growing traffic in all parts of the city. Various suggestions for the solution of Chicago's transit problem were given in the issues of ELECTRIC RAILWAY JOURNAL for Feb. 16 and 23. The report of the committee now given summarizes the conclusions reached as the result of studying the various proposals.

An important consideration is that the facilities of the transit lines should offer the least interference with other traffic and promote the comfort and convenience of the largest number. The following principles are recommended as the basis for the solution of the present problem:

1. Construct a limited system of subways and expand the existing elevated and surface railways, including bus-line feeders where desirable, to form a comprehensive and unified system of transportation.

2. Consolidate and co-ordinate all surface and elevated lines, so as to insure unified operation.

3. Establish on the unified system within the limits of the city, a single primary fare, based on cost of service, with free or paid transfer between rapid transit and surface lines, as the economics of operation determine to be necessary.

4. Limit the rate of expansion of the unified system to that which shall be reasonably justified by the demands of traffic.

5. Route through traffic so as to avoid congested centers, so far as feasible.

6. In view of the fact that financial losses, interference and other difficulties are driving private capital from the local transportation field, it is believed that unless legal and financial conditions can be changed so as to again attract private capital, the credit of the city must be used to acquire the present surface and elevated systems, as well as for the extensions required.

7. If the unified system is financed by the city, operation should be by a private corporation under lease, supervised by a board of commissioners. These commissioners should have long tenure of office and should be competent persons selected from the financial, engineering and commercial fields.

The following principles are believed to be fundamental in determining the type of construction to be used for rapid transit:

1. The wide extent of territory to be served, the low density of population and the limitations imposed by the cost render the so-called comprehensive system of subways impracticable.

2. A modern elevated type should be the standard construction for the city, owing to its lower cost. (Open-cut construction may be substituted for elevated structure where applicable.)

3. The proper function of subways in Chicago will be to accommodate elevated trains and surface cars in areas where space on or above the surface is inadequate to accommodate the needed transportation.

In order to extend the area occupied by the downtown district, the following principles are recommended:

1. Improve the conditions south of Loop district as follows: (a) Straighten the Chicago River from Polk Street to Eighteenth Street. (b) Open through north and south streets between State Street and the relocated river. (c) Rearrange the steam railroad facilities south of the Loop district to permit the opening of streets as described in (b).

2. Provide additional transportation facilities throughout an enlarged area surrounding the present loop.

3. Reduce the allowable height of buildings, in order to decrease the maximum density of occupation.

PRIVATE AUTOMOBILES, CABS AND BUSES

These facilities have their place in the development of the city and the solution of its transportation problem.

The motor buses are valuable as extensions of surface or rapid transit lines, in districts where the rate of fare is not an essential consideration and on streets where fixed tracks are objectionable.

Among the many street improvements which have been suggested to facilitate the handling of all classes of traffic, the following are recommended:

1. Open up and widen important through streets.

2. Remove the produce market from South Water Street to a less congested location.

3. Separate street and railroad grades where traffic requires.

4. Complete paving through the outskirts of the city of the arterial streets necessary to connect with state and county highways.

The following improvements in use of street space and in handling of street traffic are recommended:

1. Establish loading zones for street cars in congested districts where feasible.

2. Prohibit parking in streets and alleys of the downtown district between the hours of 7 a.m. and 6:30 p.m.

3. Limit the height of the crown of street paving in order to facilitate the full use of streets.

4. Widen pavement at loading points of buses, when possible, so as to permit free passage of other vehicles.

5. Develop and extend a co-ordinated through-street system and install adequate signs throughout.

6. Install additional automatic and uniform signal lights at congested intersections.

Among the many suggestions which have been made, the following are believed to have sufficient merit to justify a full investigation, but are not recommended without such investigation:

1. Use of steam railway right-of-way and tracks in connection with the rapid transit system.

2. Provision for additional parking space in the vincinity of the Loop district.

3. Reduction of terminal loops and switchbacks of surface line cars in the downtown district.

4. The policy of fixed instead of open bridges over the Chicago River, with provision for barge transfer and terminals.

5. Use of sidewalk subways, elevated sidewalks or arcades in the Loop.

6. Use of special assessment policy to meet cost of construction of transportation facilities in excess of that which would be supported by a reasonable rate of fare.

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The News of the Industry

Loop Favored

Engineers Vote for Completion of Loop in Cincinnati—Representatives Will Visit Other Cities

Cincinnati, Ohio, is overwhelmingly in favor of the completion of the entire loop of the proposed rapid transit system in Cincinnati, even though it would involve an issue of $6,000,000 of additional bonds, according to the consensus in the first answers to the questionnaire sent out by the Engineers' Club of Cincinnati. It was explained in the questionnaire that the $6,000,000 already authorized for the project would complete it from Canal and Walnut Streets to Oakley. In their answers the engineers expressed themselves almost unqualifiedly in favor of the completion of the loop even at added cost. The votes against the further issue of bonds were registered because it was believed that the system as far as Oakley should first be tried out.

Less than ten of those who answered the questionnaire voted against the project as it has been planned. Some of the engineers qualified their answers and some failed to vote either way, saying that they did not understand the idea as at present projected. The engineers were about evenly divided in their opinions as to whether the system should be operated by the Cincinnati Street Railway or by a separate utility organization, but there was a decided majority against the bond issue of $2,500,000 for equipment for municipal operation of the lines. Although the majority of those whose answers were announced favored combined passenger and freight service over the system, there was almost an equal number of the engineers who would restrict the use of the system to the transportation of passengers only.

The questionnaire was sent to more than 1,500 of the foremost engineers of the Cincinnati district by the public relations committee of the Engineers' Club, to obtain the opinion among the engineers as to the future possibilities of the rapid transit system from an engineering point of view. Approximately 150 answers were represented in the announcement made at a meeting of the Engineers' Club, March 1, as part of the first returns.

As far as the transit situation is concerned affecting the local railways, there have been no further public moves recently with respect to either company. In order better to understand that problem, however, investigation of electric railway conditions in eight cities will be made by a special committee representing the Cincinnati, Ohio, city administration before consideration is taken up of a joint report of the Cincinnati Street Railway and the Cincinnati Traction Company, submitted to the street railroad committee of Council on Feb. 21. The report contained the terms upon which the two companies propose to adjust the traction situation in Cincinnati. The investigation trip started March 2. The committee will visit Boston, Toledo, Cleveland, Rochester, New York, Baltimore, Philadelphia, Washington and Pittsburgh. The first city to be visited is Toledo.

The City Council has appropriated $2,500 for the trip. Within three days after the return of the committee conferences will begin with the officers and attorneys of the Cincinnati Street Railway, which is to succeed the Cincinnati Traction Company as the operating company.

Bus and Home Rule Bills Introduced in New York

Minority Leader Bloch has introduced in the New York Assembly a bill adding a new article to the general city law relating to municipal bus and trackless trolley lines. The measure reflects the administration ideas and legalizes the existing bus lines in Greater New York and permits all cities to acquire, own and operate bus or trackless trolley lines.

A 5-cent fare for passengers is prescribed. Deficits are to be made up by appropriation of public moneys or by the issuance of further revenue bonds. Property may be taken over by purchase or condemnation, and the city may operate or maintain a bus or trackless trolley parallel to any other trolley line provided if such new line parallels on the same street an existing trolley for more than 5,000 ft. a certificate of convenience and necessity shall be obtained for its operation.

In short, by the terms of the measure blanket authority is conferred on the governing legislative body of all cities to go into the business of transporting passengers at 5-cent fare, the only restriction imposed being that in case of a continued deficit in operating the city may discontinue operations, but the measure would obligate the city to pay all outstanding obligations, and for any bonds of the trackless trolley or bus project that the city itself owned it would have no preference in payment over other creditors.

Mr. Bloch has also introduced in the Assembly a measure known as the city home rule transportation law, granting to cities of the state power to construct, acquire, own, operate and regulate transportation facilities, and transferring certain powers, duties and jurisdiction of the public service commission and of the transit commission. This measure is virtually the Walker-Donohue bill of last year adapted to the home rule amendment to the Constitution approved by the people in November.

Co-operation Established

Oakland Apparently Realizes More Will Be Gained by Working Together Than Working Separately

Oakland's one-man car war has reached the armistice stage. The safety cars are still running, but threats against them have ceased. In fact, the city authorities have voted to co-operate with the Key System Transit Company in a traffic survey. This offer has been accepted by the company and it seems likely that peace will follow.

Matters came to a climax on Feb. 14 when the application of the Key company for a permit to run a bus line in East Oakland came up for a vote in the Oakland City Council. Mayor Davie and Commissioner Moorehead favored granting the operating rights to the Peerless Stage Company in order to "end this traction monopoly," but Commissioners Carter, Baccus and Colbourn would not accede to this. Instead, they offered a plan for a traffic survey which finally was accepted by the Mayor and Mr. Moorehead.

It so happened, however, that the traction company had already made plans for a similar survey. Realizing that the rapidly growing needs of the city demanded greater knowledge of conditions on its part the company had engaged the services of Richard Sachse to study the situation and report upon it. So, at a later meeting, Feb. 18, a resolution was adopted by the Council soliciting co-operation in a traffic survey with the Key company.

This resolution pointed out that two surveys, conducted independently of each other, would cause duplication of work, delay in completion and inharmonious recommendations. Six questions were then put to C. O. G. Miller, head of the Key system. The high points were:

What is to be the general scope of the survey?

Will the company agree to carry out the recommendations of Engineer Sachse, so far as practicable?

Will the company give the city's experts access to its books, records and data?

Will the company welcome co-operation with the city?

Must all improvements await completion of the survey or will the company, from time to time, make improvements which may be recommended?

On Feb. 23 Mr. Miller answered these questions categorically. Most assuredly, he asserted, the Key company will permit its expert, Mr. Sachse, to co-operate with the city's experts in an exhaustive survey. Most assuredly the company will give access to its books. He was also willing to confer as to the scope of the survey and he also agreed to abide by the recommendations of such joint survey. In regard to the installation of improvements, Mr. Miller said he believed that improvements agreed

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upon should be made as rapidly as possible and need not await the completion of the entire survey.

In the meantime, the Rosalie, erstwhile municipal bus run by the city for four months as an experiment, has been returned to the manufacturer, the city auditor having refused to release funds to pay for her, due to a technicality in the law.

Civic clubs were canvassed, citizens were harangued and petitions were circulated in the interest of city bus operation, but Oaklanders refused to wax enthusiastic over the proposition.

And so the matter died.

As for the Peerless Stage Company, its application for a permit to run a bus line between Alameda and Oakland at a 5-cent fare as compared with the 6-cent fare charged by the Key company has been referred by the Alameda City Council to the State Railroad Commission. It is now trying to induce that body to grant this permission. Decision has been reserved.

Application Made for Right to Build Philadelphia Subways

The city of Philadelphia on Feb. 29 took the first actual step toward construction of the Broad Street and Chestnut Street subway. That day application was made to the Public Service Commission for the necessary certificate of convenience to start the work outlined in step No. 1 of the high-speed transit program. There were no objections to the request and it will be granted by the commission.

During the hearing before the commission, Ralph T. Senter, vice-president of the Philadelphia Rapid Transit, explained that the company favors underground passageways for pedestrians between stations in the projected Chestnut Street subway. This subway, he said, should be completed in about three years after the start of actual work.

Board of Estimate Sued in Staten Island Case

Mayor Hylan, Comptroller Craig, Murray Hulbert, President of the Board of Aldermen, and the five Borough Presidents, all members of the Board of Estimate, were made defendants in a suit for $75,000 brought in the Richmond County Supreme Court recently by Mrs. Eva Chrampanis of Graniteville, S. I., whose husband was run over and killed by a city-owned trackless trolley car on Staten Island on March 22, 1922.

The case was opened some time ago when an attorney of St. George filed a complaint naming the city of New York as defendant. Assistant Corporation Counsel Draper claimed at that time that the city was operating the line without right and that it was not responsible for accidents. This claim of Mr. Draper came as a surprise to counsel for the complainant, and it was immediately decided to begin proceedings against the members of the Board of Estimate instead of against the city of New York.

The matter was referred to in the ELECTRIC RAILWAY JOURNAL issue of Feb. 9.

W. C. White Urges Co-operation of All Transportation Agencies

"Steam and electric railroads should be authorized by legislation to own and operate their own motor vehicles in selling transportation to the public. Through their experience in marketing transportation they are the logical operators of buses and motor trucks, supplementing their present service."

That is the keynote of an article, "The Bus and Truck in Transportation," contributed to the *Nation's Business* by Walter C. White, president of the White company.

Mr. White says that it seems to him there must be something wrong in the mental attitude of a trained transportation engineer who says he does not expect to be able to make buses pay.

Mr. White believes buses and motor trucks will play a major rôle as indispensable units in one sympathetic system embodying transportation by rail, water and motorized highways. He says co-operation and co-ordination, instead of competition, will solve problems of transportation in the relationship between buses and trucks on one hand and steam railroads and electric railways on the other.

In expressing this view in his magazine article, Mr. White quotes Elisha Lee, vice-president of the Pennsylvania Railroad System. He is also in agreement with opinions similarly expressed by Britton I. Budd, president of the American Electric Railway Association, and by such outstanding figures in the recent transportation conference as Herbert Hoover, Secretary of Commerce, and Julius Barnes, president of the United States Chamber of Commerce. Mr. White writes:

> The bus and truck would not exist today in anything like the quantity they do unless there was a public demand for them. The bus is not a competitor of the electric railway. If all the buses in operation today were removed it would make very little difference in the number of people carried by the electric railway. The touring car—individual transportation which everybody likes—is the active competitor of the railways. There are several instances of high-class bus service that pay well without showing any influence on street car revenues. The right kind of service is getting people to ride in buses instead of in their own automobiles, and those same people would drive their own cars rather than take the street car.
>
> It is important that our steam and electric railroads should enter the field of motor transportation now, and direct its development in order the better to offer the kind of service the public demands and is willing to pay for.

Mr. White emphasizes the belief of the motor industry that the same principles should govern the operation of motor vehicles as common carriers as are applied by state regulatory commissions in the operation of other public utilities. He says:

> For example, the motor bus carrying passengers for hire is, in its very nature, a monopoly, and as such should not be permitted to operate until it has applied for and secured a certificate of public convenience and necessity from a fair state commission. It should be required to carry public liability insurance adequate to indemnify injury to persons and property.

Tax questions affecting the bus and truck in a co-operative and co-ordinated system of transportation are treated from the standpoint of solution in Mr. White's article. On this point Mr. White writes:

> The motor industry has taken a definite stand on taxation. It contends that the cost of construction of improved highways for the use of the general public should be paid for out of funds raised by general taxation and that the entire annual budget for the maintenance of improved highways used by motor vehicles should be paid out of special taxes levied on the motor vehicle.

Films of the Industry for the Smithsonian Institution

Watterson R. Rothacker is preparing to present to the Smithsonian Institution for preservation to posterity a motion picture with scenes taken from the various movies which that film company has made in the past dealing with different phases of public utilities. Railroads and electrical companies will be represented and power plant scenes will show the source of electrical energy in 1924. The electrical industry as a whole will be featured, even beyond its application to public utilities. The methods of financing utilities will be touched upon, showing banking methods as practiced in the present year. The Rothacker Film Company says that these scenes will be selected with a view to giving people æons from now a comprehensive picture of utility enterprises in Anno Domini, 1924.

Improvements in Schenectady Deferred Until June

With no objection on the part of those appearing at the hearing, the Public Service Commission under an order issued Feb. 25 extended to June 1 next the time in which the Schenectady Railway, Schenectady, N. Y., is to comply with an order of the commission on April 4, 1923, to make certain changes in its plant and equipment to improve the service.

Franchise Conferences Proposed at Birmingham

Conferences between members of the City Commission at Birmingham, Ala., and Lee C. Bradley and J. S. Pevear, co-receivers of the Birmingham Railway, Light & Power Company, are to be held soon to discuss extensions of certain franchises of the company for a period of thirty years. It is stated that there are many franchises which will expire in six to seven years, which the receivers desire shall be extended. Members of the City Commission are understood to have agreed tentatively upon the conditions to be asked for the extensions.

Consent of the city to the separation of the Tidewater line into two sections with the elimination of quite a lot of track, including a number of railroad crossings, has been withheld by the commission. In the event that the purchasers of the Birmingham Railway, Light & Power properties at foreclosure on March 24 will not take the Tidewater line in its present condition, it is stated that it probably will be allowed to remain in the hands of a receiver unless some other buyer is found. Further discussions of the Tidewater situation, however, are expected to be held shortly between the commission and the receivers before the sale day.

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Terms Outlined for Proposed New Columbus Grant

Tentative terms for a blanket franchise for the Columbus Power, Railway & Light Company, Columbus, Ohio, have been presented to the Council. An unofficial summary of the terms of the new grant says that it proposes the following:

A 6-cent cash fare, with five tickets for a quarter. (The same as at present.)

An owl car fare of 10 cents. (The same as at present.)

Universal transfers with the company given the right to designate transfer points.

Not more than 1 mile of new extensions a year unless the company can obtain the capital therefore at "reasonable" rates of interest.

That the company shall not be required to pave or repave, surface or resurface, any part of any street.

Research Graduate Assistantships

The University of Illinois maintains fourteen research graduate assistantships in its Engineering Experiment Station, for each of which there is an annual stipend of $600 and freedom from all fees except matriculation and diploma fees. These are open to graduates of approved American and foreign universities and technical schools who are prepared to undertake graduate study in engineering, physics or applied chemistry. These appointments are for two consecutive collegiate years, at the expiration of which period, if all requirements have been met, the degree of master of science will be conferred. Half of the time is required in connection with the work of the department to which assignment is made, the remainder being available for graduate study. Research work and graduate study may be undertaken in various branches of engineering, including electric railway engineering.

Nominations to these positions will be made this year from applications received by the director of the station each year not later than April 1. Preference is given those applicants who have had some practical engineering experience following the completion of their undergraduate work.

Additional information may be obtained by addressing the director, Engineering Experiment Station, University of Illinois, Urbana, Ill.

New Information Bureau Formed in the South

The organization of the North and South Carolina Public Utility Information Bureau has been perfected with offices in Raleigh, N. C., and Columbia, S. C.

The purpose of the organization, according to the announcement, is to seek through the distribution of accurate information a clearer understanding on the part of the public of the aims and problems of the utilities in the two states. By this means it is hoped the utilities may be aided in contributing further to the industrial development and progress so essential at this time for the two Carolinas.

Many prominent men in the utility field directed the organization of this bureau and will continue their activities under S. E. Boney, selected director. The executive committee is composed of P. A. Tillery, chairman; Stuart Cooper, vice-chairman; N. A. Cocke, R. J. Hole, Raymond Hunt, F. H. Knox and George B. Tripp.

In announcing the organization, Mr. Tillery said that the information bureau was designed to supply the people with useful and accurate information and that it was the bureau's hope to establish a partnership of understanding with the public, just as there now existed in a large measure a partnership of investment.

Street Cars Do a Greater Business than Ever

"Are Street Cars Doomed?" was contained on a page of the program prepared by the transportation department of the Chicago Surface Lines, Chicago, Ill., for one of a series of shows which each department is giving for the entertainment and education of the other departments of the system. The item ran as follows:

"There are 2,886,121 people in Chicago and 218,991 passenger autos. In each 100 automobiles passing along Michigan Avenue are 180 passengers. If each Chicago owned automobile came into the Loop area each morning the passengers at this rate would total 394,184, while 300,000 passengers enter the Loop in two morning hours by surface and elevated cars.

"The 218,991 passenger autos would each require at least 20 ft. of space in the procession, and might run two abreast at 15 miles per hour. Allow ten streets for entrance at this rate, which is very liberal, and the procession in each street would take two and one-half hours to pass. Imagine ten streets choked by autos, two rows abreast each way for two and one-half hours, to bring in the passengers now carried by cars of the surface and elevated lines.

"Ten years ago the rides on electric cars per year per inhabitant of Chicago totaled 329, in 1923 the rides were 356. In spite of the enormous increase in private automobiles street cars do a greater business than ever."

Ordinance to Oust Railway.—The Village Council of Maumee, a suburb of Toledo, Ohio, will have before it for passage at its next meeting an ordinance to oust the Maumee Valley Railway, from the River Road between Detroit Avenue and Wayne Street in Maumee. Mayor John A. Smith and Councilmen have expressed the opinion that there is no doubt but that the measure will pass. The street from which the cars would be ousted is now being paved and the village officials want the traction company to move its tracks to the middle of the street, which would cause them to assume a big proportion of the expense of the paving. The traction company and the village have been at loggerheads, too, over a renewal of its franchise, which expired about four years ago.

Bus Bee Buzzing in New York State Capital.—J. J. Dunnigan and Joseph E. Kingsley, Democrats from the Bronx, New York City, introduced simultaneously in the Senate and the Assembly on Feb. 27 a bill empowering the city of New York to establish, own, operate and finance a bus line along the Grand Concourse in the Borough of the Bronx from 138th Street and Mott Avenue to Mosholu Parkway. The rate of fare on the line is to be 5 cents forever and the deficit of operation is to be paid for by the taxpayers. At Albany the appearance of this measure is generally looked upon as a gesture to make a newspaper story for one of the big dailies. The act may pass the Senate, but appears to have little show in the Assembly, unless the lower house should "wish it onto" the city of New York.

No Comment on Paving.—The Philadelphia Rapid Transit Company, Philadelphia, Pa., said recently that it had no comment to make with regard to an agreement reported to have been reached with the Jenkintown Borough Council regarding the paving of Old York Road between the borough lines. Under the agreement it is said that the company will pay the borough $20,000 and turn over to it property rights in block paving now between the tracks, worth about $17,000. In return the franchise under which the company operates through Jenkintown will be discontinued and the company will be relieved of its annual license payments.

Mayor Protests Viaduct Fee Proposal.—Mayor W. W. Gordon of Kansas City, Kan., recently reiterated his refusal to relinquish to the Kansas City Railways rent on the inter-city viaduct, so the L road might be rebuilt in compliance with an order of Judge Kimbrough Stone. Mayor Gordon said that if Judge Stone issues an order that the city must relinquish the rent, the city will comply with the mandate, but the city will not sign an agreement to waive the consideration permanently.

Dinners Edible and Edifying.—In order that employees may become better acquainted and learn more about the company in general, the Elmira Water, Light & Railroad Company, Elmira, N. Y., recently began a series of dinners, at which various features of the company's operations will be discussed. The first dinner was given on Feb. 26, at which sixty-seven employees representing all departments were present. At this dinner, the object of which was explained by F. H. Hill, vice-president and general manager, the gas end of the business was discussed, including the progress shown in that department in 1923 and the company's aspirations for 1924.

Backs Improvement Plan.—The Association of Commerce is strongly back of the movement to obtain additional transportation facilities in Racine from the Milwaukee Electric Railway & Light Company. Recommendations which have been made to the company include the establishment of a bus serrvice from the north end of North Main Street to the zoo grounds.

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Foreign News

Tickets and Fares on London Tramways

Return tickets on the London County Council tramways of London, England, issued to central termini are to be made available for return from any terminus so long as the fare originally paid is not less than that applying to the point from which the return journey is made, according to a report by the highways committee adopted by the Council. With regard to the issue of season tickets, the committee held that objections were insuperable.

On the question of increasing the length of fare stages, it was considered impracticable to increase the length of the 1d. stage by less than one section, which would raise it from 1.2 miles to 1.8 miles. Consequential increases would have to be made in the distances corresponding to other fares. The general manager estimated the risk of loss would be about £450,000 a year, which was too great to justify any such change. In regard to a proposed reintroduction of ½d. fares, the shortest distance for these would be one section of 0.6 mile, and the approximate loss would be £500,000 a year. To recoup this and the loss on longer stages, the cars would have to carry 185,000,000 additional passengers a year, and it did not seem reasonable to anticipate the increase of 30 per cent.

Paris Street Car and Bus Fares Increased

The first and second class fares on all Paris street cars and buses, which are operated by the "Transports en Commun," have been increased according to the following schedule:

	Fare, Centimes	
	Present	Former
First Class:		
One section	45	40
Two sections	60	55
Second Class:		
One section	30	25
Two sections	45	40

Fares on the Metropolitan and Nord-Sud subway lines have undergone a like increase. Although these lines are controlled by the same operating company, there are no transfers between them. Fares are now 60 centimes for first class and 35 centimes for second class.

This change is said to place Paris street transportation among the costliest in the world. At normal rate of exchange the first class street transport fare would be say 9 cents and 12 cents, although at the present depreciated value of the franc they would be much less on a gold basis. While it is stated by the authorities that the new fares are but 75 per cent above those existing before the war, they are actually greater, since the distance covered in a zone is materially less, so that in some cases a ride which formerly cost 15 centimes now has become 55 centimes. A first class ride that formerly cost 20 centimes on the trolley and 25 centimes on the bus now costs uniformly 75 centimes if the whole distance of the route is covered. Although not all passengers cover the entire distance, it is manifest that the Paris organization intends to grade the fares more closely in accordance with the length of haul, so that the revenue per mile on the long haul is approximately the same as on the short haul.

Some dissatisfaction has been expressed by residents of Paris on account of the fare increases, which work out to be 266 per cent for the second class and 275 per cent for the first class. This has also brought out a discussion as to whether it is an economic operating plan to furnish both first and second class on public service street and subway lines.

A critic has just brought to light the fact that by the inordinate use of free passes there is lost annually to the operating companies of the street and subway lines and the boat service on the Seine something like 19,000,000 francs.

British Tramway Receipts Off

Particulars of accounts and statistics of the tramway and light railway undertakings in Great Britain for the year ended Dec. 31, 1922, for companies, and March 31, 1923, for local authorities are contained in the annual return issued by the Ministry of Transport. The publication contains, as usual, elaborate statistical details for every separate undertaking.

As shown in the return, the total route mileage open for traffic was 2,594, of which 1,788 miles were worked by local authorities and 806 miles by companies. The gross receipts were £31,264,141, as compared with £32,523,339 in 1921-22, and working expenditure was £23,831,523, against £26,835,292 in the preceding year, leaving net receipts of £7,432,618, or £1,744,571 more than for the preceding year. The number of passengers was 4,349,041,241, an increase of 92,722,549 or 2.18 per cent. The miles run amounted to 351,910,233, an increase of 19,830,368 or 5.97 per cent. Of the total mileage run, 98.92 per cent was by electric cars.

Staggered Hours Proposed for Paris

Coincident with the recent increase of fares on street cars, buses and subways the Paris municipal authorities are studying the means of serving a continually increasing traffic. The consulting committee which recently met at the Hotel de Ville has issued a communiqué to the effect that an important exchange of views has been going on between the parties interested, including the users of public transport services. The principal resolution was to the effect that it would be desirable if various lines of business would spread the hours of arrival and departure of their employees over a more extended period of time than at present. This is quite similar to the plan recently proposed in New York.

The general French point of view, however, is that public transport should be made to serve the public, not that the public should bow down to the vagaries of the companies. The word is perhaps ill advised, but France is a very democratic country. The public registered its opinion that the street cars, the auto buses and the subways should be subservient to the vagaries, at least the variation in the method of life and the conduct of business of the public. There the matter rests for the moment, but it is bound to come to the surface again at any time.

London Tubes Are Linked

The construction has just been completed of new tunnels to connect in Camden Town, North London, the lines of the Charing Cross & Hampstead Railway and the City & South London Railway. For over half a mile there are now six tube tunnels almost side by side. Sometimes, however, one is above another, and sometimes they cross (at different levels). The scheme has been arranged so as to avoid having grade crossings. This is necessary as during rush hours there may be forty trains per hour on each branch, making 160 trains per hour to be handled at the junctions in all directions. When the work is done trains will be run from either Highgate or Edgware to Charing Cross, or switched via Euston to Clapham Common and eventually on to Merton to the southwest of London.

The construction of the new tunnels at Mornington Crescent (Camden Town) has given direct employment to about 500 men. The iron segments for lining the tunnels amount to 13,000 tons, and 80,000 tons of earth have been excavated. Despite the engineering difficulties, the work has been carried out with remarkable precision; the margin of error at any time in cutting the tunnels was never more than a quarter of an inch.

Trailers to Be Abandoned in Paris

Among the measures proposed recently by the Prefect of Police in the city of Paris is the entire elimination of trail cars in the area which lies within the circle of the grand boulevards. It is admitted that trailers are necessary, or at least desirable, to handle the suburban traffic from the boulevards to the area without the fortifications. There are very few street car lines running from the city beyond the fortifications and most of the suburban lines end at the various octroi gates.

The trailers used in Paris are large and cumbersome. Considerable time is wasted when they change ends. This is an inconvenience and consumes a great deal of time in the center of the city, since few of the Paris street car lines run through across the town. There is not even a continuous belt line, and at least three changes are necessary to go out and back to the starting point.

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Financial and Corporate

Acquisition of Chelsea Division Likely

Proposition Before Massachusetts Legislature to Make Boston Elevated the Only Railway in Boston

There is every prospect this year that by legislative direction the Chelsea division of the Eastern Massachusetts Street Railway will be taken by the Commonwealth of Massachusetts, for about $3,000,000, leased to the Boston Elevated Railway and merged with the Elevated system so that Revere Beach may have a single ride and single fare to all parts of the Boston Metropolitan district.

Under this plan the state will take the Chelsea division by the right of eminent domain. It will lease it to the Boston Elevated on a rental basis that shall cover the necessary bond issue, just as is done in the case of the tunnels and subways that are leased to the Elevated. An appraisal of that division by the Massachusetts Public Utilities Department places the value at $3,338,000. That is approximately the amount which will have to be paid, but as the property is not worth more than about $2,000,000 to the Elevated for operating purposes it is proposed to charge the Elevated rental on only $2,000,000 and to assess about $1,000,000 against the communities which are directly benefited. Revere and Chelsea would have to pay the principal part of it and smaller amounts would have to be paid by Malden and Everett and probably by the city of Boston. Revere and Chelsea are willing to pay.

If the Elevated indirectly pays the $2,000,000 and the communities traversed pay $1,000,000 there will still remain $338,000 to be accounted for by trustees of the Eastern Massachusetts. They suggest that the Eastern Massachusetts be permitted to retain such property as the Elevated cannot use, probably the power house with its machinery and real estate, and the car equipment in the division. The Elevated can supply power much cheaper from its own modern plant in South Boston; and it cannot use the Eastern Massachusetts cars. These, then, the Eastern Massachusetts could sell or transfer and realize at least a part of the $338,000.

If the plan is adopted the Boston Elevated will become the sole street railway in the Boston Metropolitan district.

Fewer Passengers in District of Columbia

Figures compiled by R. G. Klotz, traffic engineer of the Public Service Commission for the District of Columbia relative to street car traffic, show that in 1923 the daily average number of pay passengers carried on the combined lines of the Washington Railway & Electric Company and the Capital Traction Company was 412,141, as compared with 416,882 in 1922. The average daily total number of passengers carried in 1923, which includes free transfer patrons and those who travel on passes, was 522,000, as against 529,000 in 1922.

In 1920 the two companies carried 436,863 pay passengers a day, or 24,000 more than were carried last year. In 1920 the total daily average of all passengers was 552,242, or 30,000 more than last year.

Walter C. Allen, executive secretary to the commission, believes the reduction in volume of traffic is due to the gradual cutting down of the war-time personnel in the government departments and the constant increase in the number of automobiles.

Merger Bill Passed by New Jersey Legislature

The merger bill proposed by the Public Service Corporation of New Jersey has been passed by the Senate by a vote of seventeen to one. It now goes to the House.

In support of the bill, Senator MacKay pointed out that the consent of the Public Utility Commission was a prerequisite to the consummation of a merger.

As has been explained previously in the ELECTRIC RAILWAY JOURNAL this is permissive legislation, and recourse to the authorization may or may not be had according to how the plan develops which the company is understood to have under consideration for realigning its corporate financial structure.

Moosic-Pittston Line to Be Abandoned

The Pennsylvania Public Service Commission has approved the request of the Scranton Railway to abandon that portion of the Moosic-Pittston line extending from the Lackawanna township-Moosic boundary line on the north to the southern terminal at Broad and Main Streets, Pittston. The decree of the commission sustains in its entirety the contention of the railway that the Pittston end of the line had been run at a loss and that further loss would be occasioned by the contemplated improvement.

The commission holds that with the Lauren Line, the Delaware & Hudson and the Central Railroad of New Jersey operating between Moosic and Pittston and the Wilkes-Barre Railway operating from West Avoca "the community will be adequately served." Further anticipating the construction of a modern highway by the state along the east side of the valley from Pittston to Scranton, the commission says that the building of such a road "will no doubt suggest the establishment of bus lines."

Louisville Railway Prospects Bright

Year 1924 Expected to Show Result of Program of Efficiency and Economy Recently Carried Out

For the year ended Dec. 31, 1923, the balance available for dividends from the earnings of the Louisville Railway was $489,542. This compares with $504,979 available for the same purpose for the year 1922. So reported President J. P. Barnes of the company at the annual meeting of the stockholders on Feb. 21.

At the same time directors declared a 5 per cent dividend on the preferred stock, representing a regular dividend of 1¼ per cent, and 3¾ per cent on back dividends. Dividends are on a 5 per cent cumulative basis. This leaves 11¼ per cent accumulative since October, 1918, no dividends having been paid from that date, until 1923. No common stock dividends have been paid since July, 1918. The 5 per cent is payable on March 10.

COMPARATIVE INCOME STATEMENT OF THE LOUISVILLE RAILWAY FOR YEAR ENDED DEC. 31

	1923	1922
Operating Revenues:		
Revenue from transportation	$4,255,772	$4,358,450
Other operating revenues	190,094	184,367
Total operating revenues	$4,445,866	$4,542,817
Operating expenses	3,078,522	3,190,232
Net revenue from operations	$1,367,344	$1,352,585
Taxes	396,000	388,000
Operating income	$971,344	$964,585
Non-Operating Income:		
Louisville & Interurban Railroad Company—Net income	127,256	145,982
Other non-operating income	37,816	17,813
Total non-operating income	$165,072	$163,795
Gross income	$1,136,416	$1,128,380
Deductions from Gross Income:		
Interest on bonds and notes	645,819	619,589
Miscellaneous debits	1,055	3,812
Total deductions	$646,874	$623,401
Balance available for dividends on stock	$489,542	$504,979

The year 1923 was the first complete year's operation under the plan which provides that all earnings shall be credited to a so-called barometer fund. From the fund are to be deducted operating expenses, taxes, interest on bonds and other debts, 5 per cent for preferred stock, and as long as the present rate of fare continues, and the barometer fund stands at $200,000 or more, 6 per cent dividend on common stock. Mr. Barnes explains that these sums have been withdrawn each month during 1923, and that the barometer fund, which stood at $350,000 on Jan. 1, 1923, was as of Dec. 31, 1923, depleted to $232,681, a net reduction during the year of $117,318. Mr. Barnes says that this result from the first year's operation is neither unexpected nor alarming, as several of the programs for improved economy and efficiency of service were not completed until some time after Jan. 1, 1923.

The company was particularly hard hit during the year. On the night of Jan. 15, 1923, the brick portion of the Fourth Avenue carhouse burned, with all its contents, including twenty-four passenger cars and ten service cars.

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Plans were rapidly completed for a new fireproof sprinklered carhouse, with a separate office and recreation center, and the new carhouse and office were completed in October.

On Feb. 16, 1923, the carhouse at the southeast corner of Thirteenth and Main Streets was burned. In this fire sixteen cars were damaged, six of which have been repaired and placed in service.

The loss in the two fires was $270,195, but prompt payment by the insurance companies enabled the railway to proceed at once with the work of rehabilitation without any financial embarrassment and with no difficulties other than those incident to the reconstruction of the carhouses.

To replace cars totally destroyed and to provide sufficient additional trail car equipment to meet the growing needs of traffic, an order was placed last summer for fifteen new motor cars and twenty-five trail cars of the most modern type. These cars are being purchased in part with insurance recoveries and in part from the proceeds of the sale of $230,000 ten-year equipment trust certificates, Series "B," which are dated Jan. 2, 1924.

As a further precaution against possible losses from fire, the carhouse at Twenty-ninth and Broadway, which is the largest on the property, is now being equipped with automatic sprinklers.

Mr. Barnes says that great savings—and an improvement of service—have been realized from the general use of the single-truck safety car, of which 101 are in operation on city lines. Early in the year a general rerouting and improvement of schedules became effective. Fifty-five new safety cars were purchased during the year with the proceeds from the sale of $230,000 ten-year equipment trust certificates, Series "A," dated Jan. 15, 1923, similar to Series "B" previously described.

These are merely some of the outstanding things discussed by Mr. Barnes.

New Financing Plan for Detroit Municipal

A plan to refinance the Detroit Department of Street Railways, extending the D. U. R. purchase plan over a period of twenty years, is to be drafted by Clarence E. Wilcox, newly appointed head of the D. S. R. claims division. Announcement to this effect has been made by officials of the street railway department. The plan when drafted is to be submitted to the Mayor, to the Detroit United Railway and the City Council. It is announced also that in studying the various methods of refinancing, the advice and counsel of outside financial interests will be sought.

According to Ross Schram, assistant general manager of the municipal railway, the demand for extensions and improvements to the city system and for the additional cars and equipment is so great as not to permit it to be financed from the present income from operation, amounting to about $900,000 annually.

It is further announced that a sum is available from the $5,000,000 bond issue authorized by the voters last year sufficient to provide extensions contemplated within the next few years. In addition to this fund, $3,000,000 is stated to be immediately necessary for the purchase of new rolling stock. The present demands are attributed to industrial growth of the city, particularly on the west side. All previous daily records for passengers carried were recently surpassed when more than 1,600,000, persons were handled.

The reported acquisition of new locations for carhouses is denied by the commission. Work is being rushed at the city's Highland Park car shops to complete the twenty-five new trailers under construction. Requests have also been sent to car builders to rush work on the 100 new Peter Witt type cars ordered last fall and bids are to be asked for in the near future on 100 more Peter Witt type cars.

Railway in Readjustment

New Jersey Board Approves Rearrangement of Utility Properties on Atlantic Coast

The Board of Public Utility Commissions of New Jersey has approved a plan to permit the readjustment of the properties of the Atlantic Coast Electric Railway, and subsidiaries, the Atlantic Coast Electric Light Company and the New Jersey Water & Light Company, as sought to be carried out by the Eastern New Jersey Power Company.

A realignment was sought so that all of the property devoted exclusively to railway service shall belong to the Atlantic Coast Electric Railway and the balance of the property to the Eastern New Jersey Power Company. This plan has been modified with respect to the property to be owned by the Eastern New Jersey Power Company, the revised plan providing for the continued ownership by the New Jersey Water & Light Company of all of the property devoted to water service and the ownership of all of the property devoted to electric service by the Eastern New Jersey Power Company. In addition to the direct ownership of the electric property, including the power station, etc., by the Eastern New Jersey Power Company, the plan also contemplates the ownership of all of the stock and bonds representing the property of the railway and water company.

In support of the application, two appraisals of the property were submitted on behalf of the petitioner:

	Total Property at Present Prices	
Total Cost New	Cost New Less Depreciation	Plus $400,000 Additional Cash
$6,217,425	$5,678,320	$6,078,320
$6,259,416	$5,338,592	$5,738,592

Valuations of the property were also submitted by the board's engineer on several different bases of prices. The value corresponding to that just noted, at present-day prices, is as follows:

Cost New Total Property	Cost New Less Depreciation
$5,700,000	$4,625,000

The board concluded that the value of the property properly represented by the issuance of securities is $4,412,500. This total includes the $400,000 additional cash indicated previously, which with $75,000 cash included in the appraisals, provides $175,000 in cash for working capital and $300,000 cash for construction purposes.

The petitioner requested permission to issue the following securities for the Eastern New Jersey Power Company:

$3,500,000 par value of 6 per cent bonds, due in 1949
$1,250,000 par value of 7 per cent preferred stock
6,500 shares common stock, no par value

In order to make the securities comparable with the value determined by the board, it decided to permit the following securities to be issued:

$3,250 par value of bonds (at 85) to realize not less than	$2,762,500
Par value of 7 per cent preferred stock to be issued at par	$1,250,000

This will leave a balance of the total as determined by the board to be represented by the issuance of common stock amounting to $400,000. This amount will represent the value of the no par common stock.

First Presentation of No Par Value Stock Question

In its decision the board points out that this is the first time that the question of the approval or disapproval of no par common stock has been before it. The act of 1921, Chapter 284, permits corporations organized under the general corporation act to issue no par value stock. The new corporation was formed under that statute. After careful consideration of the act of 1906, the board has concluded that an electric company formed under the general corporation act, although a public utility, has the right to issue no par stock. In order to carry out the purpose of the act of 1921, however, the board feels it was necessary for it to state the value of the no-par stock.

The Atlantic Coast Electric Railway has outstanding at the present time $1,000,000, par value, of stock and certain underlying bonds and obligations which are proposed to be retired. The board has determined the value of the railway property to be $1,700,000, to which is added $25,000 to represent cash working capital, $50,000 cash for construction purposes—making a total value to represent the securities to be issued by the railway $1,775,000. Deducting $1,000,000 par value of stock now outstanding from this value leaves a balance of $775,000 to be represented by a like amount of bonds to be issued at not less than 85 per cent of par.

In accordance with the terms of the order the Atlantic Coast Electric Railway, West End & Long Branch Company, Sea Coast Traction Company, Asbury Park & Sea Girt Railroad and Sea Shore Electric Railway will all be merged.

The board has also approved the transfer of all of the preferred or common stock of the Eastern New Jersey Power Company to the Utilities Power & Light Corporation of Virginia.

A syndicate including Bonbright & Company and W. C. Langley & Company, New York, is offering $3,250,000 of the first mortgage 6 per cent bonds of the Eastern New Jersey Power Company at 95 and accrued interest to yield 6.40 per cent.

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Preferred Stock of Recent Merger Offered

Pynchon & Company, New York, N. Y., are offering for subscription at $91 per share and accrued dividend to yield about 7.70 per cent 15,000 shares of the cumulative preferred stock of the North Carolina Public Service Company, Inc. It is explained that the company has been incorporated under the laws of the State of North Carolina and has acquired all of the properties, rights, franchises and other assets of the North Carolina Public Service Company. These properties include the plants, distribution systems, and business of the former Greensboro Electric Company, Greensboro Gas Company and High Point Electric Power Company, and the gas plant and distributing mains and electric railway system in High Point, as well as a lease of the Salisbury & Spencer Railway, which was formerly that of the Salisbury Light & Power Company and the Salisbury Gas & Electric Company. In addition, the new company owns 92 per cent of the entire capital stock of Salisbury & Spencer Railway, which property it operates under the lease.

The North Carolina Public Service Company, Inc., is controlled by the General Gas & Electric Corporation through ownership of the entire outstanding common capital stock, and the properties are under the management of the W. S. Barstow Management Association, Inc., New York City.

Auction Sales in New York.—At the public auction rooms of A. H. Muller & Sons there were no sales of electric railway securities this week.

High Mark in Employees Stock Ownership. — The Lake Superior District Power Company, Ashland, Wis., has a record of 100 per cent among its employees as stockholders in the company. It required approximately two weeks to enlist the support of every employee.

One Bidder for Pomeroy Property.—At the sale of the Ohio River Electric Railway & Power Company, Pomeroy, Ohio, by Harry Hartwell, receiver, acting under orders of the Federal Court, there was but one bidder, a representative of the protective committee acting for the bondholders. Under a requirement of the court in order to qualify as a bidder a bond of $10,000 had to be put up. This was done by none except the representative of the bondholders, and, therefore, there could be but one bid. The line was first offered from Ash Street in Middleport eastward, which consisted of the old line. On this $85,000 was bid. Then the Hobson extension was offered and $4,000 bid on that. Then the whole line was offered, and a bid of $89,000 was made on that. It was knocked down on this bid subject to the approval of the court.

Seeks Relief from Maintaining Fund.—The Key System Transit Company, successor to the San Francisco-Oakland Terminal Railways, has applied to the California Railroad Commission for a modification of the decision of the commission to relieve the petitioner from the necessity of further setting aside in cash the depreciation reserve provided for in the commission's order. The applicant states that since the making of this order the San Francisco-Oakland Terminal Railways has been reorganized and put on a firm financial basis, the reorganization plan having been formally approved by the commission, and that no further necessity exists for the requirement that the said funds should be created and maintained.

$54,000 of Bonds Authorized.—The securities division of the Wisconsin Railroad Commission has authorized the Madison Railways to issue $54,000 of first mortgage 5 per cent bonds to reimburse its treasury. These bonds are to be sold at not less than 75 per cent of par.

Net Income Increases.—The City of Detroit, Department of Street Railways, reports a total operating revenue of $1,973,453 for January of the current year. This compares with $1,712,228 in January a year ago. The revenue from transportation included in the above amounts was $1,926,419 and $1,620,210 respectively. The total operating expenses increased from $1,221,492 in January, 1923, to $1,423,186 in January of this year. The net income for the month of January, 1924, was $89,023. The similar figure a year ago was $70,558. The total number of passengers carried in January of the current year was 41,451,043. In January of last year the number was 40,167,868. These figures include both revenue and transfer passengers.

Sioux City Gold Bonds Offered. — Halsey Stuart & Company, New York, are offering $2,550,000 of the Sioux City Gas & Electric Company's first mortgage twenty-five year 6 per cent gold bonds, known as Series B. The bonds, due Feb. 1, 1949, and non-callable for ten years, are being sold at 98 and interest, yielding about 6.15 per cent. The Sioux City Gas & Electric Company owns all the outstanding capital stock of the Sioux City Service Company, which owns and operates the electric railway and heating business in Sioux City, Ia.

First Mortgage Gold Bonds Offered.—Baker, Young & Company, Blodgett & Company and Arthur Perry & Company, Boston, Mass., are offering $1,000,000 of Dubuque Electric Company, Dubuque, Iowa, first mortgage 6 per cent gold bonds due April 1, 1942. These bonds, $3,200,000 outstanding, which includes bonds recently issued, are secured by a first mortgage on all franchises and property of the Dubuque Electric Company. The value of the property, as established by appraisals made in 1920 and subsequent expenditures, is about $6,500,000, or more than twice the par value of outstanding bonds.

Petition for Abandonment. — The Colorado Springs & Interurban Railway has asked the Colorado Utilities Commission for permission to cease operating its line from Colorado Springs to Roswell, a distance of about 3 miles. In its application the company sets forth that the branch line cost $7,900 to operate last year, whereas only $572 was received in revenue. The company recently informed the City Council that it did not desire a renewal of its city franchise.

First Dividend in Nine Years.—The directors of the Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio, recently declared the first dividend on the common stock in nine years, authorizing a payment of 1¼ per cent. Edmund Kerper and H. W. Kinney were elected directors.

Deficit After Dividends in Providence.—The report of the United Electric Railways, Providence, R. I., for the year ended Dec. 31, 1923, shows a deficit after dividends of $275,768, compared with a surplus of $40,717 for 1922. The deficit for 1923 before payment of $206,267 in dividends early in the year was $69,501, against net income of $370,691 in 1922. Operating revenues dropped $234,109 last year and operating expenses increased $176,250.

Operations Discontinued.—The Pennsylvania & Ohio Traction Company, which for twenty-three years has operated an interurban line between Conneaut and Jefferson through Ashtabula, ceased operations on Feb. 29. Permission to discontinue service was granted by the Ohio Public Utilities Commission following a recent hearing. In its decision the commission found that for the last five years the Pennsylvania & Ohio Traction Company line had a loss of more than $100 a day.

Balance Shows Falling Off.—For the month of January the gross earnings of the Virginia Railway & Power Company were $925,885, against $909,439 for the same month a year ago. The operating expenses, maintenance, taxes and rentals were $578,605, compared with $550,912 for January a year ago. The net earnings showed a falling off of $11,247, being $347,280 in January, 1924. The balance after the consideration of depreciation and renewal reserve was $120,884, a decrease of $28,794 over the same month in 1923. The total assets of the company on Jan. 31, 1924, according to its financial exhibit, were $51,862,132.

Collateral Issue Offered.—A syndicate headed by J. A. Sisto & Company, New York, is offering at 96½ and interest to yield more than 6.80 per cent $8,000,000 of the Montreal Tramways & Power Company five-year 6 per cent collateral trust bonds. The bonds are dated March 1, 1924, and are due March 1, 1929. Under the terms of the contract between the Montreal Tramways and the city of Montreal the Montreal Tramways Commission is obliged to adjust the fares to provide the Montreal Tramways with sufficient revenue to pay all operating expenses and maintenance renewal fund payments, and an annual return to the company of at least 6 per cent on the capital value of the company's property, and on such additional capital expenditure as may be made from time to time. The amount of revenue thus provided under the contract is more than sufficient to pay the 5 per cent interest on Montreal Tramways 5 per cent debentures and 10 per cent dividends on Montreal Tramways stock, which are hypothecated as collateral for the above Montreal Tramways & Power Company's five year 6 per cent bonds. The Tramway & Power Company owns a majority of the tramway common stock.

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Traffic and Transportation

Philadelphia Fare Upheld

Superior Court of Pennsylvania Decided Against City—Also Upholds $200,000,000-Plus Valuation

The 7-cent cash fare, with four tickets for a quarter, now being charged by the Philadelphia Rapid Transit Company was upheld on Feb. 29 by the Superior Court of Pennsylvania in a decision dismissing an appeal brought by the city against the order of the Public Service Commission authorizing the company to maintain the rates mentioned. In the same decision the court supported the Public Service Commission's finding that the valuation of the Philadelphia Rapid Transit property is $200,000,000 and upward. In upholding the validity of the present rate of fare, Judge Linn of the Superior Court held that the Public Service Commission has a right to fix rates irrespective of any ordinance of Council or any prior agreement.

The court said that the appeal really brought up only one contention, namely, that the rate charged is unreasonable in the sense that it yields a larger net return than appellants thought should be earned on the fair value of the property devoted to the public service. The court said in part:

The company is entitled to receive a reasonable return for the services it furnishes and no more; the public is entitled to receive an adequate return for the reasonable rate it pays and no more.

1. It is said the commission made no definite valuation. The law does not require one. It may be made when necessary or desirable; if, in the course of its inquiry, the commission finds, as it did in this case, that it has sufficient evidence to act finally, nothing can be gained by thereafter wasting time and money in unnecessary investigation.

2. The report is condemned as vague and evasive. We are not impressed with that comment. The report contains thirty-five printed pages sufficiently stating the views of the commissioners for the purposes of the order made; we have no difficulty in determining that the order is supported by evidence; the concessions of counsel show the same thing.

3. Appellants contend the commission "gave undue weight to the evidence of present reproduction costs. It has confused the terms present fair value with present reproduction cost." A proper reading of the report shows that criticism is without foundation.

4. Objections are made to the force attributed to certain items of valuation; we consider them without merit on this appeal, and shall refer to only one, to the expenditure of $14,000,000 for street paving prior to the agreement of 1907. Of this, the commission said the city, in its historical studies, determined to its own satisfaction that the actual cost of this paving so laid was in excess of $14,000,000. The company claimed for the item of paving nearly $26,000,000. . . . In such cases we feel that all the company can claim to have protected is its original investment or price paid for the franchise, and we, therefore, can give no consideration to the higher figures which it is admitted the present cost of paving would reach. Appellants have no cause to complain of that; it is not unlawful to capitalize the amount paid for franchises.

5. The contract of 1907 between the city and the transit company provided: ". . . the present rates of fare may be changed from time to time, but only with the consent of the parties hereto." The city's brief now objects that "the commission entirely ignores the city's claim of the binding effect of the agreement of 1907, notwithstanding the fact that question, under the contract clause of the Constitution, was raised. . . ."

We have not found where that point was raised below. On the contrary, the commission's power to make the change was expressly conceded by the city in the complaint by which this suit was begun. In its complaint the city averred: "On July 1, 1907, the company entered into a contract with your complainant, which provided, *inter alia*, that the transit company should make no change in the rates of fare which were then in force without the consent of the Councils. Your complainant avers that while your honorable commission has power to order a change in said rates irrespective of the consent of the Councils, the said transit company has no power of its own motion to make such change without the consent of the Councils, prior to the determination and specific order of your honorable commission, without violating its obligation under said contract (of 1907) . . ."

We find nothing withdrawing that; nor is there anything in the commission's report indicating any question about its power; moreover, we think the position stated in the averment was right—that the commission has the power pleaded. Without now determining that by the specific terms of its complaint and its suit before the commission the city in fact, within the meaning of the contract, consented to the change in fares ordered on its complaint, and adopted by the company, we are clear that the principles governing Leiper vs. R. R., 262 Pa. 328; Scranton vs. P. S. C., 268 Pa. 192, and White Haven Bor. vs. P. S. C., 80 Pa. Superior Court 536, and similar familiar cases, apply in this case, and that the city has not been deprived of any right under the contract.

Improved Service Promised in Springfield, Mass.

Clark V. Wood, president of the Springfield Street Railway, Springfield, Mass., has sent to Mayor E. F. Leonard a statement of the company's plans to increase service after May 1, when the jitneys, according to orders, cease service.

Mr. Wood estimates that the jitneys carry 10,000 passengers daily, of whom 33 per cent are transported in the morning rush hour, 20 per cent in the afternoon rush and 47 per cent at other times. Respecting non-rush hour traffic no additional facilities are required, he says, as cars are not now filled to their seating capacity. Nevertheless, he states that the company will provide more frequent cars on its Forest Park, Dickinson Street, State Street, Wilbraham Road and Liberty Street lines throughout the day. He also states that orders have been placed for five additional buses to be delivered before May 1. Two new bus routes are tentatively planned, and extension of the present Orange Street bus route is considered. The company's buses are operated to serve districts off the railway routes, and it is not proposed to parallel any of these routes with buses. In his statement Mr. Wood says that the company's buses are earning less than one-half the cost of their operation.

After President Wood's letter to the Mayor was published Richard J. Talbot, attorney for the Springfield Bus Owners' Association, gave out a statement saying that the proposals were "wholly inadequate to meet the traffic needs of the community."

Attorney Talbot said that a bill had been drawn and sent to Boston, to be introduced in the Legislature, ordering a stay of the Mayor's order to stop the independent bus service, until after a referendum vote could be had from the people of Springfield.

Broad Jersey Bus Plan

President McCarter Says Bus Service Will Not Be Diminished—Five-Cent Fare to Continue

Thomas N. McCarter, president of the Public Service Railway, Newark, N. J., says that if the company should acquire control of the motorized transportation system in Newark the 5-cent fare will be maintained on trolleys and buses so long as it is economically possible and there will be no curtailment of buses or bus lines. Moreover, rush-hour express service will be introduced under the proposed co-ordinated system. He also says that directors have authorized the purchase of 100 modern buses, and that negotiations have been completed for the purchase of a $300,000 plant to be used for the repairing of buses and possibly later for the building of buses.

The plans for a coordinated trolley-bus system for Newark, of which the foregoing is merely an outline, were announced on March 4 by the Public Service Railway in a letter to Commissioner Thomas L. Raymond, director of the Department of Streets and Public Improvements. The letter was signed by Mr. McCarter, and was in response to a request from Director Raymond for a statement of the company's plans.

Mr. McCarter says the plan contemplates the employment of buses and street cars in a properly co-ordinated or unified service, under a single management, so as to utilize both types of vehicles in the most efficient manner to meet in full the reasonable demands of the riding public. He is hopeful of receiving the co-operation of the people and is "confident that the consummation of such plans will redound to the public's benefit and to that of the company as well." He says that the progress of the railway during the last two months has been so encouraging that at the close of the so-called experimental period the company management made known to the Board of Public Utility Commissioners its determination voluntarily to continue the 5-cent fare now in effect. The company proposes to maintain the 5-cent fare permanently if it be economically possible.

If the law permitted, Mr. MacCarter explains, the railway would today be operating buses in a co-ordinated service with its electric cars instead of being obliged to conduct the bus end of the business through a separate corporate organization. In the development and operation of the co-ordinated bus and trolley service, there will be no diminution of service and no reduction of bus-miles operated on the Newark lines. Co-ordinated bus and trolley operation will also make possible express service where desirable during the morning and evening rush hours.

Mr. McCarter said that for weeks past he had devoted a large part of his time to the study of bus operation in other cities.

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Five-Cent Fare Spells Ruin

Vice-President Hanna of Capital Traction, So Testifies—Opposed to Abolishing Commission

The establishment of the 5-cent cash, and six for a quarter rate on the lines of the Capital Traction Company, Washington, D. C., would mean ruin for the company. This statement was recently made by John H. Hanna, vice-president and general manager, before the sub-committee of the committee on the District of Columbia of the Senate, which is holding hearings on Senator McKellar's bill to abolish the District Public Utilities Commission and thereby restore the old rate of 5 cents cash, with tickets six for a quarter. The statement was made on Feb. 29 and was preceded by brief remarks by President George Hamilton, and will be followed in subsequent hearings by more detailed presentation of facts by Mr. Hanna. Mr. Hanna was the first witness on behalf of either local electric railway.

He said that in 1923 the Capital Traction Company earned a reasonable but not excessive return on the present value of its property as determined by the commission. Further that he had no reason to believe that during 1924 any higher return than this would be earned under the present rate of fare, and assuming that car riding continues to fall off during this year as it has done for the past three years, the return would certainly be less. Operating expenses had increased 175 per cent since 1914 despite the efforts to economize wherever possible, while revenue had increased only 115 per cent and fares only 63 per cent.

It was his belief that if the 5 cent, six for a quarter fare had been in effect during 1923, the other conditions remaining the same, the revenues would have failed by nearly $300,000 to meet actual costs and taxes. No income whatever would have been available for interest or other return on investments. Mr. Hanna resented the attitude of some critics by stating forcefully that the books and records of the company were always available to those vested with proper public authority.

He said that aside from the disastrous effect which the establishment of the 5-cent cash fare would have on the two railways and the service which they furnish, the proposal in the McKellar bill to take away from the commission the right to regulate fares was a serious backward step in modern government and "makes the bill of great interest and importance to all."

One-Man Cars Being Operated.—One-man cars are now being used exclusively on the lines of the Morris County Traction Company, Morristown, N. J.

Bus Fares Increased.—The Pennsylvania-Ohio Traction Company, Youngstown, Ohio, has announced an increased fare on its bus lines. The fare from Youngstown to Warren, which was 45 cents, has been raised to 50 cents, while the fare from Youngstown to Niles, which was 30 cents, was increased to 40 cents. The Youngstown-Girard fare, formerly 20 cents, was boosted to 25 cents.

Ten-Cent Fare Adopted.—The Fitchburg-Leominster Street Railway, operating lines in central Massachusetts, has adopted a flat 10-cent rate on all lines. The six-ride ticket for 30 cents will be discontinued.

Five Cents for Short Rides.—The new Gardner & Templeton Street Railway, operating between Gardner and Templeton, Mass., has instituted a 5-cent fare rate for short rides as a means of meeting competition by the buses. As a result of the departure, receipts are said to have been increased from 15 to 25 per cent.

Parking Ordinance Introduced.—An ordinance to abolish parking on several important downtown thoroughfares of St. Louis was recently introduced by Director of Streets and Sewers Clinton H. Fisk. The measure was given to the Board of Aldermen on Feb. 15. Because automobiles have been parked along the sides of narrow streets it has been impossible for more than one line of traffic to move in the same direction at the same time. Electric railway transportation has been retarded and thousands of persons have been inconvenienced.

Award Made to Distinguished Service Members.—Fourteen employees of the Birmingham Railway, Light & Power Company, Birmingham, Ala., are gold button men, who had highly satisfactory records for 1922 and 1923, for which they received the gold buttons. Another group of seventy-five men received bronze distinguished buttons for the first six months of 1923 and made a satisfactory record for the second six months of 1923, and are now entitled to receive the silver distinguished service buttons. Still another group in the distinguished service class for 1923 made a satisfactory service record for the last six months of 1923 and have been awarded the bronze distinguished service buttons.

Hours for Use of Tickets Stipulated.—A new regulation governing the sale and use of individual school commutation tickets on the lines of the Chautauqua Traction Company and the Jamestown, Westfield & Northwestern Traction Company, both in Jamestown, N. Y., provides that they will be honored for transportation between the hours of 7:30 a.m. and 5 p.m. only, effective March 21. At present there are no limits as to hours.

Extension of Time Allowed on Fare Changes.—The California Railroad Commission has granted an extension of time until April 4, 1924, to the Key System Transit Company in which to eliminate the discrimination in the matter of interurban fares between San Francisco and the city of Piedmont, which the commission found to be discriminatory as compared with other East Bay municipalities. Reference was made to the matter in the ELECTRIC RAILWAY JOURNAL, issue of Feb. 16.

Wants Operations Limited.—The Salt Lake & Utah Railroad has applied to the Public Utilities Commission of Utah for a modification of the franchise granted to the Butters & Speers Company to limit their operations to a freight line between Magna and Garfield, Utah. At present the company has a franchise to operate between Salt Lake City and Garfield. Besides denying the public convenience or necessity for a service other than that given by the railroad between Salt Lake City and Magna, the railroad alleges that the recently formed company is violating the minimum schedule on individual shipments and also that it is charging rates other than those on file with the commission.

Railway Men Invited to Criticise Traffic Plan.—C. E. Smith, consulting engineer for the city of St. Louis, has invited Col. A. T. Perkins, general manager for the United Railways, St. Louis, members of the City Plan Commission, the Board of Public Service and others interested in traffic to express themselves concerning the plan he has advanced for solving some of the city's traffic problems. Mr. Smith's plan includes the development of two new east and west traffic ways, with separated roadways at busy crossings of other streets just north and south of the present congested east and west streets. The plan consists of widening and connecting present streets, the improvements on the greater portions of which, in Mr. Smith's opinion, are backward by reason of having been partly deserted by former users and not yet fully developed for new use.

Cars Operating Over New Viaduct.—The new steel and concrete viaduct spanning the railroad tracks and Cherry Creek on Sixteenth Street, Denver, Col., has been completed. The Denver Tramway is now operating about a dozen routes over the viaduct. Since the old wooden structure was torn out, the trams have been forced to use the tracks at the street level and to cross about fifteen railroad tracks.

Classed with Motor Trucks. — The attorney-general's department in Wisconsin recently handed down an opinion ruling that passenger-carrying buses be placed in the class of motor trucks, and are therefore included in the provision fixing the speed limit at 20 m.p.h. on highways for heavy vehicles, under the state motor vehicle act. Buses are now being operated in Wisconsin under the state jitney law and the average speed is usually around 30 m.p.h. The opinion is the outgrowth of complaints about speeding received from bus patrons.

Advertising Brings Results.—During the past few years the United Railways has advertised extensively the Missouri Botanical Gardens, located in St. Louis, by means of signs on its cars, telling the patrons how to reach the gardens and also calling attention to the special showing of plants, etc. This campaign has undoubtedly helped to increase the popularity of the gardens, which is reflected in the attendance, now three times as large as a decade ago. Only 15 per cent of the many thousands of people who visit the gardens every year come in automobiles, according to statistics compiled by the officials of the garden. This fact was brought out in the thirty-fifth annual report for the gardens, recently made public by George T. Moore, director, and was given as one of the principal reasons why the gardens should not be moved outside the city limits. Such a move had been contemplated because of the need for more room for expansion.

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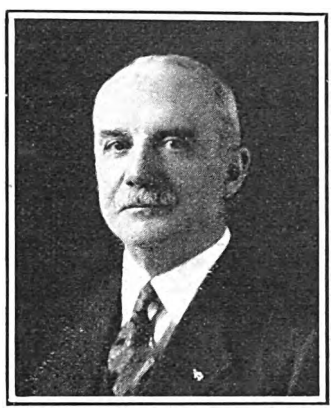
Personal Items

Messrs. Miller and Alberger Elected

Well Known Pacific Coast Executives Head Successor to Reorganized Oakland-Terminal Railways

The Railroad Commission of California recently authorized the reorganization and refinancing of the San Francisco-Oakland Terminal Railways, and the reorganization has now been effected, but the executive personnel of the corporation remains unchanged.

C. O. G. Miller is president of the successor company, as he has been since 1917 of the San Francisco-Oakland Terminal Railways and W. R. Alberger is vice-president and general manager, positions he has filled with the former company since becoming connected with the concern in 1911.



W. R. Alberger

The bondholders at a meeting in December unanimously voted to keep these two officials in their places.

Christian Otto Gorbording Miller is one of the ablest and best known financiers on the Pacific Coast. He was born in Oakland in 1865 and was educated in the Oakland public schools. As a young man, with scarcely any capital, he successfully floated a bond issue of a gas company in Los Angeles. That was thirty years ago. It marked his entrance into the utility field, in which his interest has gradually been extended since that time. Today he is president of the Pacific Lighting Corporation, the holding company for the gas concern, and a director in the Los Angeles Gas & Electric Corporation, which he helped finance.

Mr. Miller is an outstanding figure in San Francisco's world of finance. He is a director in at least twelve concerns and is vice-president of the Mercantile Trust Company and vice-president of the Realty Syndicate of Oakland.

When the affairs of the San Francisco-Oakland Terminal Railways reached a crisis on July 27, 1917, following the resignation of President G. K. Weeks, Mr. Miller was chosen president, a position which he has since continued to fill. During the war he served as the head of the San Francisco branch of the War Trade Board.

William Randolph Alberger is a veteran railroad executive. He started to learn the business as an office boy in 1876 in Buffalo, N. Y., in which city he was born. Mr. Alberger worked in several railroad offices in the East before he heeded the call of the big West and ultimately secured a berth with the Santa Fé Railroad, by which he was employed for many years. He passed through various clerkships, including several of the confidential variety, rising finally to the position of traffic manager in Oakland.

FOURTEEN YEARS WITH KEY SYSTEM

Mr. Alberger resigned from the Santa Fé to go with the Tonopah & Tidewater Railroad as traffic manager. There his capacity for hard work and his efficiency soon attracted attention. It was about this time, 1911, that the San Francisco-Oakland Terminal Railways, on the verge of being reorganized, was seeking experienced operating talent. Mr. Alberger was invited to become vice-president and general manager. Before this time Mr. Alberger had confined his duties strictly to steam lines, but he knew Oakland, he knew the Key System and some of its problems, from observation. So he accepted the offer and has since remained with the company. Under his management the company has grown to its present proportions. Twice the property has been reorganized financially, but the operating problems have been left to Mr. Alberger and have been successfully solved by him.

Four newly organized corporations all figure in the refinancing of the old corporation, namely:

Key System Transit Company, Key System Securities Company, Oakland & Hayward Railway and East Oakland Railway.

The first named will assume charge of all the properties formerly owned by the San Francisco-Oakland Terminal Railways, and the Securities Company will take the place in the reorganization of the Oakland Railways. The Key System Transit Company will be the name of the operating company. It will run under lease the railways properties of the East Oakland Railway and the Oakland & Hayward Railway.

Power Station Changes in Youngstown

H. W. Bromley, formerly superintendent of power of the Pennsylvania-Ohio Electric Company, with office at Youngstown, Ohio, resigned recently to devote his time to his personal interests. He had given more than ten years service to the company. Andrew Carnegie has been appointed acting superintendent of power. F. V. Canning has been appointed assistant to Mr. Carnegie and F. C. Beattie has been appointed chief engineer of the Lowellville power generating station, succeeding Mr. Canning.

W. B. Mayo Municipal Manager

Head of Local Detroit System Looking Into Future Needs of City Difficult Problems to Solve

William Benson Mayo, general manager of the Detroit Department of Street Railways, recently reiterated to a representative of the ELECTRIC RAILWAY JOURNAL his active interest in the proposal to provide rapid transit for Detroit. He has analyzed critically the provisions contained in the report of the Rapid Transit Commission, and it is his belief that careful consideration should be given the relation between the Street Railway Commission and the Rapid Transit Commission if the latter is to become a permanent feature. He also sees the need for

W. B. Mayo

serious consideration immediately of the plans for a metropolitan area.

In Detroit Mr. Mayo has played an important part as a member of the Street Railway Commission in steering railway matters along successful lines. At the request of Mayor Frank E. Doremus of Detroit, Mr. Mayo took up the work of general manager last July after the death of former General Manager Joseph S. Goodwin left the active management of the system on the shoulders of Ross Schram, assistant general manager.

He assumed the duties as a citizen and offered his best efforts in helping the city to solve its transportation problems, with the single idea that what the citizens of Detroit desire most is the best street railway transportation regardless of the merits or demerits of public operation. Mr. Mayo's work for the public good also includes his services as a member of the board of arbitrators appointed under an agreement between the city of Detroit and the Detroit City Gas Company, dated Nov. 14, 1923, to determine what rate the company will be allowed to charge consumers of gas in the city.

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In view of the fact that through years of unfortunate controversy the system taken over from the Detroit United Railway had stagnated to a great extent, the first task was that of building up a stable foundation for the municipal system. To this end Mr. Mayo has devoted his efforts unceasingly. Since 1913 Mr. Mayo has been chief engineer of the Ford Motor Company, Detroit, Mich., a position which he still holds.

Mr. Mayo was born in Chatham, Mass., on Jan. 7, 1866. He was educated in the public schools and under private instructors. For twenty-five years he was with the Hooven-Owens-Rentschler Company, manufacturers of steam engines, ten years as chief engineer and five years as vice-president and general manager.

The Detroit Athletic Club, the Detroit Club, and Engineers' Club of New York are numbered among the organizations to which Mr. Mayo belongs. He is also a member of the American Society of Mechanical Engineers, and a trustee of Antioch College.

Fred J. Miller was recently appointed a member of the Public Service Commission of Pennsylvania. He will conduct a survey of the electrical power service of the state. He is an engineer and a former president of the American Society of Mechanical Engineers.

Obituary

John F. Kent, president of the Cameron Electrical Manufacturing Company, Ansonia, Conn., died recently. Mr. Kent was seventy-four years old. He had been identified with the electrical manufacturing business of the Naugatuck Valley for more than fifty years.

Grenville S. MacFarland, attorney, editorial writer of the Boston *American* and general counsel for the Hearst interests in New England, died suddenly in Boston on Feb. 28. He had been in ill health for some time. He was graduated from Harvard in 1897. Mr. MacFarland participated freely as a commentator during the discussion of the trustee plan at Boston, under which the Boston Elevated Railway and the Eastern Massachusetts Street Railway are now operated, and also commented on the transit situation in New York for the Hylan-Hearst political interests.

Otto F. Koss, formerly superintendent of the transportation department of the St. Joseph Railway, Light & Power Company, St. Joseph, Mo., died recently. He retired from the railway property about two years ago.

F. B. Clements, secretary and auditor of the Mobile Light & Railroad Company, Mobile, Ala., died recently after a short illness. Early in 1919, when M. W. Glover resigned from the Mobile property to become auditor of the West Penn Railways, Mr. Clements succeeded him as secretary and auditor. Mr. Clements was connected with the Panama Railroad on the Isthmus of Panama for several years.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Westinghouse Expanding

Electric Company Plans Plant Extensions — Stock Dividend Declared — Additional Stock to Be Offered

The Westinghouse Electric & Manufacturing Company has authorized an issue of $17,955,000 common stock at $52.50 a share and a stock dividend of 10 per cent on the common. The new issue is payable April 16 to holders of record on March 17. The stock dividend is payable to holders of record May 2, and thus will be shared in by the new stock.

The directors have also declared the quarterly dividend of $1 a share on the preferred, payable April 15 to holders of record March 17, and the quarterly dividend of $1 a share on the common, both $50, par value, payable April 30 to holders of record March 17.

Figures of the company available for the ten months ended Jan. 31, 1924, indicate that the volume of business done, or sales billed, for the fiscal year will probably exceed $150,000,000. The directors are optimistic over the profits for the future. They believe that the demand for the products of the company will continue to increase and they have therefore approved plans for additional manufacturing facilities to be provided during the next two years. These plans will require not only further capital expenditures, but also additional working capital which the directors believe should be met by the sale of additional common capital stock.

The present outstanding capital stock of the company is $89,775,150. The present annual dividend requirements at the rate of 8 per cent per annum are $7,183,013. It is estimated that the net income available for dividends and other purposes for the fiscal year to end March 31, 1924, will be approximately $16 000,000. The annual dividend requirements at the present rate of 8 per cent per annum, on the amount of stock outstanding, including the amount offered for subscription and also the amount of the 10 per cent stock dividend above mentioned, will be $9,480,252.

Factory Employees Receive Unusual Recognition

A new method of giving recognition to the constructive work of factory employees has been put into effect by the General Electric Company. At the various plants of the company the managers presented certain workmen with sums of money and certificates acknowledging their contributions to the progress of the electrical industry. These awards were made by the Charles A. Coffin Foundation, which was established for the broad purpose of stimulating progress in all branches of the electrical industry.

This is said to be the first time that employees in any large industry, particularly workers in the shops, have been publicly recognized for work they have done for the industry outside their ordinary duties. Engineers and research workers have gained public distinction by their achievements, but the man in the shop, as a rule, has seldom become known to other than a few of his immediate associates.

Many Orders for Interurban Freight Cars

Orders for interurban freight cars totaling nearly $60,000 are now in process of being filled by the Inter-State Car Company, Indianapolis, Ind. The largest of these amounts to $37,000 and covers twenty-five cars ordered by the Union Traction Company of Indiana. Five 50-ft. motor car bodies are being built. Steel underframes and wooden superstructures are called for in the design. The car will have a capacity of 80,000 lb. The same railway has also ordered fifteen 40-ft. trail box cars of the same capacity. The bodies in this case also will have wooden superstructures on steel frames. Five 39-ft. stock cars are to be built with a capacity of 60,000 lb. each.

The Indianapolis & Cincinnati Traction Company has ordered five new 40-ft. box cars of 80,000 lb. capacity each. These cars will have steel underframes and steel body bolsters. Five stock cars are being completely rebuilt for the same railway. They will be equipped with steel panel center sills, with cover plate and steel end sill construction. The trucks and body bolsters will be all steel. These cars will have a capacity of 60,000 lb. each. Six stock cars are also being rebuilt for the Terre Haute, Indianapolis & Eastern Traction Company. All worn parts are to be replaced and when completed the cars will be practically new.

Metal, Coal and Material Prices

Metals—New York	March 4, 1924
Copper, electrolytic, cents per lb	13.937
Copper wire base, cents per lb	16.375
Lead, cents per lb	9.05
Zinc, cents per lb	7.05
Tin, Straits, cents per lb	55.75
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.70
Somerset mine run, Boston, net tons	2.25
Pittsburgh mine run, Pittsburgh, net tons	2.125
Franklin, Ill., screenings, Chicago, net tons	1.95
Central, Ill., screenings, Chicago, net tons	1.725
Kansas screenings, Kansas City, net tons	2.25
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$6.75
Weatherproof wire base, N.Y., cents per lb	18.00
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal	$0.96
White lead, in oil (100-lb. keg), N.Y., cents per lb., carload lots	12 25
Turpentine, (bbl. lots), N. Y., per gal	$1.03

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Exhibits Planned to Show Manufacturers' Wares

To stimulate interest and pride in local industry the Ansonia National Bank, Ansonia, Conn., has inaugurated a scheme whereby the local manufacturers are taking turns exhibiting their products at the bank.

The exhibit of the Cameron Electrical Manufacturing Company included generator and railway motor commutators, starting and ignition commutators for automobiles, trucks and buses, industrial motor commutators, drop-forged commutator segments, formed mica rings and slot insulations, armature and field coils for all types of railway and industrial motors.

Rolling Stock

Birmingham Railway, Light & Power Company, Birmingham, Ala., has announced the complete specifications on its twenty new cars. The details are as follows:

Number of cars ordered	Twenty
Date order was placed	Sept. 28, 1923
Date of delivery	April 1, 1924
Builder of car body	Cincinnati Car Company
Type of car	Semi-convertible passenger
Seating capacity	Sixty-two
Weight:	
Car body	13,800 lb.
Trucks	10,000 lb.
Equipment	10,000 lb.
Total	33,800 lb.
Bolster centers, length	32 ft. 0 in.
Length over all	49 ft. 5 in.
Truck wheelbase	4 ft. 10 in.
Width over all	8 ft. 5 in.
Height, rail to trolley base	10 ft. 8 1/4 in.
Body	All steel
Interior trim	Cherry
Headlining	Agasote
Roof	Arch
Air Brakes	Westinghouse straight air
Armature bearings	Sleeve
Axles	Steel Brill
Bumpers	Hedley
Car signal system	Electric Service Supply
Car trimmings	Brass
Center and side bearings	Brill
Control	K-35
Curtain fixtures	National lock washers
Curtain material	Pantasote
Destination signs	Hunter
Door operating mechanism	National Pneumatic
Fenders	H. B.
Gears and pinions	G. E. helical
Hand brakes	Cincinnati
Heater equipment	Consolidated
Headlight	Golden Glow
Journal bearings	M. C. B.
Journal boxes	Brill
Lightning arresters	General Electric
Motors	G. E. 265
Motors	Outside hung
Paint	Flood & Conklin
Registers	International No. 5
Sanders	Ohio Brass
Sash fixtures	Dayton 183
Seats	Slats, Cincinnati Car
Seating material	Wood
Slack adjuster	American
Springs	Brill
Step treads	Feralun
Trolley catchers	Ohio Brass 13141
Trolley base	General Electric
Trolley wheels	General Electric
Trucks	Brill 76-E-1
Ventilators	Railway Utility
Wheels	26-in. chilled iron

Department of Street Railways, Detroit, Mich., will ask bids in the near future on 100 more Peter Witt type cars.

Trenton & Mercer County Traction Company, Trenton, N. J., through its subsidiary, the Central Transportation Company, has purchased seven street car type Fageol buses and three Fageol chassis.

Track and Line

Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio, will replace 2 miles of track in Bowling Green this year at a cost of $60,000.

Interstate Public Service Company, Indianapolis, Ind., is completing the installation of about 3 miles of the new steel rails between Columbus and Indianapolis. It is expected that at least 10 miles of the new steel will be put in by spring. The new rails are 80 lb., while the old rails are 60 lb.

Market Street Railway, San Francisco, Cal., during the fiscal year 1922 to 1923 started replacing the rails on all four tracks on Market Street, from Sansome Street to the ferry. The Municipal Railway is paying its prorata share of the cost. The rail used was a new section weighing 121 lb. per yard, but so designed as to fit the joint plates at the 106-lb. rail.

Godbout, Que.—The St. Regis Paper Company has completed an electric railway in and about the town of Godbout which connects the mills and the water front. It will be used largely for the transportation of pulp and paper from the mills to the wharves. The rolling stock has been purchased and operation will be started in the spring. Power will be obtained from the hydro plant of the St. Regis Paper Company, at Godbout, on the Saguenay River.

Tri-City Railway, Davenport, Iowa, will replace six blocks of trolley wire on Second Street from Scott to Pershing. Construction of new cables to support the new trolley has already progressed along several blocks of the street.

Georgia Railway & Power Company, Atlanta, Ga., is extending what is known as the McKuhn Street switch on McLendon Street to Whiteford Avenue, a distance of about 1,400 ft. at a cost of approximately $18,000. Marietta Street will also be repaved. The track is being rebuilt on Piedmont Avenue and on Pulliam Avenue.

Trade Notes

W. J. Jeandron, United States agent for the "Le Carbone" carbon brushes, has been away for six weeks visiting the Le Carbone factory in France. It is understood that he is about to introduce into the United States dry cells and primary batteries of "Le Carbone" manufacture. These batteries will have the same high standard of quality and uniformity that "Le Carbone" carbon brushes enjoy.

C. L. Hancock is the Phono-Electric sales engineer of the Bridgeport Brass Company, Bridgeport, Conn. He has been with the company since 1920. After two years in high school Mr. Hancock went to work for Westinghouse, Church, Kerr & Company in 1906. The next year he joined forces with the Westinghouse Electric & Manufacturing Company on the electrification of overhead lines. In 1908 his work had been so unusual that the attention of the railroad officials was attracted to it and he was transferred to the New York, New Haven & Hartford Railroad in charge of its overhead maintenance. In 1910 he became chief clerk of the superintendent of electric traction and for ten years increased his experiense along this line.

E. G. Best has recently been made general manager of the Eureka Company, North East, Pa., which has passed into entirely new hands. During the past eighteen years Mr. Best has been connected in an engineering and consulting capacity with several of the largest steel companies in the United States and Canada. The company will continue its production of line materials, trolley wheels, controller and commutator parts and drop forgings.

Lapp Insulator Company, Inc., Le Roy, N. Y., has placed contracts and is now at work on additions to its plant which will double the capacity, giving an equivalent of twenty-two kilns. A contract for the main factory addition, 120 ft. x 500 ft., has been placed with the Austin Company, Cleveland, Ohio, and a contract for the largest size continuous kiln has been placed with Carl B. Harrop of Columbus.

Cameron Electrical Manufacturing Company, Ansonia, Conn., at a recent meeting of its board of directors elected John B. Davidson president and treasurer. Mr. Davidson has been identified with this company as its active directing head for more than twenty-five years. He succeeds as president John F. Kent, deceased.

New Advertising Literature

E. P. Seymour Rail Grinder Company, Waltham, Mass., has just issued an interesting new circular on its "Midget" rail grinding machine. A complete description of the advantages of the machine is given in brief itemized form and several photographs illustrate its general shape and type of construction.

Crouse-Hinds Company, Syracuse, N. Y., has issued Folder No. 8, on condulets for switch and plug receptacle outlets.

Quigley Furnace Specialties Company, New York, N. Y., has issued a booklet on "Ganisand" with illustrations. Information is given to show haw ganisand is used for refractory linings including its uses for baffles, patching boiler settings, making special tile, etc.

J. W. Paxson Company, Philadelphia, Pa., has published a forty-eight-page booklet on "Sand Blast Machinery." It illustrates and describes sand blast rooms, sand blast hose machines, dust collectors, etc.

Walter A. Zelnicker Supply Company, St. Louis, Mo., has issued bulletin No. 315 on plant equipment specials.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has recently published an eight-page circular, known as C-1694, entitled "Supervisory Control." In this circular the general principles of operation and construction of both audible and visual systems of supervisory control for automatic substation are set forth.

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New York, March 15, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 63
Number 11

Running the Same Old Cars in the Same Old Way

ABOUT the only thing which benefits by being the same today as it was many years ago is some relic of a bygone generation. When a railway man boasts that "We go along in the same old way we have always gone—nothing much that is new or different," it places his company in a class with other antiques. The strange part of it is that some railway executives seem proud to be following such a policy.

It goes without saying that this attitude of pride in being old fashioned is not characteristic of the electric railway industry as a whole. But it is unfortunate that there should be even a few who take that position, because it furnishes ammunition to the critics of the electric railway who decry its usefulness and prophesy its speedy demise.

What a different point of view is that of the president of a railway which recently commenced bus operation. He was asked why the company was planning this move. "Well," he said, "it's something new; that's what the people want. It shows we are doing something besides running the same old cars in the same old way."

Criticism of the railway which sticks firmly to its established customs and makes no changes or improvements is perfectly fair because it is nearly always a question of disinclination to do otherwise rather than inability. That this is so is shown by the fact that it is boasted of, not regretted.

The executive with foresight and courage will find a way to do something new, regardless of the financial condition of the company, and usually such improvements will pay for themselves many times over.

Contracting for Labor on Annual Output Basis

PERHAPS the most interesting idea to Americans in the review of operations of the combined transit system of Paris on page 415 is the plan of handling the time of platform men on the basis of annual instead of daily or weekly output. The limitations set upon the Paris management because of the legal regulations concerning eight-hour days, forty-eight-hour weeks and twenty-one-day vacations certainly called for ingenuity and mutual good feeling if the undertaking was to be operated without an excessive number of extra men. The plan of contracting for a total annual output goes a long way toward settling this problem in a time when the employment situation made it difficult to employ extras in any event.

In essence, the plan means that a man agrees to work more hours per week in the heavy traffic months, or on the heavy traffic days; and in exchange therefor he enjoys a shorter working period at other times. The natural tendency resulting from this practice is to give the experienced man the opportunity to earn extra money when there is extra work to be done, and, on the other hand, to permit the management to economize in labor expense during periods when it would not pay to have the men average a legal day's work.

It may be worth some thought to see whether this Paris plan could be put in practice here. It certainly is not fair to have to keep regular runs going full time on the dullest days simply to give the men their guaranteed pay and then, at other times, to have to employ extras with minimum wage guarantee and maximum accident liability. The annual output plan has the advantage of averaging out many inequalities and of proving profitable to both parties.

Make Your Headways Sell Your Service

"EVERY hour on the hour. Your watch is your time-table" is the well-known slogan by which some interurban railways seek to popularize their service. There is an idea in this that street railways might use, too. Of course, an hourly headway is likely to occur only in interurban service, but the same general principle applies with equal force to any other headway except one so short that the public does not have to keep in mind the leaving times of cars.

When the service is infrequent, it should be so operated that railway patrons or the man on the street can easily remember the schedule. For instance, if cars leave a central terminal on a ten-minute headway it is desirable that they should leave at ten, twenty, thirty minutes, etc., past the hour. At other points the leaving times can be remembered quite readily as the cars will leave, say, three minutes later, at thirteen, twenty-three, thirty-three, etc., or some corresponding combination. Freak headways of any sort are undesirable. One car every twenty-eight minutes is not appreciably more convenient from the standpoint of frequency than one car every half hour, and it certainly is much worse from the standpoint of ease in remembering the schedule. A combination headway with a three-minute interval between cars and then a seven-minute interval may pass for a five-minute average headway in the time-table department, but it will not be so considered by the general public.

Undoubtedly great economies in electric railway operation have been accomplished by the scientific scheduling of cars. Careful study by competent men is required to prepare time-tables so that cars will not pull out too early, stay out too long, waste time in excessive layovers, or bunch in the central district. The time and money employed to make accurate traffic checks are well spent.

But after the mathematical analysis of traffic demands has been made, the matter should not be dropped there. The psychological effect on the public

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of a change in the headway should be very carefully considered. For example, if a fifteen-minute headway were found slightly shorter than required by traffic demand, the interval should not be lengthened to, say, seventeen minutes. Of course, it sounds absurd to say that any railway would do such a thing as that, even though a car could be saved by the change. The JOURNAL is, however, familiar with a number of systems where just such headways are maintained, and the time-table men feel that they have made excellent schedules. In such a case as that cited, if the headway could be increased to twenty minutes it would accomplish still more saving and make a schedule the public could understand. Every unnecessary car-mile should be cut out of the schedule, of course, but there always must be a certain leeway. Since the idea of the railway is to sell service, economizing should not be done at too great a sacrifice of public convenience. The public needs to be encouraged in every possible way to ride on the railway, and an easily remembered time-table is a factor of no small importance.

Local Citizens in the Directorate an Asset for Syndicate Properties

ABSENTEE management of utilities, particularly of street railways, has long been known to have very distinct disadvantages from the standpoint of public relations. The administrative advantages of syndicate management, which are of course the reason for it, can easily be demonstrated. With the form of organization so often adopted, where the local manager has little authority and has to obtain orders from headquarters even for inconsequential acts, his position is difficult. When a serious local controversy arises some of the local people seem to take delight in attacking the company, because they feel, perhaps, that they are fighting "Wall Street"—because there is no local personality that stands out as representing the company.

Several means have been used successfully by holding companies to overcome this tendency. One of them is to place on the board of directors local men who have the confidence of the public and whose business experience qualifies them to serve. Another plan goes even further, in selecting for the president of the company a local man. The manager, of course, should be a man who, although he may come from outside and be chosen for his ability in operation, will become a part and parcel of the community.

But such things are not always done, even at this advanced stage of the art of maintaining good public relations, desirable as they are. Recently, in an instance where the company needed all the favor it could muster with the local people, the question arose at once, "Who are your local directors?"

The company had none. There was no local banker or merchant or manufacturer, whose standing in the community and whose knowledge of the company's affairs enabled him to speak authoritatively and show the justice of the company's position. There was no local man identified with the management, or who had interests in the company, that would be hurt by unfriendly or unwarranted treatment. The situation, already bad, was made that much harder to handle, and the result was perhaps less favorable than it might otherwise have been. It served to impress on observers again the desirability, in fact the necessity, of having local representation in the councils of the company.

The Habit of Preserving Junk

SOME railway men, it seems, cannot bring themselves to junk old cars as long as there is a dollar of value left in them. When the need for some change is realized, instead of buying new cars, they scheme up some way to rearrange the body, or put two bodies together, and then after a nice paint and varnish job, run the product out on the street as "modern" equipment. And what have they done?

They have increased the original investment in the car by perhaps 100 per cent, considering the price of the car twenty years ago. They have saddled upon themselves the continuance of the high energy and maintenance costs. They have continued the slow acceleration and slow running speed, items which are most costly in the light of present-day wages. They are depriving themselves of the merchandising value of the higher speed and easier riding which would have been effected by the purchase of new cars. And finally, they still have old cars—improved to be sure, but still old.

What may seem at first thought to be an economy, often is a very dear procedure. To spend 20 per cent to 30 per cent of the cost of new cars to rebuild the old ones may cause a company to lose savings which would make a substantial addition to its net, not to try to evaluate the attraction of new cars to riders.

Definite examples of this fallacy have been cited in these columns heretofore. Two more cases, which, incidentally, are from the studies of one who would not profit by the purchase of new equipment, are cited here.

A certain street railway company, had it junked its equipment and bought all new cars, instead of rebuilding, would have saved enough on the two items of power and maintenance alone to have paid for the new cars in five years and thereafter earned 20 per cent on the cost of the new cars. Still this company has not only been rebuilding its old junk, but it has bought a number of cars "unloaded" by some other company and spent a sizable amount in fitting them up.

A certain rapid transit company is planning to spend a large sum in rebuilding old wooden cars for a different manner of operation, while if it were to spend a larger amount for new cars and junk the old ones, the procedure would be twice as profitable to the company, measured in net results.

There are of course exceptions where it may actually be profitable to rebuild old cars. But generally speaking the order of the day is new cars, for it is part of the industry's program of modernization. Furthermore, it is very questionable whether any steps should be taken to perpetuate the operation of wooden cars, in view of the lightness with which steel cars can be built and their greater freedom from serious accidents.

Truth Must Dominate Publicity

THERE is just a little evidence, only recently manifested, that the instrumentality of publicity may be used to put something over that would not bear up under close scrutiny. The industry should jealously watch and guard against any such work, for it will later react to undo much of the good will that has been built. We must not permit anything but honest purpose to be the underlying motive for any of our publicity matter. And we cannot afford to let any unscrupulous person endanger the accepted sincerity of our publicity efforts in general.

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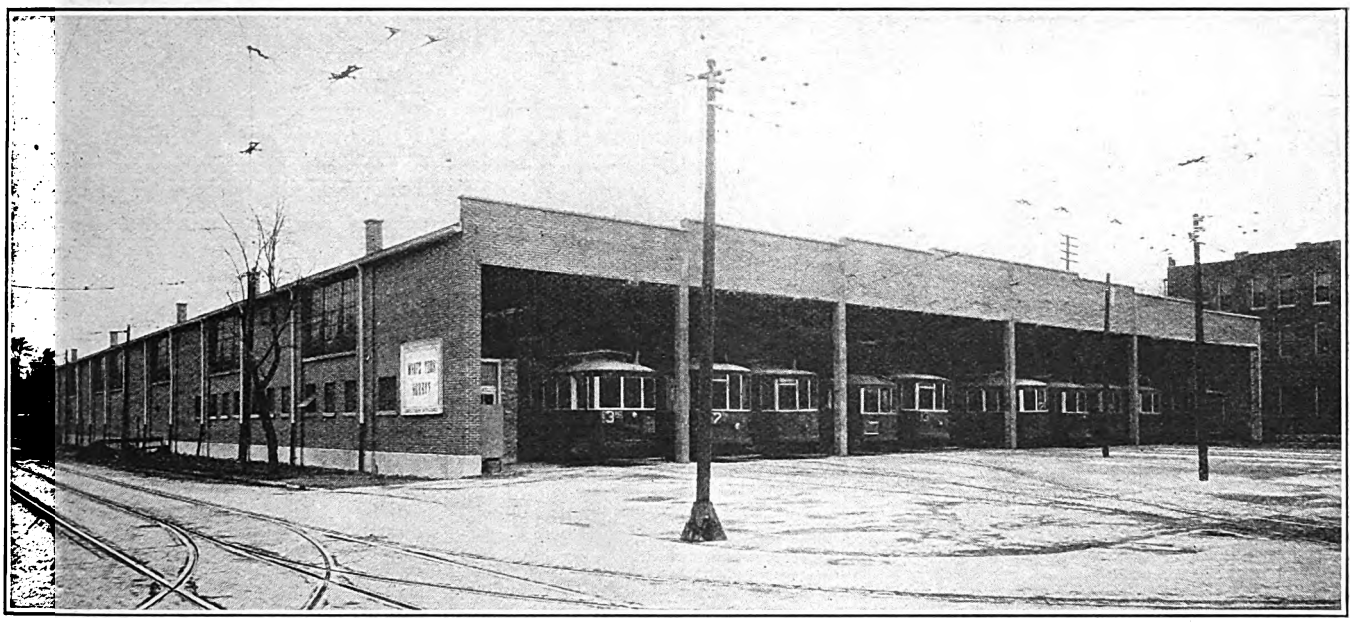
Carhouse for 100 Cars at Louisville

New Structure, Which Replaces Carhouse Burned Last Year, Is of Reinforced Concrete with Full Sprinkler Equipment—Through Tracks Facilitate Car Movement—A Novel Type of Double Skeleton Pits and Facilities for Car Washing Are Features

By F. H. Miller
Vice-President in Charge of Engineering, Louisville Railway



Louisville Carhouse from the Corner of Fourth and Avery Streets. A Reinforced Concrete Roof Is Placed Over the Entire Carhouse, but End Doors Are Not Provided

THE Fourth Street carhouse of the Louisville Railway, which recently was put in commission, represents the best thought of the company in the design of a modern fireproof structure for housing approximately 100 cars. Facilities are provided for inspection, car washing and light repair work.

The fire which destroyed a portion of the old carhouse occurred Jan. 15, 1923, and burned thirty-four cars of various types, including twenty-four passenger cars. The fire wall between the brick portion of the old carhouse and frame sheds, combined with a favorable direction of the wind, prevented the spread of the fire, so that no cars were lost other than those housed in the brick portion.

Four days after the fire the fire loss had been adjusted by the insurance company, the burned carhouse had been cleared of rubbish, temporary trolley wires had been erected and a temporary roof had been built over the office, so that the carhouse foreman was back in his old location and the carhouse in use. Deciding at once to rebuild, plans were prepared for the construction of a modern reinforced concrete, sprinkled carhouse, with a separate office and recreation building, the latter being placed on a separate lot owned by the company on the opposite side of Fourth Street. A contract was let for the building March 24, 1923, and the entire construction was finished in October, the office building being opened by a dance given by the Co-operative Welfare Association of the company on the night of Nov. 1.

The south end of the carhouse with its track connections was finished first and that portion placed in use while the north half was being constructed. To take care of the additional car storage required, temporary outdoor tracks were provided on company property several blocks from the carhouse site.

Track Layout Is Flexible

The new track layout is very flexible, as indicated in the larger line drawing. The loop around the office building is used as a terminus for a short line of cars. Cars can enter the house from either direction and, as each track goes completely through, can leave without being reversed. It is also possible to wye cars at either end of the carhouse. This arrangement is of particular advantage when hauling trailers, as is the practice in Louisville.

Due to the narrowness of the street and the special track layout, the ends of the building are set back 45 ft. 9½ in. from the property line. This gives ample clearance within the house.

The construction is reinforced concrete throughout, except the walls, which are of brick. No doors have been placed at either end of the carhouse, but provision has been made for installing gates in case they are deemed necessary. This has been provided for by inserting steel angle supports for hinges in the vertical concrete columns. Some saving was made by utilizing the east wall of the old brick carhouse in the construction.

A row of small rooms and bins has been built along the entire west wall of the carhouse. These provide a shop office, a room for the motor inspectors, wash-

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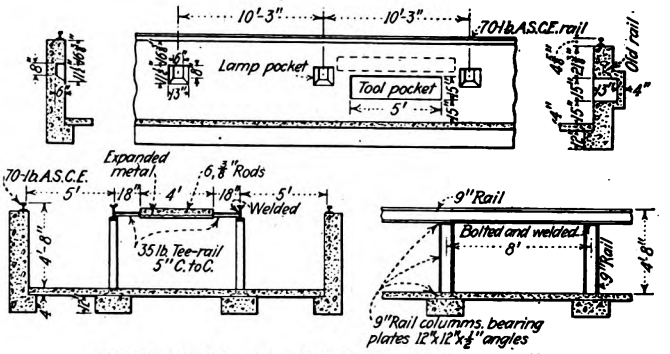
rooms and toilets for men employees and women car washers, also for storage of various kinds. Space is given for drying and storing sand, coke and salt. Steel sash are used in the windows.

The roof is of reinforced concrete construction, supported on reinforced concrete pillars spaced between the tracks. The roof is covered with 4-ply Trinidad Lake asphalt felt. A number of skylights in the roof provide light and ventilation.

Fire protection for the entire building is obtained by the dry-pipe sprinkler system. There are 1,486 sprinkler heads spaced beneath the roof, instead of at car height. This places them out of danger of being struck by trolley poles. Sprinkler heads are not provided in the pits.

The arrangements within the carhouse are shown in the larger line drawing. There is one pit of ordinary type, 150 ft. long, on track 8. Two double pits of novel construction are under tracks 2 and 3 and 10 and 11. These pits, shown in the accompanying illustrations, are arranged in such a manner as to give a free space on one side of each of the two adjoining tracks. This is accomplished by supporting the track rails on vertical columns made of old 9-in. girder rails. Cross members of 35-lb. T-rail tie the adjacent track rails together and form the beams for a reinforced concrete walkway midway between the two tracks of the pair. The steel members are bolted and welded top and bottom. The pits are 4 ft. 8 in. deep from the top of the track rails, which leaves a free space beneath the concrete walkway of approximately 3 ft. 10 in.

In addition to lamp pockets along the walls of the pits, a novel feature is the inclusion of tool pockets,



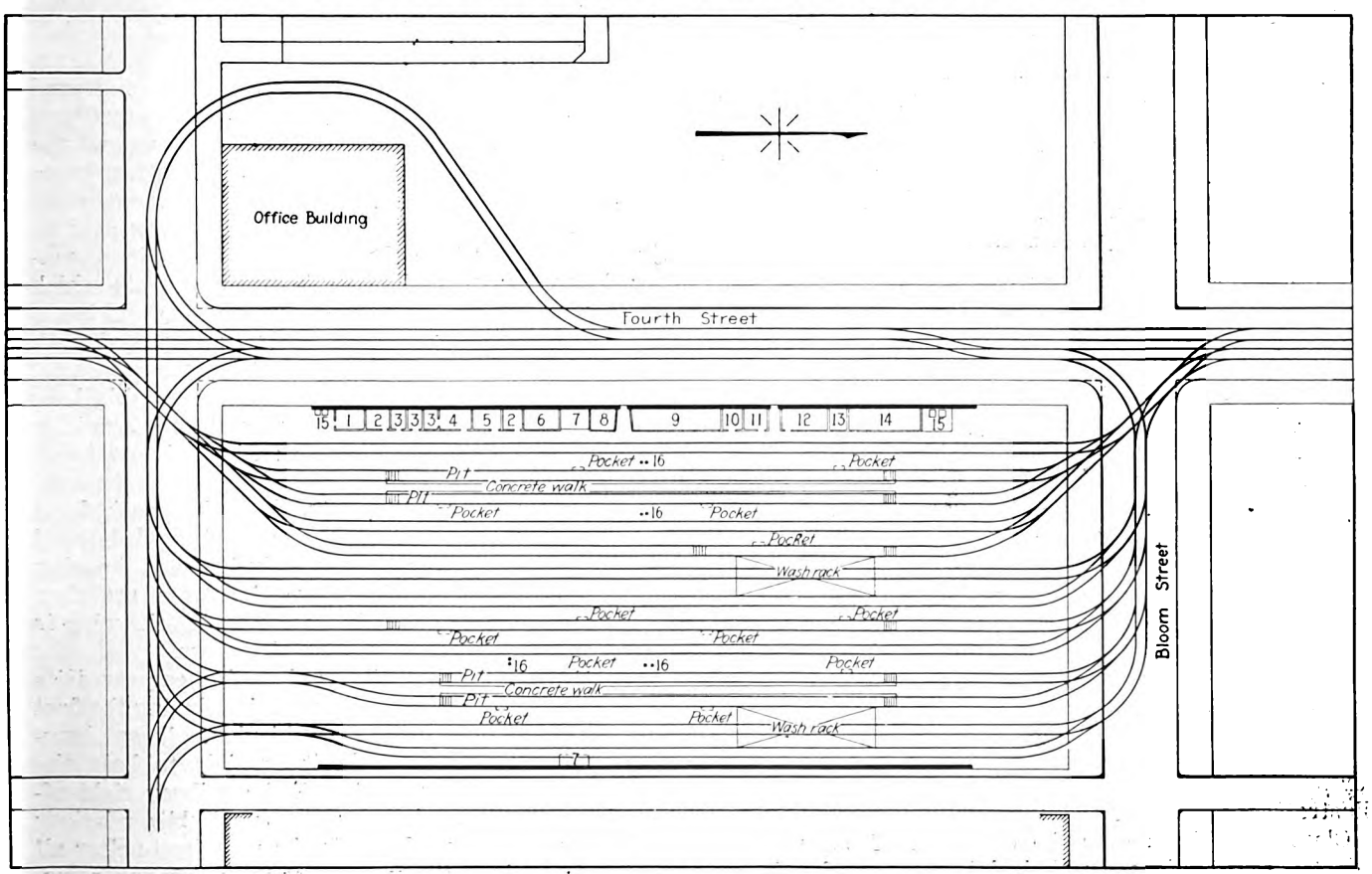
Details of Pits, Showing Walkway Construction

providing places where the workman may leave his tools out of the dirt and moisture of the pit bottom. There are four of these pockets, two on each side of a double pit, the nearest one being approximately 20 ft. from the steps at the end. The lamp pockets are spaced 10 ft. 2 in., giving ample lighting at all points beneath the cars.

The floor of the carhouse is paved with 1½ in. of Tarmac placed on old macadam ballast which had previously been thoroughly tamped and rolled. Relaying rails are placed on creosoted ties for the trackwork inside the carhouse. Inside drainage is provided by frequent cesspools connected to 8-in. wrought iron drain pipes which connect with the city sewers.

The carhouse is piped for both hot and cold water, and a number of taps for each are provided at convenient points.

A car washing system is being installed at two locations within the carhouse. With this arrangement,



Floor Plan of New Louisville Carhouse

1—Office.
2—Storage.
3—Toilets.
4—For women car washers.
5—For men car washers.
6—Salt.
7—Pit and sprinkler system control.
8—Kindling.
9—Sand.
10—Rags.
11—Oil.
12—Motor inspector's room.
13—Coal.
14—Coke.
15—Sand and coke.

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cars will be washed by being passed between several vertical streams of flowing water. This system is similar to that used successfully in Detroit and Toronto.

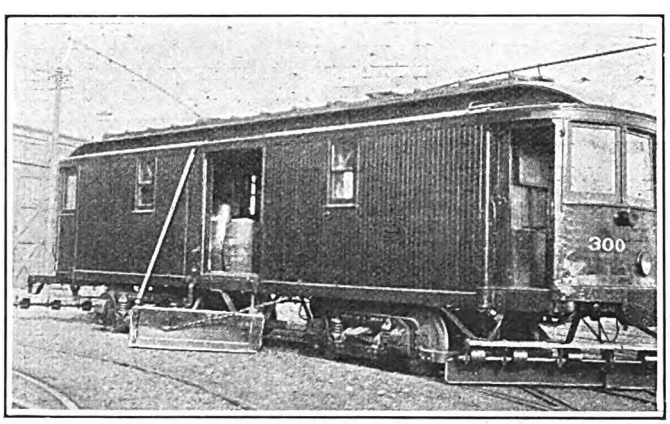
Wooden trolley troughs are used throughout the carhouse, being suspended from the concrete roof by means of ¾-in. rods. Lighting within the carhouse is from the 600-volt d.c. trolley circuit, while the office building across the street is lighted from the local electric light company's service.

The office building, which is directly across Fourth Street from the carhouse, at the corner of Avery Street, has the foreman's office on the first floor. A large waiting and recreation room is provided for the platform men. As shown in the illustrations, this room contains ample facilities for writing reports, and is provided with time-table racks, bulletin boards, etc. There are also two pool tables, a locker room with individual steel lockers for each employee, a shower bath room with extra lockers for the basketball teams and a washroom. The second story is devoted to recreation purposes and has a large floor which is used for games and as a gymnasium. The basketball floor is 40 ft. x 80 ft. with a clear height of 25 ft. This floor is used weekly by the company basketball team, which plays in an industrial league. The employees also hold dances there monthly.

The basement, which goes under only a portion of the building, provides space for a heating plant and coal storage.

Snow Scrapers on Heavy Freight Car

BECAUSE of lack of business due to auto truck competition, the electric express department of the Union Street Railway, New Bedford, Mass., was forced to discontinue operation some time ago. This left the company with several express cars on its hands and no apparent use for them. As they were of heavy tonnage the company decided to try the experiment of equipping them with special snow-fighting apparatus. This was done in different ways on different cars, but the general plan was to place diagonal scrapers on the front and rear ends and wing attachments at the middle of the sides. A typical example of such a freight car equipped



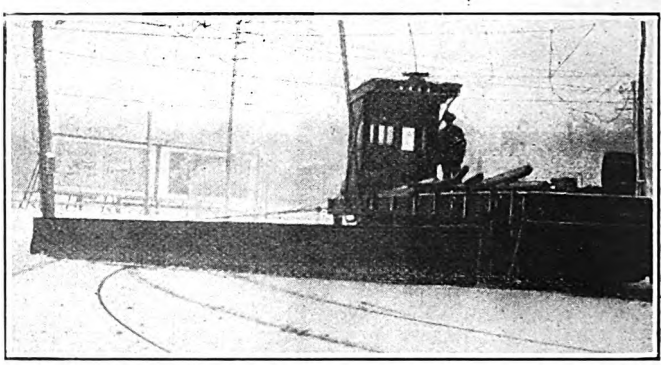
One of Several Express Cars Rebuilt by the Union Street Railway for Use as Snow Plows

for snow-fighting work is shown in the accompanying illustration. These cars have proved extremely effective.

Close supervision over the operation of snow plows during a storm is accomplished by means of a large map showing all the routes of the railway. Yellow headed pins numbered to correspond with the numbers of the snow plows are placed on this map to indicate the position of the different units. The operators of plows are required to telephone in to the office of the superintendent of transportation whenever they reach a telephone station. The approximate location of every such unit at any particular moment is shown by the pins on the map.

Long Wing Clears Roadway of Snow

AFTER a snowstorm, in order to clear a vehicular roadway alongside of its track and thus provide a place for the operation of automobiles, the Boston & Worcester Street Railway, Framingham, Mass., has equipped a heavy flat car with two extremely long wings. There is a wing on each side of the car ar-



When the Snow Wing on This Car Is Swung Outward to the Maximum a Roadway of 22 Ft. Can Be Cleared

ranged to swing outward to the right from the front end of the car, regardless of the direction in which it is going. The wings are hinged and may be swung outward at varying angles according to the width of the roadway to be cleared of snow. When not in use they are swung in close to the side of the car and hooked up.

Each wing is built of ⅝-in. steel sheeting reinforced in back by two 75-lb. rails. Two A-frames, the vertices of which rest in sockets in the side of the car and the legs of which rest against the wings, are used to brace it in its outward position. Frames of different sizes are available so that the position of the wing may be adjusted. Timber is used for these frames, the dimensions depending upon the length and the strain which they have to carry. The wing is 33 ft. long and has a maximum sweep of 22 ft. A minimum space of 4 ft. can be obtained by using the shortest frame.

Because it is of such heavy construction this long wing is difficult to handle. The procedure when it is desired to swing it out into position is first to raise it slightly by means of a block and fall from the supports on which it normally rests. It is then pushed out by hand far enough to clear the supports and dropped down to the ground. The car is backed up and the wing swings out by itself. The two A-frames are then placed in their proper position, after which the wing is tightened up by means of ropes and pulleys.

It is thought by the railway that this car saved its comparatively small cost of construction during the first snowstorm. The clearing of a vehicular railway alongside of the track has made it possible to keep the automobiles and motor trucks off the railway right-of-way and has prevented many tieups. Public relations also have been improved. It is the practice to clear all streets where the railway operates with this apparatus, the snow being pushed back all the way to the curb. No particular attention is paid to sidewalks, hydrants, etc., in the operation of the car, the clearing of such locations being done later by hand.

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Would Speed Up Cars and Stop Jitneys

In Houston, Tex., Shortening of Indirect Railway Routes, the Elimination of Unnecessary Stops and Changes in Car Design to Speed Up Service Are Recommended as the Result of Consultant's Investigation —Jitneys Unnecessary and Elimination Will Materially Aid Railway

ELIMINATION of jitneys on the part of the city, and rerouting, rescheduling and general conservation of time, combined with the use of all practicable operating economies on the part of the Houston Electric Company, are recommended in two reports by John A. Beeler, New York, made for the city. He maintains that the jitney should be limited to fields where it will assist in building up the community rather than to be allowed to operate where it tends to destroy a service which it is economically unfitted to supplant. While showing the city the wisdom of eliminating this unfair competition, the report points out that the solution of present difficulties lies largely within the power of the railway. It must revamp its slow, halting service, eliminate unnecessary stops and delays, and reduce the waste in all factors involving the time element.

As a result of this survey an agreement has been accepted by the city and by the company, as told in ELECTRIC RAILWAY JOURNAL of Jan. 26, 1924, which will eliminate the jitneys after April 1. The railway will undertake extensive improvements costing approximately $1,500,000 during the next three years.

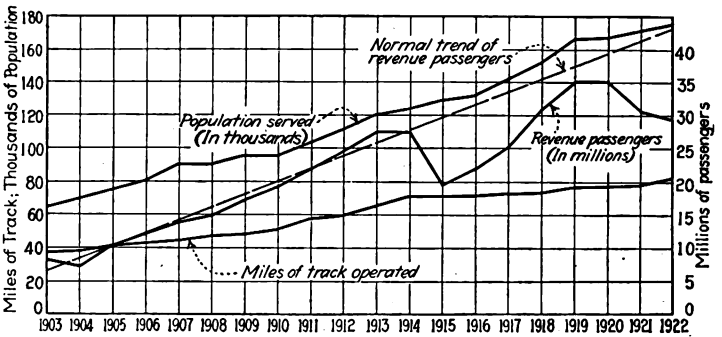
The engineer's report shows that the number of revenue rides per capita per annum per mile of track formerly ran between 3.36 and 3.91, averaging 3.58 prior to 1914. In 1915 when the jitneys began to operate in numbers this factor dropped to 2.13. Since then the riding habit has been unsteady. It rose to 2.78 in 1918, but afterward it fell off steadily until 1922, when it was down to 2.08, or 40 per cent below the pre-war rate. There has been a similar trend in the total number of revenue passengers carried. Had the general traffic trend continued after 1914 as it was from 1903 to 1914, the number of passengers would now be 45,000,000 instead of 31,000,000. The jitney in 1923 was carrying 8,700,000 passengers, bringing up the total to nearly 40,000,000. The fare increase to 7 cents undoubtedly had its effect on the riding habit, but the slow speed of cars is thought to be also to blame.

Factors that are contributing to slow speed in Houston are slow loading and unloading due to narrow single doors, waiting at turnouts, too many stopping places, and a large number of positive stops, the report states. The failure on the part of the management and the men to realize the value of the time element in transportation is everywhere in evidence. The value of a second seems to be completely ignored. These valuable time units are being squandered all day long on practically all lines. One of the reasons why the jitney has made such inroads into the railway business is because it saves time.

The operating revenues for Houston are uniformly lower than elsewhere except as measured in earnings per mile of track. The reason for this item being higher is apparently the large amount of single track. This would indicate the need of more double-track lines for two-way operation, enabling the company to make better schedule speed.

At present there are nineteen routes in operation. Four of these are shuttle lines. Six are routes operating through the business district from one section of the city to another. The through routing is a prominent feature. Favorable conditions for through routes require balanced loading in the two sections and direct-routing. Some of the present lines do not entirely meet these requirements, and suggestions are made in the report for rerouting to overcome this difficulty.

A number of lines operate in one direction only on certain streets, service in the other direction being supplied on a parallel street several blocks away. On one single-track belt line the patrons from some districts ride a considerable distance out of their way on inbound trips. Test rides show that approximately 73 per cent



Population Served, Track Operated, and Revenue Passengers of the Houston Electric Company, 1903 to 1922. Passenger Curve Shows Effect of Jitneys, Beginning in 1915.

of the total passengers ride through the terminal on their way to the business district. These people are carried on an average of 1.19 miles out of their way at a loss of eight minutes time.

A routing which will provide an extension of service into some well-settled districts, and give two-way service in some sections now served in only one direction by the present belt or loop lines, would be an improvement over the existing arrangement. The principal changes suggested to accomplish this end are the combination of two shuttle lines with their connecting trunk lines, and the double tracking of certain streets to permit operation in both directions.

The discontinuance and removal of 2.32 miles of track is recommended. This is to be replaced by 3.66 miles of new track consisting of connections for more direct routing, and double tracking for some of the existing single-track lines. The track which is to be removed includes single track which must be taken up for the laying of double track. As much of this track is rapidly approaching a condition when it will have to be rebuilt, the entire expense can hardly be attributed to rerouting alone. The extent of the accrued depreciation would be a renewal. It is considered that it would be advisable to charge the value of all the track that is discontinued to the renewal and retirement fund instead of new capital account.

The running time of a street car is of vital importance to the quality of service. The faster the schedules are, consistent with their being maintained, the

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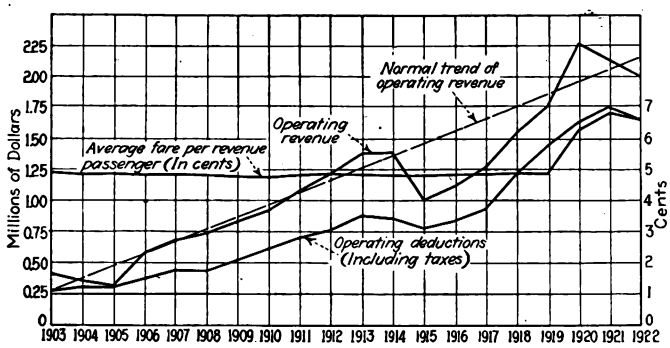


Average Fare per Revenue Passenger, and Annual Revenue and Expenses, Houston Electric Company

better the service for the car rider and the community in general. Cars are averaging 9 m.p.h., while the jitneys are making 14 m.p.h. Every practicable thing should be done to minimize the delays and speed up the service. The running time on most of the lines in Houston is too slow. Some have a long layover, much of which is killed along the route to the disgust of the patron.

Cars are operated at present on a "stop-at-every-block" policy. The number of passenger stopping places under the arrangement is about sixteen to the mile. In Houston an average of 6.28 stops per mile are made during the middle of the day, and 6.83 per mile during the rush hour.

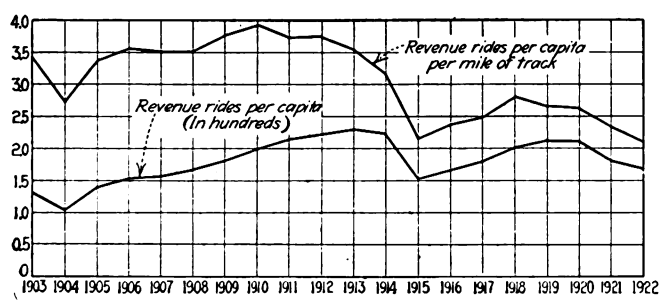
The report states that a complete revision of stopping places is hardly justified, but that readjustment is needed in some sections where the spacing is altogether too close. Care should be taken to have the stops located in the most advantageous places. A stop should not be made on a single track if there is a possibility of one on double track serving approximately the same location. By this means cars moving in the opposite direction would not be delayed.

At certain points positive stops serve a useful purpose. It is common practice, however, to have positive stops ordered for various reasons which have little or nothing to do with safety, and sometimes they are enforced long after the disappearance of conditions for which they were installed. Houston has an excessive number of positive stops.

Boulevards are important arteries of passenger travel, but the number of persons in automobiles accommodated by requiring every street car to stop before crossing is small compared with the number of car patrons discommoded by the practice.

Positive stops are made at street car intersections by cars approaching on all lines. This is unnecessary as the more important lines can be given the preference and the other lines required to observe the stop. Such a procedure would speed up considerably more than half the cars, with no reduction in safety.

At all street intersections in the business district



Trend of Riding Habit on Houston Electric Company Lines

positive stops are required. This applies even when the signal lights show "clear." While it is true that a car is usually obliged to stop at each of these intersections to load or unload passengers, this does not entirely justify the practice, because it is the occasional time gained when having the right-of-way that enables the cars to keep on schedule.

Double berthing should be employed at all important stops in the congested districts and at the heavier outside loading points. This is not now practiced, although when two or three cars are standing at the same stopping place they all load and unload simultaneously. However, when the first car pulls out the second car frequently goes forward and stops again for additional passengers. When the second car moves ahead after taking on and discharging passengers it should proceed without stopping a second time.

Every one-man safety car in Houston is provided with a single door at the front end. Only one line of passengers can load or unload at a time. It is not uncommon during the rush hour to see a car stand ninety seconds or longer at a single stop. In the business district where the congestion is greatest and where there is the greatest necessity of keeping cars in motion, the most time is taken up in the interchange of passengers. Every possible means should be used to reduce the length of stop. Test rides indicate that the average length of passenger stop is slightly more than eleven seconds. With a car making six stops per mile it means that with every second reduction in the average length of stop, the speed can be increased one-eighth of a mile per hour.

All of the large double-truck Birney cars should be remodeled so as to provide separate entrance and exit facilities at the front end, and a single entrance or exit at the rear. With such an arrangement and with the use of street collectors, loading and unloading in many instances would be accomplished in a third of the time that it takes at present.

At the more congested corners, young, energetic men should be stationed to sell tickets, collect fares, and assist passengers. With the larger cars remodeled and equipped with doors at both ends, these street collectors can let passengers in the rear door in the case of the safety car, or in the front door on the two-man car.

One source of delay to street cars and vehicles alike is angle parking in the congested district. In many places this forces moving vehicles on the car tracks and interferes seriously with the movement of all traffic. The parked cars backing out into the street are a source of great danger. For safety and speed in transportation, angle parking should be discontinued on all streets on which there are car movements. Of course, parking opposite a car stop should be prohibited throughout the city.

The effect of the proposed changes in routing and headways will reduce the number of cars needed.

NUMBER OF CARS

	Present	Proposed
A. M. rush period	158	147
Non-rush period	90	83
P. M. rush period	174	152
Night	73	68

The proposed schedules result in a total saving of seven base and twenty-two rush-hour cars, and the proportion of one-man cars is greatly increased. About 27 per cent of the cars are now operated with two men. Careful investigation indicates that one-man operation can be extended further, thus increasing the efficiency.

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With a single exception, all lines should operate one-man cars regularly.

A summary of the car-hours and car-miles present and proposed follows:

	Car-Miles		Car-Hours	
	Present	Proposed	Present	Proposed
Two-man cars	3,984	1,300	464	155
One-man cars (single-truck)	8,709	8,587	1,030	935
One-man cars (double-truck)	5,349	7,720	540	762
All cars	18,042	17,607	2,034	1,852

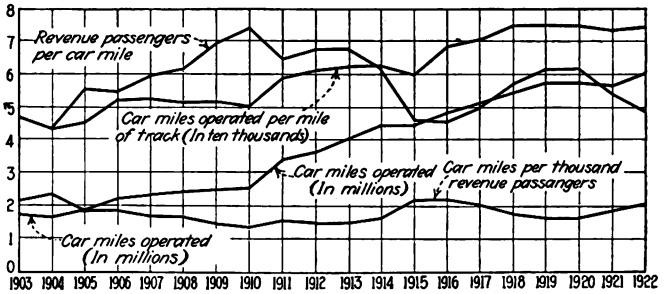
This is a saving in car-hours required of 182 daily, and 309 car-hours now operated with two-man cars will be replaced by one-man cars. There will be a reduction of 435 car-miles daily because of the better distribution of service. There will be an actual extension and increase of needed service. The waste mileage will be eliminated, several of the routes will be shortened, two-way service will be provided in a number of places where there is only one-way operation at present, and the rush-hour cars will be better distributed to meet the demands under the proposed plan.

More than 33 per cent of the revenue passengers carried by the Houston Electric Company make use of the free transfer privilege. Such a proportion is unusually large for a system with so many through lines, and one with practically every line entering the business district. Many people do not hesitate to use transfers improperly obtained or that have expired. The railway is thought to be largely to blame for the abuse of the transfer privilege because of the laxity of the system employed. It is recommended that a new type transfer be adopted and that the issuance and acceptance of transfers be carefully inspected.

Financial Aspects of Recommendations

The consultant states in his report that in order to bring the plant up to the highest degree of operating efficiency needed, some $163,000 will have to be spent for trackwork, and fifteen modern double-truck one-man cars purchased at a cost of about $12,000 each or a total of $180,000. This means a total immediate expenditure of $343,000.

As all of the new cars are replacing old equipment unfitted for present operation, their entire cost should be paid out of the renewals and retirements reserve. The cost represented by the track that is retired by the new trackwork should be charged to the renewals and retirements reserve. This amounts to $93,000, leaving about $70,000 which should be charged to capital. At 7 per cent this will increase the annual interest charges $4,900.



Service Rendered by Houston Electric Company. Total Car-Miles Operated, Car-Miles per Mile of Track and per Thousand Revenue Passengers, and Revenue Passengers per Car-Mile

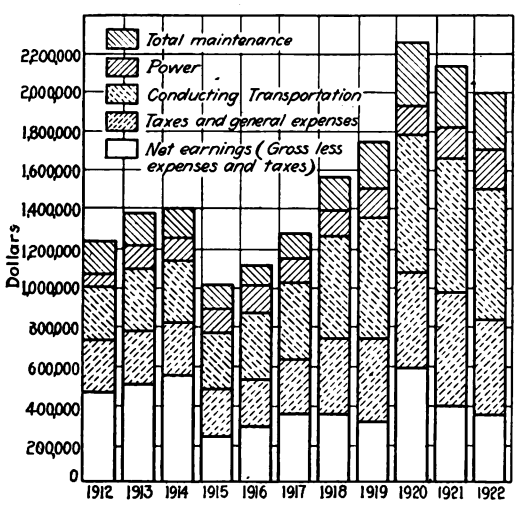
In order to determine the reduction in operating expense due to the fewer car-hours required, an estimate was prepared of the cost per car-hour. With the changes as proposed effective, the total annual reduction in expenses that should accrue are as follows:

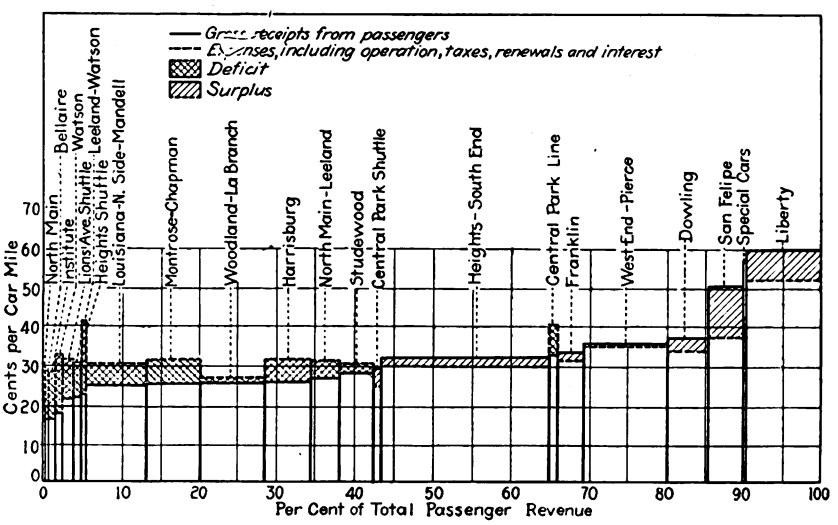
309 car-hours daily changed from two-man to one-man operation, 309 x $0.741, equals $229 daily; or yearly, $229 x 365	$83,500
95 one-man single-truck car-hours saved daily, 95 x $1.277, equals $121 daily, or yearly, $121 x 365	44,300
Equivalent of eighty-seven one-man double-truck car-hours saved daily, 87 x $1.598, equals $139 daily, or yearly, $139 x 365	50,700
Increased revenue by improved transfer system	65,000
Total savings	$243,500

Complete accounts for 1923 beyond the five months ending May 31 are not available at this time, but judging from last year's accounts, these five months may be taken as representative of what may be expected for the entire year of 1923. The total revenue will be about $2,042,000, an increase of $40,000 over last year; but operating deductions, including taxes, will increase from $1,659,000 to $1,683,000, leaving net earnings of $359,000. After interest and amortization charges of about $232,000 are paid off, a surplus of $127,000 will remain for renewals and dividends on the capital stock.

The statement below shows these figures in comparison with the estimated results with the proposed plan in operation for the year.

	Present Operations		Under Proposed Plan	
Operating revenue		$2,042,000		$2,107,000
Operating expense	$1,538,000		$1,360,000	
Taxes	145,000		145,000	
Operating deductions		$1,683,000		$1,505,000
Net earnings		$359,000		$602,000





Left—Distribution of Revenue Since 1912. Right—Receipts and Expenses per Car-Mile by Routes. This Gives a Complete Picture of the Difficult Situation Confronting the Houston Electric Company in the Face of Jitney Competition

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It is also pointed out that without jitney competition, the gross revenue of the railway for 1923 would probably be about $2,250,000 instead of $2,042,000.

How the Jitney Affects the Situation

Jitney competition began in 1914. Its effect on the railway revenue can be seen by the drop in revenue during the later years. At the present time the city is served by a dual transportation system comprising nineteen electric car lines and eight jitney lines. The jitney lines all operate between near-by residential sections and the business district and in nearly every instance along or parallel to the railway lines. The type of jitney employed is the ordinary Ford touring car.

The investment actually represented in the make-up of the two systems is assumed by the engineer to be as follows, that for the jitney, with garage and shop facilities, being estimated at $1,000 for each vehicle in service:

INVESTMENT COMPARISON IN RAILWAY AND JITNEY

	Railway	Jitney
Investment represented	$6,000,000	$150,000
Investment per capita served	33.52	.83
Investment per dollar of annual revenue	3.00	.29
Investment per thousand revenue passengers	193.00	17.23
Investment per thousand seat-miles operated annually	23.00	5.86

The following comparative figures give a good idea of the annual volume of business handled under present conditions:

PASSENGERS CARRIED

	Railway	Jitney	Total
Revenue	31,000,000	8,710,000	39,710,000
Transfer	11,450,000		11,450,000
Total (including free)	42,800,000	8,710,000	51,510,000

Of the 39,710,000 revenue passengers, the jitney carries 8,710,000, or 22 per cent. Out of the grand total of 51,510,000 passengers, which includes transfer and free passengers, the jitney carries but 17 per cent, while it receives passenger revenues of $522,600, or 21 per cent of the combined revenues. The service conditions may be briefly summarized as follows:

COMPARATIVE SERVICE CONDITIONS, RAILWAY AND JITNEY

	Railway	Jitney
Active cars in daily service	174	150
Car-miles run annually	6,525,000	6,421,000
Car-hours per annum	719,800	454,913
Average passenger seats per car	40	4
Seat-miles in millions per annum	261	26
Average speed, miles per hour	9.1	14.1
Miles per day per car	103	117
Miles per annum per car	37,550	42,800
Seat-miles per revenue passenger	8	3

While the total mileage is about equally divided between jitney and railway, the latter with greater seating capacity is transporting five times as many passengers as the jitney, and is giving 261,000,000 seat-miles as against 26,000,000 for the jitney. The number of seat-miles furnished per each revenue passenger, namely, eight and three, respectively, shows that the railway is furnishing 166 per cent more transportation service than the jitneys. This is partially due to the longer haul on the railway line and partially to the greater seating capacity of the railway cars. The speed of the jitney, viz., 14.1 m.p.h., is its greatest advantage to the patron, being 55 per cent faster than the railway, resulting in an average saving of about four and one-half minutes per trip. Some idea as to the relative operating features of the two methods of transportation may be gained from the following:

OPERATING FEATURES COMPARED

	Railway	Jitney
Revenue per car-mile, in cents	30.7	8.0
Revenue per car-hour, in cents	278	115
Total passengers per car-mile	6.58	1.36
Total passengers per man-hour	60	19
Man-hours required per thousand seat-miles	2.7	17.7

The jitney, operating in uniformly well populated districts, on a short haul basis, and making better speed, is earning $1.15 per car-hour, or nearly 40 per cent as much as the railway, while the earnings on a car-mile basis are 8 cents, or slightly less than one-fourth that of the railway. The fact that the jitney requires 17.7 man-hours to render a thousand seat-miles as against 2.7 for the railway, or 550 per cent more, shows huge waste of man-power by this method.

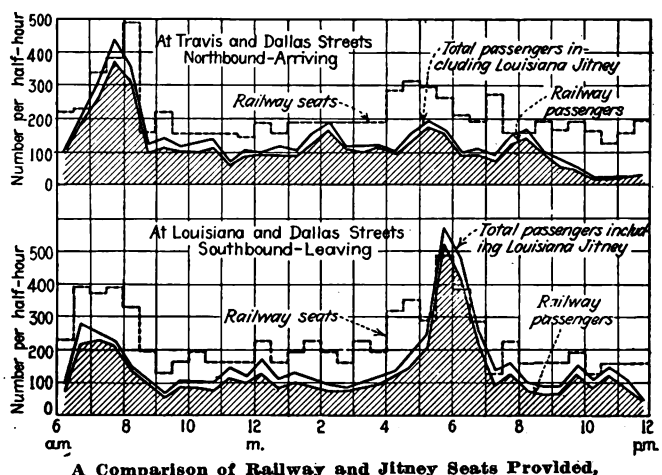
Although on some routes the jitneys run on an average of one minute apart during the rush hours, the individual is not always benefited. Often all available seats are occupied and prospective passengers are kept waiting. This type of vehicle provides only four regular seats but loads of nine or more passengers are not uncommon. The extra passengers sit upon or lean against the doors.

Passenger fares, length of trip and rides, and rates are compared below:

LENGTH OF RIDE AND RATE OF FARE

	Railway	Jitney
Cash fare, in cents	7.00	6.00
Ticket rate, in cents	6.25	....
Average receipts per revenue passenger, cents	6.45	6.00
Average length of one-way car trip, in miles	5.37	2.62
Average rate of fare per trip mile, in cents	1.20	2.30
Average length of ride per revenue passenger in miles	2.83	1.96
Averge rate of fare per mile of passenger ride in cents	2.28	3.06

Although the cash fare on the jitney is 1 cent less than on the railway, the actual rate per mile of passenger ride is greater on the jitney. The jitney rate of



A Comparison of Railway and Jitney Seats Provided, and the Loading of Each

This is for a competitive railway and jitney line and is typical of the study made for each line. The graph shows that the railway provides enough seats to accommodate both jitney and railway passengers at nearly all hours of the day.

3.06 cents per mile, applied to the railway passenger on the basis of his present average length of ride, would cause him to pay 8.67 cents. On the other hand, were the railway rate of 2.28 cents per revenue passenger-mile applied to the jitney passenger, a charge of 4.47 cents would result. The jitney rate is thus seen to be 34 per cent higher than the railway rate when the average distance actually traveled by the revenue passenger is taken into consideration.

In conclusion the report states that jitney operation has no place in mass transportation or where congestion is acute. Jitney routes should not parallel or run along railway routes where the service furnished is adequate. Where unnecessary duplication of transit facilities or service is maintained an economical rate of fare cannot be maintained for long. To continue such a practice indefinitely will involve the community in an unnecessary and wasteful expense that must eventually be paid for by the users in some form or another.

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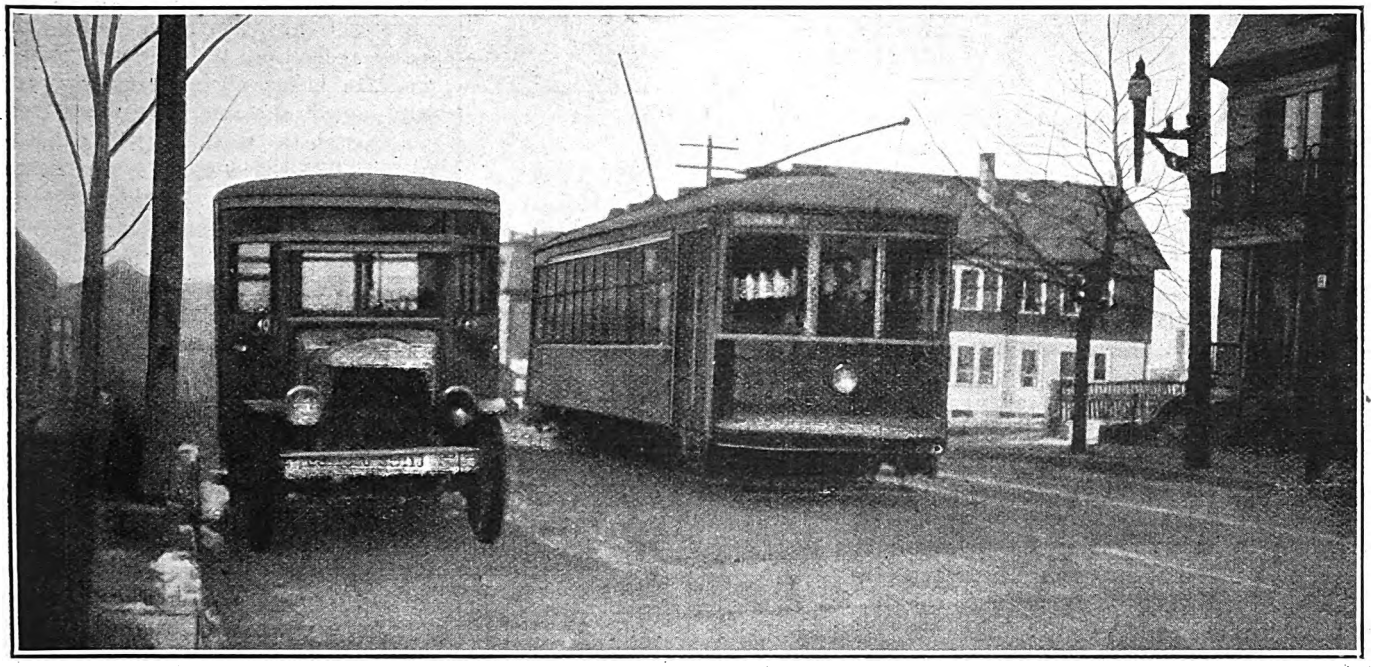

Railway Buses and Cars Operate Side by Side on Broadway, Providence

"Four-Track" Operation in Providence

Co-ordinated Service, with Buses Carrying the Local Passengers and Cars Running Express, Has Enabled the United Electric Railways to Reduce by Five Minutes the Running Time to Olneyville Square—Joint Operation Necessitates New Methods of Snow Removel

BY THE unusual expedient of inaugurating bus service parallel to and on the same street with its regular car service, the United Electric Railways, Providence, R. I., has increased its net income and gained much public good will. For several years there was a persistent demand from the residents of suburban communities, particularly in the district beyond Olneyville, for more rapid transportation. At that time the company was operating both local service in the city and through service to the outlying communities via Broadway. The complaint was that the many stops made to care for the short-haul passengers were a source of serious delay to the through passengers. Complaint was made also that on an inbound car the local passengers had no chance whatever of securing seats, because they were all occupied by the through passengers boarding at points beyond Olneyville, before the car reached the city limits.

One way that was suggested to remedy this was to build passing tracks alongside the existing double tracks to permit the operation of express cars which could then get ahead of the locals. It was felt by the company, however, that such a solution of the problem would involve considerable expense and would present serious operating difficulties. Instead of installing passing tracks, therefore, the railway decided to carry the local passengers by bus and operate all electric cars express to Olneyville Square. A summary of the proposed plan was given in ELECTRIC RAILWAY JOURNAL for Feb. 17, 1923.

A combination of two favorable circumstances made it possible to do this successfully. In the first place, the width of the street was sufficient to permit bus operation alongside the track without interfering in any way with the rail operation. In the second place, there is only one heavy traffic street crossing Broadway, so that the express cars can operate reasonably close to their scheduled speed and are not frequently delayed by traffic at intersections. The result has been to reduce the running time between the center of Providence and Olneyville Square, about 1¾ miles, from fifteen minutes to ten minutes, and also to provide vehicles which have empty seats available for the short riders.

Twin Yellow Bands on the Trolley Poles Mark Bus Stations

Bus operation was commenced in May, 1923, and the number of motor buses in service has been augmented from time to time as the traffic has increased. Mack, Republic and White buses seating twenty-five passengers are used. The present schedule calls for 280½ round trips per day, each half-trip requiring approximately eleven minutes. The headway and the number of buses in operation at various hours are shown in the following table:

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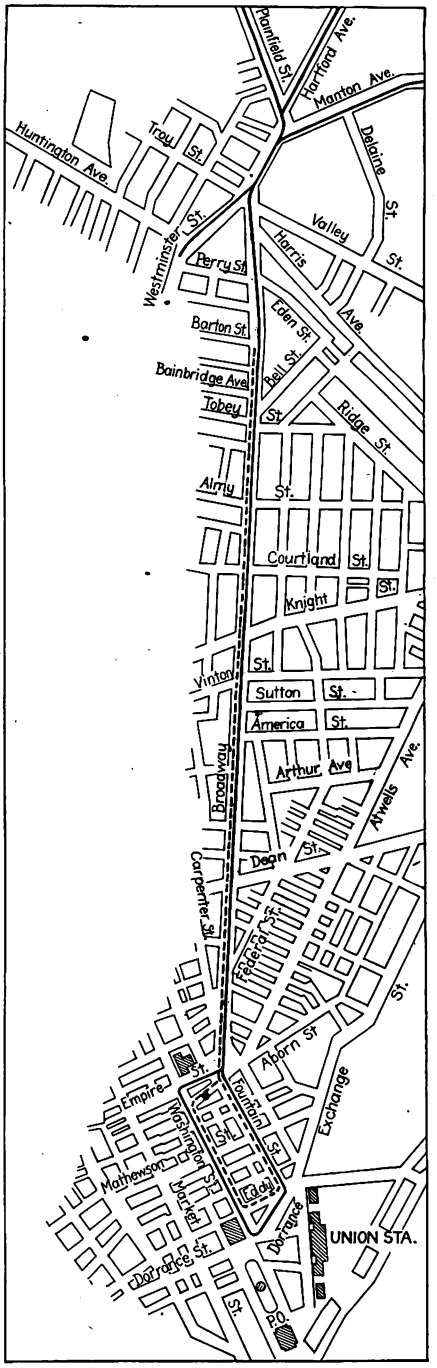
	A.M. Rush	All-Day Base	Noon Rush	P.M. Rush
Buses	8	5	6	10
Headway	3	5	4	2½

The former headway with street cars alone was never as short as the present two-and-one-half-minute schedule and was somewhat irregular, because the cars of the several through lines and the short line cars did not divide the intervals evenly. There are 7,013 scheduled seats on the buses both ways each day, and the number of passengers averages 5,500. The outbound bus terminal is about 1,000 ft. short of Olneyville Square, to prevent the crowding of the local buses by passengers to whom the express service is available. The latter people take the cars from Olneyville Square to Providence rather than walk the 1,000 ft. to the bus terminal and the entire bus carrying capacity is therefore available for the short-haul riders. The express cars run between Olneyville Square and Exchange Place, stopping inbound for passengers to alight but not to board, and outbound to pick up but not to discharge.

In the morning the first inbound trip of the buses starts at 5:40 and the last trip at night leaves the center of the city at 1 a.m. The railway express service is operated during the same hours. Between 5:40 a.m. and 11:40 p.m. there is a starter at the inbound terminal. Two men, each working a nine-hour shift, regulate the bus service. They are solely bus men, however, and have no responsibility whatever for railway operation.

The bus stations are closely spaced, averaging only about 300 ft. apart. They are marked by twin yellow bands on the trolley poles, in contrast to the ordinary white band used to designate a car stop. In spite of the frequent stops, however, the buses' average speed for the section along Broadway is slightly over 10 m.p.h.



Solid Line Shows Express Car Route Between Exchange Place and Olneyville Square, Providence. The Local Bus Route Is Shown Dotted

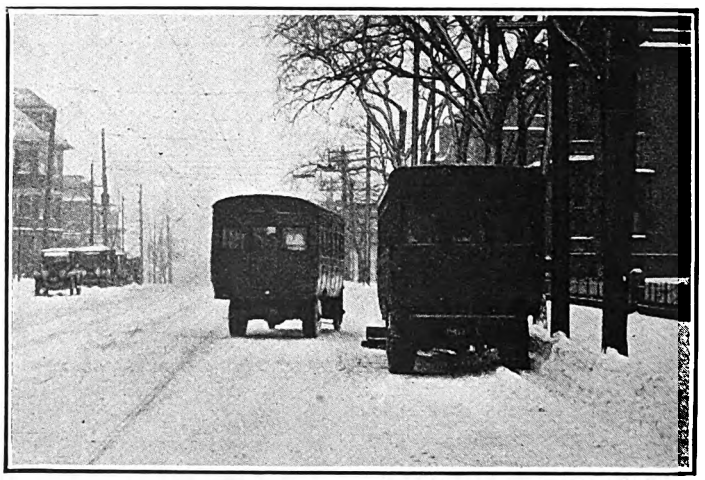
Cars average about 16 m.p.h. through this territory. The company feels that it is undesirable to operate buses at too high a speed, and hence no attempt has been made to shorten their running time. As a result, 995,848 persons were carried by buses on this route during 224 days of 1923 without injury to a single passenger. The bus-miles per accident have been nearly double the average car-miles per accident.

A 6-cent fare is charged on the buses. Nine metal tickets are sold for fifty cents, the same as on the cars. Payment is made by inserting the ticket in a Rooke register, or when cash fares are paid a nickel is inserted and a penny handed to the operator. Each operator must turn in as many pennies as there are nickels rung up on his register. Transfers good on car lines other than those operating on the same street are issued by the bus for 2 cents. Fare collection is pay-enter inbound and pay-leave outbound.

Parallel Operation Brings Problem in Snow Removal

An interesting phase of the situation created by the operation of buses and cars on the same street concerns snow removal. It was originally felt by the railway that the best plan would be to pile up the snow on the left of the vehicular roadway and on the right of the trolley track, thus making one large pile between the two lanes. There were two reasons for following this procedure. In the first place it enabled the buses to draw up close to the curb and in the second place it was thought that it would be possible to clear a wider roadway.

In practice it was found that the plan worked out nicely until the ridge of snow began to thaw and water run across the pavement to the curb. In this way the vehicular roadway



Railway Sweepers Pile the Snow Beside the Tracks and the Buses Push it Back to the Curbs

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became covered with water and when the temperature fell considerably at night the water froze and made a slippery coating on the pavement.

Another disadvantage of piling the snow in the middle of the street was the necessity of opening aisles for electric car passengers to board and alight. The advantages, on the other hand, were the complete clearing of the gutters, which permitted the buses to draw up to the curb; the clearing of lanes to the sewer catch basins, permitting rapid drainage, and, most important of all, the segregation of traffic so that motor vehicles were forced to keep off of the car tracks.

What finally proved to be the greatest disadvantage of all was that the truck drivers turned into the piles in order to pass parked automobiles and spread the snow all over the vehicular roadway. This necessitated abandoning the plan altogether and pushing all the snow over to the curb. Had sufficient space been available for trucks to turn out without cutting into the central piles, the other disadvantages would not have been sufficient to cause the change. In spite of the fact that the United Electric Railways has abandoned the central piling scheme on Broadway, Providence, the company feels that this plan is theoretically a sound one. If Broadway were slightly wider than its present width of 50 ft. from curb to curb, it is thought that the central piling would have been entirely successful.

Financially, bus operation has been very satisfactory. The withdrawal of local cars from Broadway saves the railway considerable money. Against this economy the cost of bus operation to supply the local service is less than similar rail operation would be. As a matter of fact, more passengers are now being carried by cars and buses than were formerly carried by the cars alone.

Large Shop for Brooklyn

PLANS are being prepared for large repair shops for the Brooklyn Manhattan Transit Company. They will be located between the Sea Beach right of way on the west, Shell Road on the east, Avenue X on the north and Coney Island Creek on the south. This tract comprises about 60 acres, and the city has already taken title to it for the purpose of the erection of these shops. It is said that the total investment, after their completion, will be in the neighborhood of $10,000,000 and that they will be the largest electric railway repair shops in the country.

Slump Test Determines Proper Moisture for Concrete

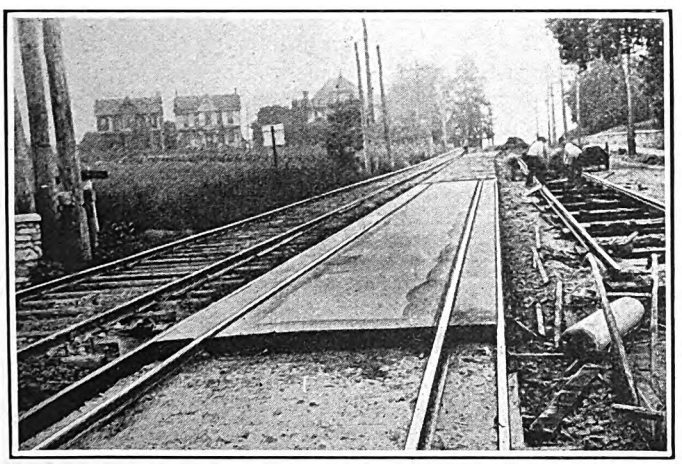
Although It Has Not Yet Been Widely Adopted by Electric Railways, This Has Been Found to Be a Satisfactory Method of Regulating the Consistency

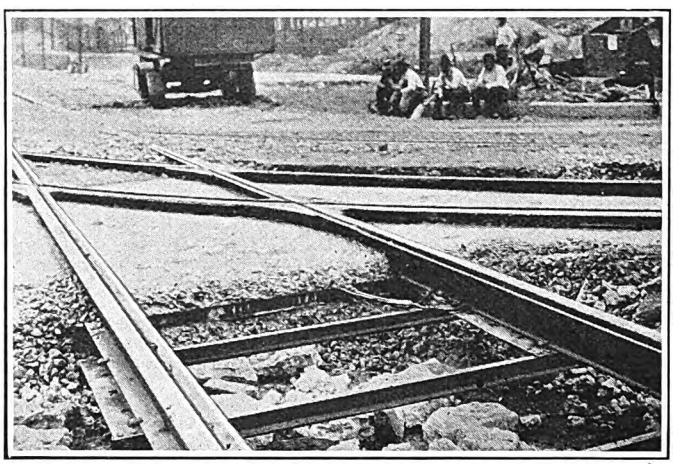
THERE is wide variation among different railways in the amount of water used in mixing concrete for track construction work. In general, the tendency seems to be to use a rather wet mixture. It is claimed that the loss of strength due to the pressure of excess water is compensated by the greater ease of working a wet mixture into place. Regardless of how wet it is desired to have the concrete, it is ordinarily desired to have it uniform for jobs of the same kind.

Because of variation in the moisture content of the material constituting the aggregate, however, the exact amount of water that will be required for a given concrete mixture and a given consistency cannot be specified in advance. There may be already so much water in the aggregate that the amount of mixing water necessary is considerably reduced. Fine sand or small pebbles will usually require a greater quantity of water than coarse sand or large pebbles. The quantity of mixing water recommended by the Portland Cement Association is given in an accompanying table.

Water is mixed in concrete for two purposes, namely, to hydrate the cement and to produce a convenient consistency. From the point of view of strength it is desirable to use as little water as possible. On the other hand, it is difficult to work a stiff mixture into the crevices around the ties and rails where concrete is used for track foundations.

A good way to regulate the consistency is by means of the slump test. By this means the amount of mixing water used in the concrete can be carefully con-





At Left—For Hand-Finished Paving Such as This a Greater Slump Is Permissible. At Right—A Moderately Dry Mixture of 1:2½:5 Concrete on Harrisburg, Pa., Track

APPROXIMATE QUANTITY OF MIXING WATER REQUIRED FOR CONCRETE

Mix — Volume of Aggregate After Mixing		Approximate Mix as Usually Expressed			Water Required (Gallons per Sack of Cement)	
			Aggregate			
Cement		Cement	Fine	Coarse	Minimum	Maximum
1	3	1	1½	2½	5	5½
1	4	1	1½	3	5½	6
1	4½	1	2	3	5¾	6¼
1	5	1	2	4	6	6½
1	6½	1	2½	5	7¼	7⅝
1	7½	1	3	6	8¼	8¾

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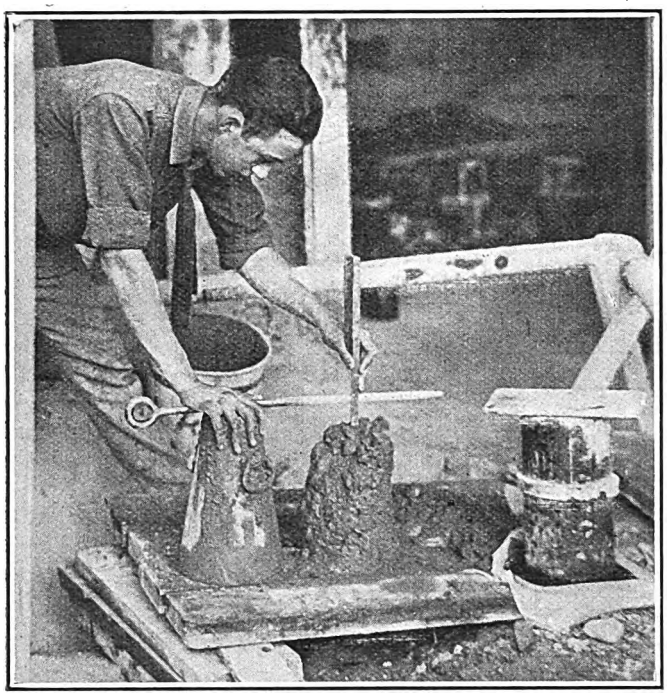


The Settlement of the Concrete Is an Accurate Indication of its Consistency

trolled. A sheet metal form, shaped like the frustum of a cone, 4 in. in diameter at the top, 8 in. at the bottom and 12 in. high, is the principal item of equipment for this test. A pointed metal rod $\frac{5}{8}$ in. in diameter and 21 in. long is also needed.

To carry out the slump test this form is filled with the concrete to be tested. It is placed in layers about 4 in. deep and worked around with the metal rod. The specifications of the American Society for Testing Materials state that in order to secure uniform results each layer should be rodded exactly thirty times. The form is then immediately removed and the settlement of the concrete is measured.

A mixture having a slump of only $\frac{1}{2}$ in. to 1 in. contains about the right amount of water for maximum strength, but is rather thick for practical purposes. For most work a slump of 2 in. would not be too much. For hand-finished paving as much as 4 in. is permissible

Batches should be tested from time to time and the quantity of water increased or decreased according to the amount of slump. If this is done the strength of the concre e can be controlled.

This Wet Mixture Is Used by the Northern Texas Traction Company Preparatory to Laying a Brick Pavement

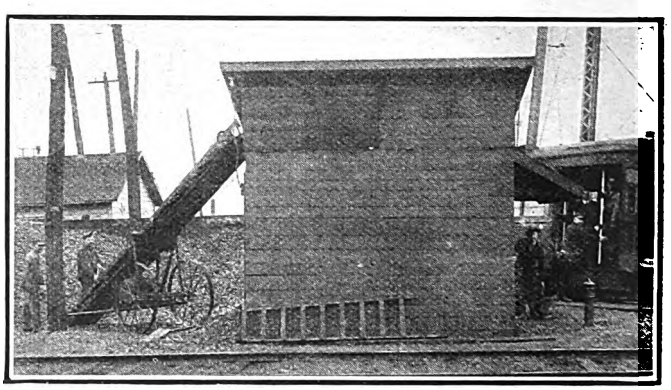
Supplying Coal for Car Heaters

By P. V. C. See
Superintendent of Equipment,
Northern Ohio Traction & Light Company, Akron, Ohio

TAKING care of the hard coal heaters in 175 cars by the method described below has cut the force handling the fires from ten men to six men and resulted in a far more satisfactory firing service. On the lines of the Northern Ohio Traction & Light Company handling heater coal has been quite a problem. Since the ground is uneven and the car storage space limited, the wheeling of the coal in wheelbarrows through the long lines of cars and then shoveling it into buckets that had to be carried into the cars took considerable time and labor. This method was unsatisfactory, and sometimes the bins on the cars were not filled up.

After a study was made at the company's Kenmore shop it was noted that in bringing the cars into the carhouse they all passed around a loop and then backed into the carhouse. Advantage was taken of this and a coal storage bin was constructed at the leaving point on the loop. This coal bin was built with chutes that could be opened so that the coal would run out into the buckets. A weighted cut-off door was installed on each chute, so that the coal handler could fill the buckets as rapidly as he could handle them without having to do any shoveling.

As each car comes in for the night, the handler has ready six or seven full buckets of coal, which he passes



Coal-Handling Equipment for Supplying Car Heaters

to the crew, who dump them into the car coal box, completely filling it up. He is able to fill the cars as fast as they come around the loop, holding them scarcely a minute, so that when the cars are all in they are all completely coaled and there is no necessity for wheeling or handling during the night.

To accomplish this an electric portable coal handler was purchased, costing in the neighborhood of $600. This greatly facilitated the unloading of the hopper bottom coal cars. The device will unload a 100,000-lb. capacity coal car in two hours. The bottom of this portable conveyor is pushed under the bottom of the car and the pockets dumped. The conveyor then lifts the coal up and throws it about 10 ft. from the car, so that very little shoveling is needed. The same conveyor is then used to pick the coal from the ground and put it into the top of the coal bin.

Since this system has been installed, even with a reduced number of men, there have been no complaints of fires not being in good shape. The car coal box is loaded and the stove is clear of ashes in the morning and ready for starting a new fire.

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Economic Problems of Car, Bus and Boat Transport in Paris*

The Management Corporation of This State-Owned System Earns Slightly More than Government Bonds of the Day—Important Improvement Is the Truckless Car—Consolidation Improves Car-Use Efficiency—Contracts Are on Annual Output Basis to Reduce Extra List While Holding to Principle of Forty-Eight-Hour Week

THE Aug. 5, 1922, issue of the ELECTRIC RAILWAY JOURNAL carried a detailed description of the state purchase and consolidation of the surface transit facilities of Greater Paris, which had been leased to a private management company while the property remains under state regulation and ownership. The agreement became effective on March 4, 1921. The following account shows how this unusual combination of state ownership and private management with bonus provisions has worked out during its first two years.

PRE-WAR AND MOBILIZATION DAYS

In the period of 1910-1914 operating conditions were so favorable that the trolleys were able to make a fair return on distance fares of 10 and 15 centimes (then 2 cents and 3 cents) second-class and 15 and 20 centimes (then 3 and 4 cents) first-class. The motor buses, following improvements in engines and tires, became profitable about the year 1914. There was every expectation that all would continue smoothly under the agreements made by the private companies of that time with the city of Paris.

Then came the war. The entire motor-bus fleet was requisitioned at once by the government in accordance with plans made in 1913. For mass transportation this left the trolleys and boats, except the Metropolitan and North-South subways. At this time the surface transport of Greater Paris comprised ten private companies and one city undertaking as follows:

General Omnibus Company
Paris and Department of the Seine Tramways
General Parisian Tramways
East Paris Tramways
Nogentais Railway
Left Shore (Rive Gauche) Tramways
Bois de Boulogne Railway
Paris-Arpajon Railway
West Paris Tramways
General Paris Steamboat Company
Belleville Funicular Railway (city-owned)

All of these concerns continued operation, although handicapped by labor shortage and scarcity of materials.

COSTS ROSE MUCH SOONER THAN FARES

The war brought an immediate increase in the cost of operation, but it was not until Feb. 8, 1919, that the fares were raised to 20 and 30 centimes first-class and 15 and 20 centimes second-class. Although the density of traffic increased from 6.24 to 9.12 passengers per car-kilometer over the period 1913-1918, the increase in expenses was much greater. For the majority of workers, wages in 1920 were triple those of 1913.

Since expenses continued to go up instead of down, the year 1920 showed a deficit like all of its war predecessors. Earnings per car-kilometer were 2.18 francs, but cost of service was 2.91 francs. In April, 1920, fares were raised again, making the second-class rates 25 and 35 centimes and the first-class rates, 35 and 50 centimes.

On granting the first increase in fare, the Department of the Seine and the city of Paris made a provisional agreement with the railways that was to hold until Dec. 31, 1920, pending the working out of a permanent plan. Under this agreement the operators were to be allowed a 4 per cent return, and accordingly, a special war deficiency account was set up in the hope that costs would soon go down enough to permit this return to be made out of operating surplus.

THE STATE PURCHASE OF THE RAILWAYS

As private capital did not care to continue in a losing venture, it was necessary for the state to take over the properties and operate them or lease them to a private organization. The latter method was chosen, with personnel drawn largely from the General Omnibus Company, which was the leading organization and which operated both buses and cars. Six companies were in the agreement by Jan. 1, 1921; the boat company by August, 1921, and the Boulogne and Arpajon railways by Jan. 1, 1922. The remaining private company, namely, Western Paris Tramways, continued to operate independently.

Under the plan the operation is conducted for the account of the department, which retains control of fares and service. In consequence all the receipts belong to the department and all expenses are charged against it, and it bears the responsibility for a surplus or a deficit.

For that reason the operating accounts of the property are carried in a "General Management Account" kept by the company and divided into three parts, as follows:

1. Financial accounts (fixed charges, including interest, amortization, etc.).
2. Operating accounts (all receipts and expenditures of operation, direct or indirect).
3. Remuneration for the company.

The remuneration of the operating company is made up of the following elements:

1. A return of 6 per cent on the new capital of 60,000,000 francs.
2. A management premium on all receipts, direct or indirect, except interest on funds invested, of 0.75 per cent on receipts up to 250,000,000 francs and of 1 per cent on anything in excess of that amount.
3. An efficiency premium based on the formula $E = 0.04\ (R - 0.65\ D)$, in which R represents total receipts from operation and D the cost of service, which includes all fixed charges such as interest and amortization of

*This article is based largely, but not entirely, upon a paper by A. Mariage, general manager of the Paris car-bus-boat combine, read before the Société des Ingenieurs Civils de France, Feb. 9, 1923, and reprinted in the November, 1923, issue of *L'Industrie des Tramways, Chemins de Fer et Transports Publics Automobiles.*

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the purchase sum, war loans (deficiency account) and rehabilitation costs.

Out of this compensation, the company pays its board of directors and some forty-five heads and sub-heads of departments in addition to their salaries. The officials also receive a pro rata share of the economy bonus.

In practice the "operating premium" works out to only 24,000 francs for every 1,000,000 francs addition to the receipts. Furthermore, the department shares in any profits that remain after 8 per cent is paid to the stockholders up to the point where it would be possible for the department to acquire 75 per cent of the surplus.

At pre-war prices, the value of the combined undertakings was 400,000,000 francs. The working capital of 60,000,000 francs supplied, according to the agreement, by the Société des Transports en Commun de la Région Parisienne merely served to care for supplies, pay of personnel and advances to equipment makers. It was not sufficient for general rehabilitation and basic betterments. The allowed return of 6 per cent plus both operating and efficiency premiums was not a sufficient incentive to private capital, as government loans were then paying a better return. For this reason, the Department of the Seine itself made two bond issues at higher rates of interest in order that the company might carry out the improvement program. Thus the ELECTRIC RAILWAY JOURNAL for Feb. 11, 1922, noted that the Department of the Seine had offered a twenty-year, 7 per cent external gold loan for $25,000,000 in the United States coincident with a similar issue for $12,500,000 through British bankers. These bonds were offered at 90½ per cent of par. The actual rate of return of 7.78 per cent on these issues almost equals that earned by the company in 1922.

WHAT THE CONSOLIDATION NOW COMPRISES

The society now operates all surface and water transport facilities in Greater Paris exclusive of the Western Paris Tramways and the city-owned Belleville Funicular Railway. The outstanding data, which show its extent, are given in the table in this column.

At this time, power was supplied from three interconnected stations at Vitry, Saint Denis and Billancourt. Eventually, power will be supplied primarily from a central station at Gennevilliers, leaving the present stations for standbys.

As early as 1910, the chief predecessor company operated two-car trains double-end by means of control equipment on the trailer. This arrangement eliminates the necessity of coupling at terminals. Fears with regard to operation around curves and with the trailer at the front of the train have proved groundless.

Although the tramcars that have been standard from about 1913 onward were fitted with light-weight, commutating pole motors and other improvements that made them unusually light in comparison with earlier designs, the management took another step forward in 1921 with its forty-nine-seat "Type L" truckless car (see ELECTRIC RAILWAY JOURNAL, Dec. 2, 1922), in which the principle of separate truck and body has been abandoned in favor of automobile methods of combining chassis and motor. There are two 45-hp. motors per car, bevel-gear drive and band brakes. Empty, this car weighs 11.5 metric tons compared with the 14 metric tons of its predecessor, "Type G," of equal capacity. The weight per seat is 519 lb. against 610 lb. in the earlier type. The new cars have less unsprung weight, less track upkeep, less first cost and 20 per cent reduction in energy consumption. They are to replace existing cars as the latter wear out, or as additional cars are needed.

As regards motor buses, the four-wheelers have been standardized with thirty-eight seats instead of thirty-one or thirty-five. The six-wheel bus (see *Bus Transportation*, May, 1923, and January, 1924) seating forty-eight and intended for operation over the wider streets and boulevards had already been ordered to the number of fifty early in 1922, but the latest news indicates that it is too awkward for wider application because downtown Paris has too many narrow streets.

Without committing itself to the general desirability of using the "national" fuel, industrial alcohol, in preference to gasoline, the management has made tests which prove that so far as propulsion is concerned, alcohol is satisfactory. The company has a department of studies and technical control for research in fuels, carburetors, process of manufacture, drive, etc.

FINANCIAL RESULTS IN 1921 AND 1922

In the year 1920 the Paris General Omnibus Company alone had an operating deficit of 37,000,000 francs; and the grand total loss of the companies now in the consolidation was 70,000,000 francs. In 1921, however, the loss was cut to 21,000,000 francs despite the fact that wages alone were increased by 27,500,000 francs. In 1922, receipts and operating expenses were almost even, the operating deficit being only 689,447 francs. As shown in more detail in the ELECTRIC RAILWAY JOURNAL for Oct. 27, 1923, the outstanding figures for the year 1922 were these:

	Francs
Total revenue	303,581,980
Operating expenses	304,271,426
Operating deficit	689,447
Charges payable by Department of Seine on sinking fund, war fund guarantees, new capital, etc.	42,600,188
Remuneration to company	9,191,335
Add operating deficit	689,447
Deficit in true cost of service	52,480,970

Of the item "remuneration to company," 3,600,000 francs were merely the 6 per cent return on the 60,000,-

PARIS SURFACE TRANSPORT, LAND AND WATER

ROUTES AND LENGTHS

	Total Equivalent —Single Track— Kilometers	Miles
130 surface car routes	970	601.4
53 motor-bus routes	335	207.7
4 railways on right-of-way	265	164.3
1 steamship line	23	14.5
183 routes	1593	987.9

ROLLING AND FLOATING STOCK

Motor cars	1,779
Trail cars	869
Motor buses*	1,100
Steam locomotives	38
Freight and service cars	380
Steamboats (400-passenger capacity)	49

*By October 1923, there were reported 1,369 four-wheel buses seating twenty-three to thirty-eight with last capacity standard; fifty-one six-wheel, forty-eight-seat buses and six trackless trolley buses.

SHOPS, POWER DISTRIBUTION, OFFICES, ETC.

50 inspection centers, area	479,500 sq. meters
5 maintenance plants, area	73,200 sq. meters
1 headquarters, area	2,400 sq. meters
32 substations, rated capacity	62,000 kw.
1 fuel depot, area	12,260 sq. meters
Total tank capacity (underground storage)	1,200,000 liters

TRANSPORTATION STATISTICS, 1922

Vehicle-kilometers for the year	135,596,979
Average daily vehicle-kilometers	371,500
Passengers carried	917,723,323
Passengers carried daily (average)	2,514,310
Receipts for the year, francs	306,801,227
Average daily receipts, francs	840,551

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000 francs of new (operating fund) capital; 2,425,158 francs was the management premium and 3,166,177 francs the economy bonus. Therefore, aside from the less than current rate of return on capital, the company received only 5,591,335 francs on a turnover of 303,581,980 or about 1.8 per cent. Its dividend to stockholders came to 8.5 per cent, but as noted previously this is not very attractive when the department's own bonds issued to non-working investors yield 7.78 per cent.

One of the factors that helped to reduce the deficit was the more intensive use of equipment. In 1920, the motor cars were active only 65 per cent of the possible time; 77 per cent in 1921 and 80 per cent in 1922. Trailer effectiveness also rose from 42 per cent in 1920 to 85 per cent in 1922. As a result, the tramways in 1921 carried 5.1 per cent more passengers than in 1920, and because of higher fares earned 16.3 per cent more revenue. In 1922 the tramway receipts were 6.4 per cent higher than in 1921.

Relations of Car and Bus in Greater Paris

In 1921, the cars of the combine ran 85,115,000 km. The buses ran 35,220,000 km., or almost 30 per cent of the total. In 1922, the cars ran 91,817,000 km. and the buses 43,210,000 km., or 32 per cent of the total. In the first six months of 1923, the buses alone ran approximately 24,296,000 km. In 1922, the cars brought 63 per cent and the buses 35 per cent of the revenue. The remaining 2 per cent was almost equally divided between the steam railways and the boats.

In considering these figures, one must bear in mind that in a large portion of inner Paris there is a surface monopoly of the buses; that the underground rapid transit lines are really short-haul distributors of traffic within Paris itself; and that the chief long-haul electric business, paradoxically as it may seem, is done by the suburban tramways.

Perhaps no true comparison of tramway and motor-bus costs is possible under circumstances involving such radical changes in financing, prices and operation. However, the available detail accounts for the year 1921 show that the operating cost per kilometer of cars tending to average forty-nine seats was 2.18 francs, while buses ranging from thirty-one to thirty-eight seats cost 2.47 francs. The fuel costs of both classes of vehicles dropped in 1922, as both coal and gasoline show a decline of about 30 per cent in unit costs.

The receipts per car rider in 1921 averaged 0.33 franc and the density per car-kilometer 7.06 passengers. The corresponding bus figures were 0.36 franc and 6.67 passengers. The tramway receipts for 1921 show an average of 2.12 francs against expenses of 2.18 francs. The bus receipts show 2.54 francs against expenses of 2.47 francs.

While the six-wheel forty-eight-seat bus has been found advantageous from the standpoint of capacity, it is heavier per seat than the other buses. The latest tendency is in the opposite direction of smaller, more mobile units of twenty-three-seat capacity.

Inasmuch as the platform cost is the outstanding factor, although the wages paid are beyond the control of the management, every possible way of saving time to increase revenue-miles per hour must be utilized. One innovation that seems small in itself but which has proved of value from a time and good-will standpoint relates to the police investigation of accidents, such as collisions.

Formerly a good deal of time and ill-will was involved every time a policeman had to secure from the motorman his name, run number and other facts which would locate him promptly should he be needed later. Today, each operator carries a card already prepared for quick turn-in to M. le Gendarme! There is no opportunity for argument or embarrassment.

Another step is the Commercial Department (Direction de l'Exploitation Commerciale), whose job it is to make most effective use of the vehicle-kilometers manufactured. The management does not hold that the simple figure of "passengers per kilometer" is a true index of the best use or the proper use of the service. Thus in pre-war days the density averaged seven passengers per kilometer (11.2 passengers per car-mile). During the war with congested conditions this density exceeded nine passengers per kilometer (14.4 passengers per car-kilometer). It is not a high figure due to overcrowding at peaks that indicates efficiency, but a high figure that comes from a good load factor throughout the operating day. Hence the desirability of studying ways and means that will give service in the way most encouraging to off-peak travel and yet cause minimum dissipation of a product which must be either consumed or lost the instant it is produced.

Using the Platform Man's Time Effectively

Besides refraining from charging fares that would discourage traffic, no matter how justifiable in theory, the management has given exceptional attention to efficient use of its personnel within these legal limitations:

The average working week must not exceed forty-eight hours, with one day off in seven.

Platform time is on the basis of an eight-hour day.

The working day must not exceed nine and one-half hours (straight run).

The elapsed-time working day must not exceed thirteen and one-half hours (swings).

Meal times are counted as part of these over-all periods.

Sunday layoffs shall be fairly equal to average weekday layoffs.

Twenty-one days vacation is given in each year with pay, and vacations are to be taken between March 1 and Nov. 1.

Within these limitations, it appears that the management is entitled to a total of 2,360 hours per man in ordinary years and 2,368 hours in leap years. Out of this total it is necessary to build runs that will require as few extras as possible on Sunday, which is the biggest traffic day in Paris (markets are open Sunday mornings, for example) and during the vacation season, which happens also to average more traffic per month than the interval Nov. 1-Feb. 28.

By agreement with the union, the men accept a longer average working day during the vacation season; and likewise they accept a longer period on Sunday than on the other days of the week. Between March 1 and Oct. 31, the average working day is eight and one-fourth hours; while in the non-vacation period, the average is only seven and one-half hours. To take care of the Sunday peaks, the men accept an average week of forty-nine and one-half hours during the vacation season, and in exchange they work only a forty-five-hour week the remainder of the year.

General Manager Mariage states that this novel division of labor time has given a high degree of suppleness to meet variations in traffic. He compliments the union for its understanding of the problems involved.

As for the undertaking as a whole, while naturally desirable to make it pay for itself, he believes the Department of the Seine ought not hesitate to finance further improvements so long as it appears that the general good of the public is served thereby.

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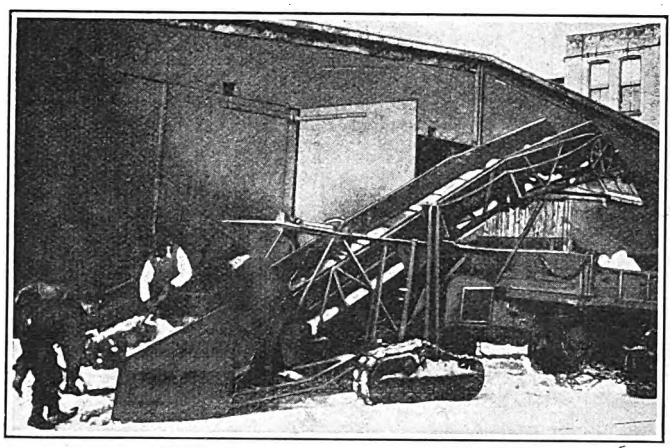
Snow Loader Is a Great Labor Saver

One Truck Filled Every Two Minutes Was Average Maintained Over a Period of Hours by Springfield Street Railway During Recent Storm

IN SPRINGFIELD, MASS., there is a mutual agreement between the city and the Springfield Street Railway that instead of removing the snow from between the rails and 18 in. outside of the tracks all over the city, the railway shall remove all of the snow from an equivalent area and for the full width of the street. As a result the snow removal work of the railway is



This Snow Loader and Four Men Clear the Streets More Rapidly than Would a Much Larger Force Working with Shovels

confined to one end of the city, and its force is concentrated, instead of the men being scattered around.

During a snowstorm the railway's plows and sweepers pile the snow in windrows clear of the tracks. When the storm has stopped motor trucks equipped with plows push these windrows back to the gutter. Following the motor truck plow, a Barber-Greene snow loader is put in operation. An attempt is made to keep the snow piles thus pushed back just clear of the gutter, as it has been found that by piling the snow in this manner it is possible to operate the snow loader so that the machine does not rub against the curbstone.

The dump trucks are lined up a considerable distance behind the snow loader facing backward. They back as the loader moves along, but keep sufficiently far away not to interfere with it or with the truck that is being loaded. The city assigns a policeman to keep vehicular traffic out of the way. As soon as a load is received the belt conveyor of the machine is stopped, the truck starts for the dump and another truck backs into place. The machine is then started again and the next truck is loaded.

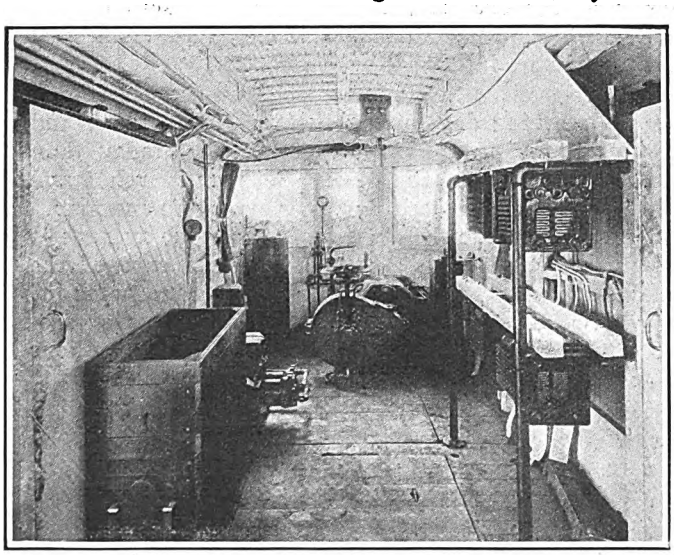
The streets from which the railway has agreed to remove the snow vary from 50 ft. to 70 ft. in width. To haul the snow from the street to the nearest dump 5-ton trucks are employed. In the downtown district snow is dumped through manholes of the new Memorial Bridge over the Connecticut River.

The organization for operating the snow loader consists of two men who precede with shovels and throw any loose snow into the general pile, two men who shovel snow into the hopper of the snow loader, one man who operates the machine, and as many motor trucks and drivers as are needed to keep the loader continuously at work. This apparatus has been able to keep seventeen 5-ton trucks busy continuously and have some spare time. A single 5-ton truck can be loaded in about forty-five seconds. Over a period of six hours an average of one truck has been filled every two minutes. During a recent storm one snow loader and four men in Springfield covered one side of a street a mile long in approximately four hours. The Springfield Street Railway has found the apparatus to be very efficient, and it has saved the company considerable money.

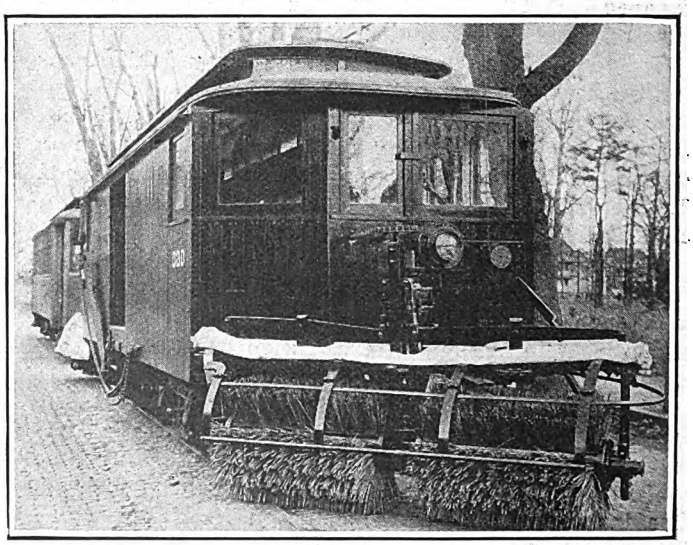
Open Cars Converted Into Snow Sweepers

All Equipment Except the Brake Cylinder Has Been Placed Inside—Removable End Panels Facilitate Replacement of Broom Motors—Steel Strips Reinforce the Rattan in the Brooms

EFFICIENT snow-fighting units have been constructed by the Worcester Consolidated Street Railway from obsolete open cars. Eleven sweepers have been built in this way at Worcester and nine more have been built for the Springfield Street Railway. These machines have proved very satisfactory for snow fight-



The Absence of Chains and Countershafts Makes the Interior of This Home-Made Snow Sweeper Convenient and Roomy



The Canvas Screen Is Fastened to a Metal Frame at the Top so that It Can Be Thrown Back When Desired

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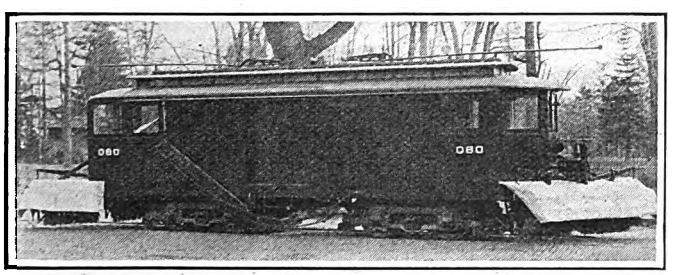
ing and are considered by the railway to be superior to other types previously used. A double-truck snow sweeper is thought to excel a single-truck unit because it can clean up deeper and heavier snow at greater speed. Moreover, the expense involved in this reconstruction was small.

The body of the sweeper is that of an old fifteen-bench open car which had been shortened 5 ft. at each end. The original trucks were used and on them are mounted G.E. type 67 motors. The broom axles are supported by extensions to the underframe of the car. A heavy tie rod runs from this framework up to the letterboard on each side, along the entire length of the body and down to the frame at the other end. These braces have turnbuckle attachments at the ends, by means of which any drooping of the noses can be prevented.

Each broom is driven independently by a G.E. type 67 motor. Gear drives manufactured by the Russell Car & Snow Plow Company are used. The absence of chain, countershaft, clutches, etc., in the middle of the car gives it a roomy appearance and facilitates the work of the crew.

An interesting feature of the body construction is that the diagonal ends of panels are removable. This permits the broom motors to be taken out quickly and casily. In case of trouble on the road with the broom



Converted Open Cars Make Efficient Snow Sweepers at Worcester

motor, the sweeper can be pulled into the carhouse and the motor replaced in about half an hour.

A canvas curtain somewhat different from that ordinarily employed on snow sweepers is used to limit the throw. This curtain is attached to a metal frame the weight of which holds it down in spite of the force of the snow thrown by the rapidly revolving brooms. The frame is hinged at the top, however, so that the curtain may be lifted up at night when there is no vehicular traffic on the street and when it is desired to throw the snow as high and wide as possible.

An extra set of brooms is kept on hand for every sweeper so that in case of a storm of long duration worn brooms can be replaced and the sweeper quickly returned to service. In order better to cut ice and sleet as well as to prolong their useful life, the broom-heads have ribbon steel interspersed with the rattan.

All equipment and wiring excepting only the brake cylinder has been placed inside the body. When the sweepers are run into the shop, a steam hose can therefore be applied to all the underparts to melt off the snow and ice quickly. This greatly facilitates the inspection work. No equipment is removed from the sweeper during the summer. Although such apparatus as controllers, motors, air compressors and the like are the same as those used on other cars, the railway considers it more economical to leave the equipment permanently on the sweepers. They are then instantly available whenever needed for service.

Bus Development by the Boston Elevated

The Company Now Has Thirty-three Buses, Which Are Used Largely in Supplementary Service at the Outer Terminals of Rapid Transit Lines

THE first bus line operated by the Boston Elevated Railway began service between Allston and Watertown, Mass., in February, 1922. Since then the company has gradually added buses until it now has thirty-three. These consist of one Republic-Knight, twelve Mack and twenty White buses. All are of the one-man twenty-five-passenger type.

All of these buses do a feeder service in the suburban districts, and operate as an integral part of the Boston Elevated system. That is to say, the same fare is charged as if the service was given by surface cars, and transfers are given between buses and cars, just as they would be if trolley cars only were used. In several of these cases, the buses take the place of trolley lines, when, because of the need of track reconstruction, or for some other financial reason, the company thought it undesirable to continue the rail service. A typical case of this kind, although on a more extensive scale than usual, was in Malden and was described in an article in the ELECTRIC RAILWAY JOURNAL for Oct. 6, 1923, by Edward Dana.

STATISTICS OF SERVICE

For the service in January, 1924, the last month for which figures are available, the company had thirty-three buses, of which twenty-three were required for regular operation and ten were used as spares, or

BOSTON ELEVATED RAILWAY MOTOR BUS OPERATION—MONTH OF JANUARY, 1924

Number of Buses in Regular Service — Thirty-three

		Per Revenue Mile (Cents)
Round trips	14,998	
Revenue-miles	57,093	
Non-revenue-miles	3,721	
Total miles	60,814	
Bus-hours allowed time	7,692	
Bus-hours running time	5,172	
Total revenue passengers	312,577	
Operating Expenses:		
Maintenance of Equipment		
Painting and varnishing	$6.75	
Repairs to bodies	544.34	
Repairs to chassis	1,914.22	
Tire renewals	743.95	
Repairs to engines	1,138.54	
Repairs to storage batteries	375.05	
Total Ac. 30	$4,722.85	
Ac. 40 depreciation (a)	3,207.52	
Total maintenance including depreciation	$7,930.37	13.89
Total maintenance including depreciation per total miles operated	13.04 cents	
Power:		
Ac. 53 Gals. of gasoline	15,392	
Cost of gasoline	$1,647.98	2.89
Total miles operated per gallon	3.95	
Transportation:		
Ac. 63 Superintendence and instruction	$342.61	0.60
64 Wages of operators	8,056.09	14.11
67 Lubricants	66.99	0.12
67 Miscellaneous supplies for buses	105.25	0.18
70 Garage employees	619.08	1.08
71 Garage expenses (heating, lighting, etc.)	548.90	0.96
71 Garage expenses, rentals	529.17	0.93
Total transportation	$10,268.09	17.98
Total operating expenses	$19,846.44	34.76
Investment in buses, 6 per cent	1,056.67	
Investment Allston garage 6 per cent on one-half of investment	75.00	
Taxes, 2 per cent	377.22	
License fees	30.00	
Total interest and taxes	$1,538.89	2.70
Total cost of service (b)	$21,385.33	37.46

(a) Depreciation of buses carried on a five-year basis, with allowance of 10 per cent salvage.

(b) No charges included for general and miscellaneous expenses.

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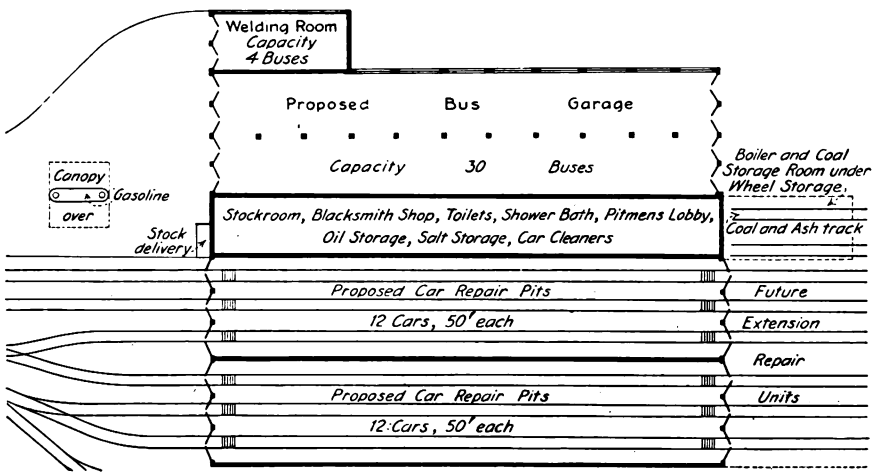
during peak loads. The management of the Boston Elevated Railway considers that in a number of respects the conditions under which the buses operate are unfavorable for a good showing. In the first place all of them, under the fare system of the company, carry passengers for 5 cents if no transfer is required, and most of them are on light traffic lines. Under such conditions inefficient schedules are inevitable. In the second place the lines are quite scattered so that housing and maintenance cannot be carried on under the most desirable conditions. This situation is improving, however, as the company has built or leased some garages and has a program of garage construction under way. In the third place, operation and drivers are new. This has meant the breaking in of nearly all drivers, who naturally are not as expert in this work as they will become by more experience. It should be said on the other side, however, that the care and operation of automotive equipment are not new matters on the Boston Elevated. The company has had for some years



At Its Medford Depot Headquarters, the Boston Elevated Railway Proposes to Add a Thirty-Bus Garage, Adjoing the Carhouse

a good sized equipment of motor tower wagons, emergency trucks, inspectors' automobiles, tractors, etc., numbering at the present time about 120. For this reason it has necessarily had to provide for the repair of this equipment, so that the maintenance of the Boston Elevated's fleet of buses has not been in inexperienced hands.

Since the establishment of its first bus line in February, 1922, the company has carefully maintained operating figures, both statistical, as to the runs of individual buses, and financial.

The mileage statistics for January, 1924, showed that ten of the buses during the month ran more than 2,000 miles, as follows: 2,835, 2,830, 2,744, 2,550, 2,504, 2,480, 2,280, 2,253, 2,110 and 2,074. The table on page 419 shows general operating statistics and operating expenses of the company's motor bus service for January, 1924, though in this statement no charge is included for "General and Miscellaneous Expenses."

Financial Statistics Explained

In this statement it should be said that the number of 10-cent fares, mentioned under Operating Statistics, means the number of passengers requesting transfers, usually to continue the trip downtown on a rapid transit line.

The monthly charges on maintenance and depreciation of equipment of course vary greatly, according to the work required, during the month, but the total given of 13.89 cents per revenue mile operated by the buses does not vary greatly from the other monthly figures during 1923. Depreciation is charged each month on the basis of an assumed life of five years for the bus and a salvage value at the end of that time of 10 per cent, based on its purchase price.

Under "Conducting Transportation" the operators' wages are based on a payment of 78 cents per hour. This is also the rate paid on the surface cars under the last arbitration decision and is made up of a base rate of 70 cents plus a premium of 8 cents for one-man cars or buses.

Under Fixed Charges, the items are self-explanatory, the interest being based on the annual rate of 6 per cent on the purchase price of the buses and the taxes on 2 per cent of the purchase price of the buses and garage investment.

Gasoline is purchased partly at the wholesale rates, where the company has storage accommodations and partly at the retail rate. The latter during January in Boston averaged about 19 cents.

The receipts of these buses during January were slightly less than the total cost of service as given in the accompanying statement. In other words, the buses at present do not pay operating expenses, including depreciation and fixed charges, but this was not expected under the conditions under which they operate.

New Garages Under Contemplation

The principal garages of the company at present are one at Allston, one at Hyde Park, and one at Riverside Avenue, Medford. The latter was built originally for a commercial garage but leased by the company until it can construct proper garage facilities. To take the place of the latter the company contemplates the construction of a garage to hold thirty buses at Medford, adjoining its Salem Street carhouse. Between the carhouse and the garage will be a long, narrow building to accommodate the stockroom, blacksmith shop, toilets, pitman's lobby, oil storage, storage, accommodations for the car cleaners, etc. The accompanying diagram shows the general arrangement. No special lobby for the bus operators is contemplated, because they will share the lobby now on this area used by the car platform men.

On the opposite side from the storeroom is a welding room with capacity for four buses, where carbon in the cylinders can be burned out, etc. The building construction itself is of brick with mill construction roof and steel columns. The floor is concrete and there are no pits, but a trestle will be built on which buses can be run for underneath inspection. The end doors are 12 ft. wide and 14 ft. high, this height admitting a tower car. Gasoline storage is provided outside under a canopy. There is a driveway at each end so that buses can enter from the front or rear of the garage.

While this particular garage has been designed so that, if necessary, it can be used as a carhouse, it is the policy of the company when laying out or rehabilitating division depots at yards to make provision for the possible future care of buses, as well as cars.

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Association News & Discussions

Bus Accounting Discussed at Fort Wayne

Operating Costs Compared with Those for Electric Railways—Officers Also Elected at Annual Meeting of the Central Electric Railway Accountants

BUS accounting was the main topic discussed at the two-day meeting of the Central Electric Railway Accountants' Association, held at Fort Wayne, Ind., on Feb. 29 and March 1. At the session on March 1 L. J. Wertzler, assistant auditor Chicago, North Shore & Milwaukee Railroad, presented an extended paper on this topic, treating not only accounting for buses but methods of establishing rates and other allied matters. This paper was published in abstract in last week's issue of the ELECTRIC RAILWAY JOURNAL. An abstract of a prepared discussion on this topic, presented by F. E. Belleville, auditor Louisville Railway, is published in this week's issue.

In the following discussion J. S. Bleecker, formerly general manager Indiana, Columbus & Eastern Traction Company, and now with Day & Zimmermann, spoke about the operation of buses by the I. C. & E. and also the bus operation in general. The point emphasized by Mr. Bleecker was that the traveling public is demanding this class of transportation, which in a measure is new business not at the present time enjoyed by the electric railways. To secure this new business and at the same time protect the electric railways from unfavorable competition, the electric railway should engage in the operation of buses. Mr. Bleecker declared that maintenance cost would necessarily be lower on buses operated by a railway company than on those of outside concerns and that bus operation could be used in place of electric cars which are now being operated at a loss.

Another point discussed at the meeting was that of transporting passengers on tickets which would be valid either on a bus operated by the railway company or upon the railway cars, according to the wishes of the passenger. This point was developed further as to the feasibility of transporting the passenger on the bus and checking baggage on the railway car, which would possibly be desirable in cases where severe competition exists.

W. L. Wilt, special representative Pennsylvania Railroad, Chicago, Ill., gave a very interesting talk on the railroad situation in general, covering the subject of valuation, basis of rate making and the effect of the recapture clause of Section 15A of the interstate commerce act. Mr. Wilt presented some interesting statistics compiled by the Pennsylvania Railroad as to the disposition of revenue received from freight, passenger, mail and express business, also the distribution of the "bread dollar" comparing the transportation revenue to that of the various features entering into the cost and profits of this commodity.

ASSOCIATION BUSINESS AND ELECTION OF OFFICERS

In accord with the rules of the association, the discussion on the afternoon of Feb. 29 covered differences in accounting methods as between different roads, and resulted in several properties agreeing to conform more generally to the working rules indorsed by the association.

The committee reports rendered on March 1 indicate progress, but no definite recommendations were made.

The following officers were elected for the coming year:

President, L. W. Van Bibber, auditor Indiana, Columbus & Eastern Traction Company, Springfield, Ohio.

First vice-president, J. P. Longon, auditor Cincinnati & Dayton Traction Company, Dayton, Ohio.

Second vice-president, Tudor W. Jones, auditor Union Traction Company of Indiana, Anderson, Ind.

Secretary-treasurer, L. E. Earlywine, Traction Terminal Building, Indianapolis, Ind.

Executive committee: C. E. Baker, auditor Lima-Toledo Railroad Company, Lima, Ohio; V. R. Shick, auditor Fort Wayne & Northwestern Railway, Kendallville, Ind.; C. A. Dugle, auditor Indianapolis & Cincinnati Traction Company, Rushville, Ind.; H. F. McColgin, auditor passenger receipts Interstate Public Service Company, Indianapolis.

It was decided to hold the next meeting at Cleveland on Aug. 15-16.

Bus Operation Is Benefiting Louisville*

De Luxe Service at a 10-Cent Fare Is Given in Motor Coaches—Also Elected at Annual Meeting of the Central Electric Deficit Is Growing Smaller

BY F. E. BELLEVILLE
Auditor Louisville Railway

IN LOUISVILLE we are getting away from the use of the word "bus" as applied to the kind of service generally furnished by a responsible transportation company, such as a street railway. We are attempting to dignify the de luxe service rendered by us by calling it "coach service" and in all cases referring to the passenger equipment as "motor coaches." Our motor coach operations are not carried on by the Louisville Railway, but by a subsidiary company, Kentucky Carriers, Inc., whose operations are entirely in the charge of officials of the Louisville Railway.

It has been said that most railway companies engage in the operation of motor coaches primarily to keep the other fellow out. This is not exactly the case in our city, nor do we believe it to be generally true in other cities. As we all know the present operating companies already have the organizations necessary to engage in this new arm of transportation, and it is but logical that they should engage in this field to secure unified transportation service.

In Louisville the question of installation of motor coach service had been discussed for some time, quite generally by people residing in sections of the city not directly served by street cars, and also by the operating officials of the railway and the conclusion was reached that eventually a profitable business could be built up. A survey of the city was made, and as a result the company commenced operations on June 24, 1923, with six coaches, operating over one route. In July, 1923, six additional coaches were added and another route was opened. Later one of these routes was discontinued and a service was inaugurated in another section of the city in the hopes that a more productive territory could be reached.

We do not regard coach service as exactly parallel to street railway service. Every community has many private automobile owners who use their machines extensively between their homes and the office, store or shop, because they desire some means of transportation better than is afforded by street car service. The increasing difficulties in finding suitable parking space in the downtown business districts, together with cost of operation, we believe, are gradually discouraging the use of automobiles by private owners, and it is this class of people whom we hope to reach by the use of motor coaches.

The results of operation for the first six months, while showing an operating loss, are not entirely discouraging, as the operating deficit has been considerably decreased during the later months. While this is partly due to a

*Abstract of discussion presented at the meeting of the Central Electric Railway Accountants' Association, Fort Wayne, Ind., March 1, 1924, of the paper on "Bus Operation and Accounting," by L. J. Wertzler, published in the ELECTRIC RAILWAY JOURNAL for March 8, page 387.

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lower selling price of gasoline, it is also partly due to a gradual increase in earnings per coach-mile. Passenger revenues averaged about 12½ cents per coach-mile during the summer months of 1923, while during the last three months the average will run about 15½ cents per coach-mile. In some cities this increase in revenue might be attributable to adverse weather conditions, but in Louisville we have had a comparatively mild and open winter, as is usually the case, and, we believe this increase to be a natural growth in the business which will continue.

Our operating expenses and taxes for the first six months of operation averaged 19.21 cents per coach-mile operated. Included in operating expenses are depreciation charges on passenger equipment at the rate of 25 per cent per annum, and accruals to reserve for tire repairs and renewals at the rate of 1¾ cents per coach-mile. The cost per coach-mile stated above (19.21 cents) does not include interest on investment.

The rate of fare charged since the inauguration of the service is 10 cents per passenger. Transfers are not given from one coach route to another, nor are they interchanged between coaches and street railway cars. No free passengers are carried. All coaches are one-man coaches, seating twenty-five passengers and are equipped with Johnson registering fare boxes.

The operating trip sheet in use is similar to the one used by the North Shore Company, and shows: date, run number, coach number, leaving and starting points, etc., speedometer readings, fare-box readings, number of passengers carried and amount of revenue. Daily reports are made to the proper department heads and officials, showing passenger earnings, coach-miles operated, earnings per coach-mile, and timetable cost.

The classification of accounts which we are using is based on the Interstate Commerce Commission's classification for electric railways and is similar to that adopted by the American Electric Railway Association at Atlantic City in October, 1923.

Oklahoma Association Meets

NEARLY 600 representatives of the four branches of the public utility industry gathered for the sixth annual convention of the Oklahoma Utility Association in Oklahoma City, beginning March 11 and continuing three days. Some twenty speakers were on the program.

The interference of motor bus lines with the legitimate operation of railways was discussed by John Shartel, president Oklahoma Railway Company, and A. S. Johnson of the M. K. & T. R.R. Both pointed out that bus lines are not compelled to stand on the same basis as other transportation. The railroads are allowed to earn only 5½ per cent on their investment and are required to pay heavy taxes, while bus lines make use of the highways paid for by the people, without having to help adequately to support the highways.

Mr. Shartel characterized the growing use of the private automobile as "a social stampede that would stop no one knows where." He said that of 26,000 automobile owners in Oklahoma City 3,000 paid income tax last year.

Mayor O. A. Cargill of Oklahoma City, who studied law while a street car motorman and a traffic policeman in Oklahoma City, welcomed the convention. He declared that municipal ownership of utilities does not offer the same degree of incentive for effort on the part of those responsible for its administration as comes with private ownership.

At the banquet Wednesday night Governor M. E. Trapp was the guest of honor and was told that the business world now has confidence in the capacity and integrity of the state government in Oklahoma.

Clarence E. Rentchler, a lineman of the Oklahoma Gas & Electric Company, was awarded an Insull medal for saving the life of a fellow lineman.

Special Trackwork

THE sectional committee of the American Engineering Standards Committee on specifications for special trackwork materials and design of 7-in. plain girder rails held its fourth meeting at A.E.R.A. headquarters, New York, on Feb. 28. Those present were V. Angerer, chairman; C. A. Alden, E. B. Entwisle, H. H. George, R. E. Hess (representing Messrs. Young and Kenney), F. Newman, E. P. Roundey, E. M. T. Ryder and J. B. Strong.

For sub-committee No. 1 Mr. George reported that he had submitted its report to the committee on way matters of the A.E.R.E.A.

In the absence of Chairman R. C. Cram of sub-committee No. 2 Mr. Roundey read the report, covering proposed specifications for standard section rails, girder groove, plain girder and girder guard rails. This report developed considerable discussion, particularly as to the matter of adoption of certain specifications in which a number of changes of minor importance were being considered.

Mr. Hess read the report of subcommittee No. 3 for Mr. Young, submitting manufacturers' standard specifications for rolled manganese steel rails, specifications for manganese steel in castings for trackwork, specifications for general steel castings, specifications for hard steel castings for trackwork, specifications for gray iron castings for parts other than bodies of track castings and also for bodies of track castings, specifications for malleable castings. He also read a letter from Enrique Touceda, consulting engineer of the American Malleable Castings Association, pointing out the objections to specifying two grades of malleable castings. It was decided to recommend one grade only, that standard with the American Society for Testing Materials.

Some discussion also insued on the various specifications, a number of suggested minor changes being considered. It was decided to obtain tentative agreement on such changes before submitting them to the different associations interested.

The next meeting of the committee will be held at New York on April 23.

American Association News

Power Transmission and Distribution

A TWO-DAY meeting of the power transmission and distribution committee of the American Electric Railway Engineering Association was held March 10 and 11, in the offices of the Chicago Rapid Transit Company. The first day was devoted to sub-committee meetings, reports of subcommittees being presented at the general session.

The subcommittee on concrete poles presented a tentative specification for the construction of concrete poles. The subcommittee proposes to have Prof. D. D. Ewing check a portion of the existing specification in section D S 3c of the Engineering Manual, which is to be revised, to determine if it conforms with present day practice.

Considerable information is being collected by the subcommittee on dimensions of approach gears, with a view toward standardization.

Consideration was given to the subject of current collectors with the result that the entire committee instructed a subcommittee on the subject to coordinate with that on car equipment.

Another subject discussed at some length was the matter of a trolley support in storage yards. This was provoked by the recent proposed rules on fire protection tentatively set up by another committee of the Engineering Association. It was felt that a set of rules should be adopted with which a majority of the companies will comply. These same rules to comply with the American Fire Protective Association code. It was suggested that a subcommittee be formed to crystallize the power transmission and distribution committee's ideas on this subject.

Progress reports were presented by the various subcommittees.

During the meeting, H. A. Johnson, president of the Engineering Association congratulated the committee on its attendance, and explained the effort being made on the part of that association to co-ordinate the work of the various committees.

The following members were present: Chas. H. Jones, chairman; J. Walter Allen, Robert L. Allen, S. M. Day, T. H. Drew, Leslie E. Delf, D. D. Ewing, Charles Gilman; H. W. Griffin, C. L. Hancock, C. J. Hixson, A. Hughes, Jr., John Leisenring, F. McVittie, H. S. Murphy, Carl P. Nachod, J. F. Neild, H. A. Pharo, W. J. Quinn, W. Schaake, A. Schlesinger and F. J. White. D. L. Smith, D. H. Huttleston, D. A. Tomlinson, W. L. McDaniels, Sam Johnson, John Stephenson, Cæsar Antoniono, G. I. Wright, H. A. Johnson, L. W. Birch, Charles Gordon and M. B. Knox were present as guests.

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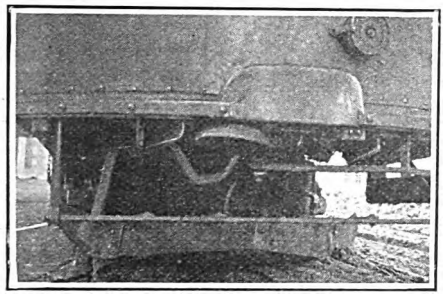
Maintenance of Equipment

Simple Snow Scraper Used at Holyoke

THE city of Holyoke, Mass., has frequent heavy snow storms during the winter. An ample number of snow sweepers and plows enables the Holyoke Street Railway to keep its lines open during most severe storms. In order to obviate the necessity of using the sweepers



The Scraper Successfully Handles Light Snow and Saves the Use of Plows and Sweepers

for light snow storms, however, the company has equipped its cars with home-made scrapers of the type show in the accompanying illustration. They consist of a metal piece bent to the circumference of a large circle and slightly greater in length than the width of the track. This is mounted on a simple framework which is hinged at the front end and may be raised or lowered by means of a lever located on the platform alongside the motorman.

Maintaining Aluminum Cell Lightning Arresters

THE Northern Indiana Power Company, Kokomo, Ind., has thirty-five General Electric direct-current aluminum lightning arresters in service on its cars. These are of the standard two-cell type and are installed outside, either under the car or on the roof.

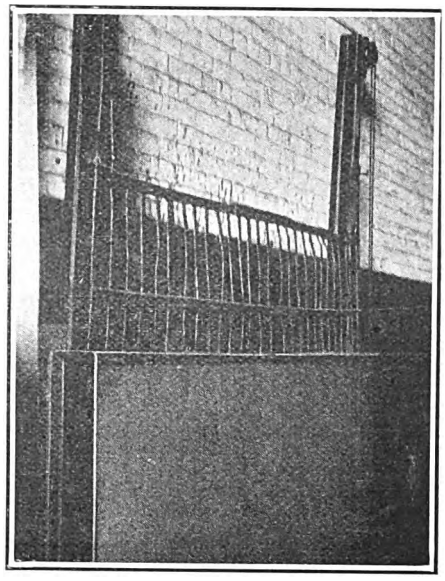
The company's practice in maintaining these arresters is to remove them from the cars at the beginning of winter. The electrolyte and oil are thrown away, the jars and plates are washed thoroughly and the arresters are then stored in a dry, warm place. When they are again returned to service in the spring, new electrolyte and oil are used. During the summer months the arresters are inspected once a month and the fuses are inspected after each lightning storm. This work is done by the pit men. Excellent results have been obtained from this method, and within a year's time the company has used but two new cells and one set of plates for replacement on thirty-five arresters. No failures have occurred due to lightning while in service during this period.

Air Hoist Used on Work Car

AN UNUSUAL type of derrick car has been constructed by the United Electric Railways, Providence. Between the motorman's cabs at the two ends of an ordinary flat car a horizontal beam has been placed about 7 ft. above the floor. The two trolley poles are attached to the upper side of this beam. From the under side of the beam is suspended an ordinary air hoist, such as is used for handling materials in repair shops. This has been laid flat along the underside of beam and from the end of the hoist a chain with a hook runs over a series of pulleys and to a rotating derrick arm. The arrangement is shown in the accompanying illustration. The hoist is attached to the air system of the car and by the operation of a valve the power of the pneumatic hoist is used for lifting objects at the end of the derrick boom.

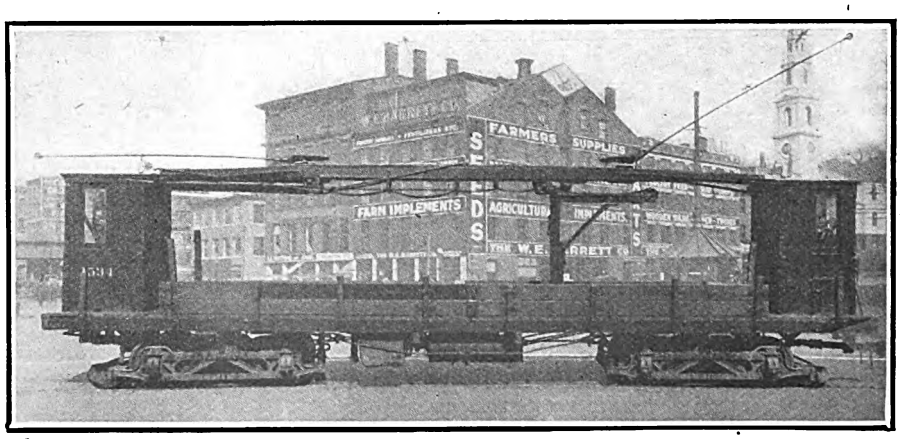
Fender Dipping Tank Does Painting Cheaply

THE steel fenders used by the Union Street Railway, New Bedford, are painted very cheaply by a dipping process. A tank of comparatively small capacity has been built slightly larger than the fender. This



Dipping Tank for Fenders

is filled two-thirds full of water and one-third of paint on top of the water. The fender is lowered by means of an arrangement of light pulleys and ropes down through the paint into the water and then lifted out again and allowed to drip. The apparatus used in this process is shown in the accompanying illustration.



A Compressed Air Hoist Suspended from the Center Beam Does the Lifting Work of This Derrick Car

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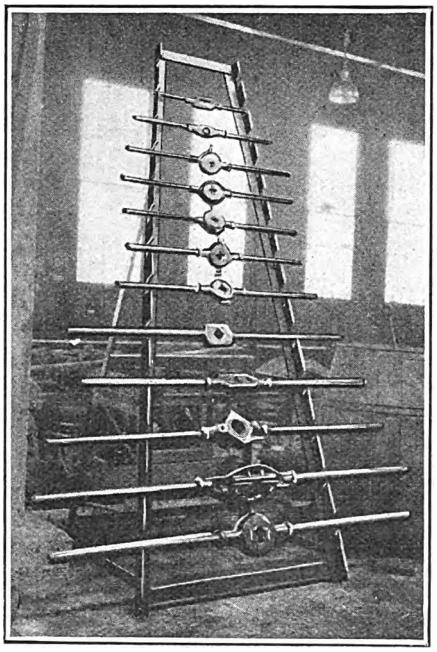
Handy Die Stock Rack

DIE stocks of various sizes are common tools about electric railway shops and it is convenient to keep these together with an arrangement for easy selection. A rack for die stocks which has been found particularly convenient is shown in the accompanying illustration. It is in use in the shop of the Philadelphia & Western Railway, Norristown, Pa.

The front pieces of the rack which support the stocks are made of 1½-in. angles and the distance between these decreases as the height from the floor increases in order to provide for different lengths of the stock handles. Slots are cut in one of the flanges of the angles to receive and support the stocks. These are sloped slightly so that there is no danger of the stocks rolling out when once they are placed in position. The back supports for the rack are of 1-in. angles and the framework is strengthened and supported by the use of flat straps. A front strap 1¾ in. wide and end straps 1¼ in. wide are used. The rack is 67 in. high, 29 in. wide at the base and 23 in. deep. The width at the top is 12 in. Provision is made for holding thirteen stocks.



Die Stocks Are Kept Convenient to the Work in This Rack

In order to provide a storage space for the dies, a shelf is included in the rack. This is 12 in. x 22 in. and is made of sheet iron. This shelf is 23 in. from the floor.

New Equipment Available

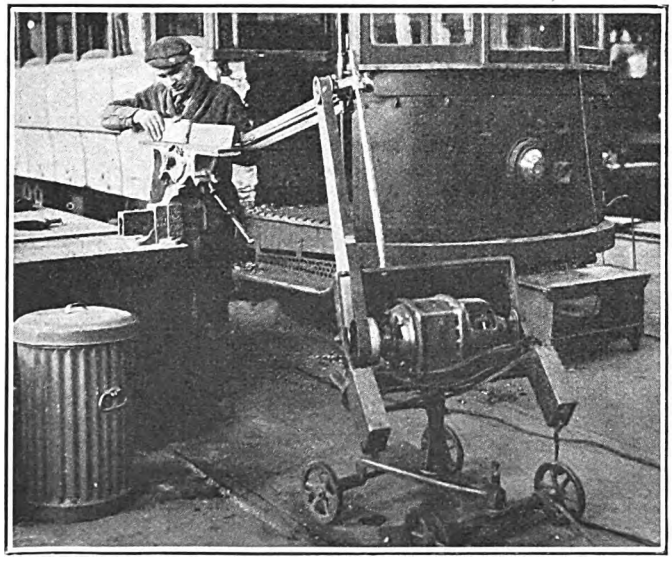
Making Woodworking Repairs on the Job

REPAIRS to electric railway cars usually entail a large amount of hand work. In order to meet this condition the P. L. Billingsley Company is marketing the Flexway woodworking machine. The work done by one of these machines comprises boring, ripping, cutting off, ploughing, splining, etc.

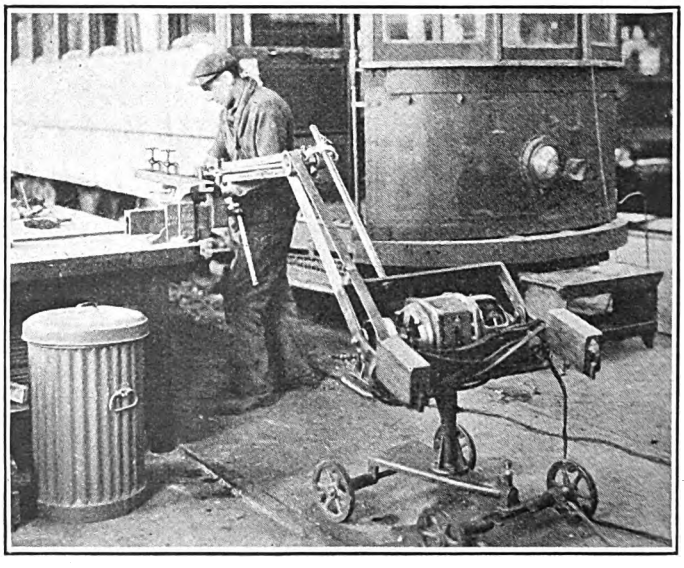
The machine combines many of the features of the mill and is portable, well balanced and flexible so that it can be taken to the job for any class of framing operation required. It is made in four sizes, the No. 1 size being adapted to lumber up to 2-in. thickness, the No. 2 to lumber up to 4-in. thickness, the No. 3 for lumber up to 6-in. thickness and the No. 4 is built to order for work on timbers of any dimensions. The No. 2 size is particularly adapted for the class of work necessary in repairing car bodies in electric railway shops. Used with different attachments, it is a router, a bench joiner, a gainer, a boring and counter sinking machine or a saw for cutting off or ripping lumber. Emery and buffing wheels can also be used as well as saws. The chassis is mounted on roller bearings and the center swivel post on ball bearings. The weights are adjustable so as to allow the operator to "tune" the machine to suit himself. The sawing head is adjustable to cut at any angle up to and including 55 deg., making it a convenient tool for various repair operations. Accompanying illustrations show this machine with a mortising attachment and also with a joiner attachment in use in the shops of the United Railways & Electric Company, Baltimore, Md.

Combination Tractor and Rail Truck

IN ORDER to provide a mobile unit that can be operated either on the rails or off, the Differential Steel Car Company, Findlay, Ohio, has developed a combination car-wheel truck and tractor. A machine that can operate on rails is of great advantage in getting to the job, as with the tractor treads alone movement over long distance is slow and



Woodworking Machine with Joiner Attachment



Shaping a Piece with Mortising Attachment

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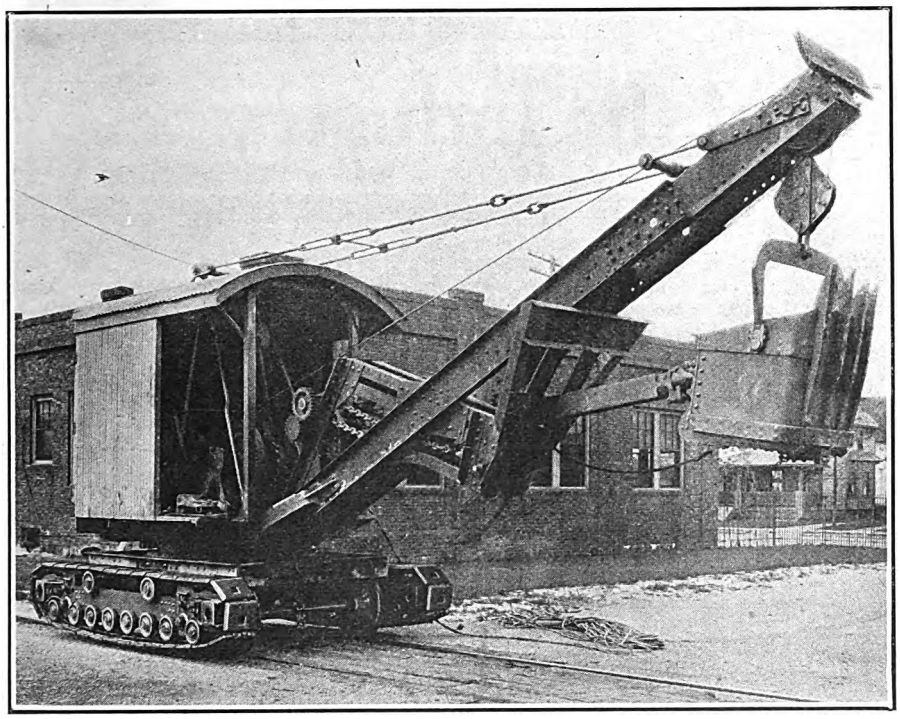


New Propelling Unit for Electric Shovel or Other Field Machine Is Equipped for Tractor Operation or to Run on Rails

costly. When once on the job tractor mounting is most convenient.

The equipment on the upper part of the car body can be anything desired, and the operating part can be fitted to concrete mixers, power shovels or other equipment. When applied to a shovel continuous digging is made possible and the time of shifting the shovel is reduced. The shovel can also advance while digging, which is a further advantage. The tractor mounting eliminates the need for mats used to support the shovel, and no blocking is required to maintain its position while digging as is required with wheel mounting.

The change in arrangements from the position of running on the tractor treads to the car-wheel operation, or vice versa, is effected by removing four nuts and filler blocks and replacing them so as to raise or lower the car wheels and bring them into contact with the rails, or raise them above the bottom of the tractor treads.

With the car running on rails, the change is made to the tractor treads by running the car wheels on wedge blocks, so as to raise the whole machine. By removing the four filler blocks above the axle, the tractor treads come down to their lowest position. Then by replacing the filler blocks beneath the axle, the equipment is ready to travel on the tractor treads. To make the reverse change, it is only necessary to reverse this operation.

The equipment is steered when traveling on the tractor treads by means of clutches of the multiple-tooth type, and either tread may be locked while the other is driven. The width varies according to the type of shovel, and whether the journal bearings are located inside or outside the wheels. The extreme width is from 7 ft. 7 in. to 8 ft. 8 in.

Improved Journal Truing and Axle Lathe

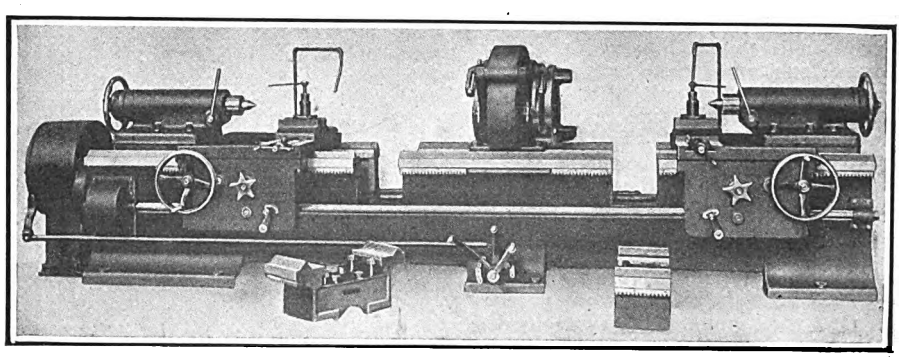
A COMBINATION journal truing and axle lathe has been developed by the Consolidated Machine Tool Corporation of America, Rochester, N. Y. This lathe is provided with two carriages, so that a pair of journals with wheels mounted may be turned at one time. The machine has a headstock of the opening type located in the center of the machine, and the bed has gaps for swinging wheels up to 45 in. diameter. When used as a journal truing lathe, the two carriages turn the journals with the wheels mounted, thereby obviating the necessity of forcing the wheels off the axle and pressing them on again. This naturally results in a considerable saving of time.

The large driving gear is made in two halves with a coarse pitch and wide face teeth. It rotates in two large bronze bearings, of which there is one on either side of the center. The pinion meshing with this gear runs in oil and is mounted on a heavy shaft located in the center of the bed and is driven from the speed change gears located in the left hand end of the bed.

The gaps in the bed of the lathe are machined and finished filler blocks are furnished, which when inserted in the gaps give the carriage full travel between the driving head and the end of the machine, so that regular axle turning, when the wheel and gear seats and journal fits are to be machined, can be handled with economy. With the filler blocks inserted, the carriages have a full bearing on the bed at all times.

This lathe has a 27-in. swing over the bed so that it will accommodate a gear of the ordinary size used by electric railways mounted on the axle. Should the gear run a little larger than this dimension, it is possible to take care of this by raising the tailstock, center driving head, and tool rest a sufficient distance to swing the larger diameter gear over the bed.

Some of the users of this type of lathe are obtaining an average production of two sets of axles per hour with four journals. This production of course greatly exceeds what could be obtained if wheels were pressed off the axles and the journals turned on an axle lathe or a standard engine lathe, and the wheels then pressed on the axle again with a wheel press. Also the pressing off of the wheels destroys the tight fit to a certain extent.



Journal Truing Lathe with Machined Gaps for Wheels

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The News of the Industry

Mayor Hylan Makes His Annual Plea: "Leave It to Me"

Mayor Hylan of New York on March 12 appeared at a joint hearing before the Senate and Assembly committees on public service and demanded that the Legislature enact his home rule transportation and public utilities bills, including one which would give legal sanction to the city for going into the bus business.

He assailed the Republican bill, which would give to New York an absolutely free hand in transit on the only condition that municipal operations be made self-sustaining. He characterized this as a measure presented to help the "traction ring."

On the other hand the Mayor made a special plea for his bus bill and renewed his pledge that with the legislation he demanded enacted he would bring about decided improvements in the New York City transit situation within sixty days after such facilities existed.

The delegation which came to speak against the bill was headed by William McCarroll, former Public Service Commissioner. Other opposition was presented by representatives of the chambers of commerce, Citizens' Union and New York Electric Railway Association.

Staten Island Electrification Advocated

Plans for the electrification of the Staten Island Rapid Transit Railway as outlined briefly in the ELECTRIC RAILWAY JOURNAL for Feb. 9, 1924, page 228, received the unanimous approval of twenty Staten Island civic organizations at a hearing before the New York Public Service Commission, March 11. Chairman William A. Prendergast of the commission, who presided, announced that the report of that body on the railway's plan will be issued within the next two weeks.

Appointment of Daniel L. Turner Recommended at Pittsburgh

The special committee appointed by the City Council of Pittsburgh to formulate a plan of procedure as to the construction of a subway and other related questions submitted its final report to the councilmanic public works committee on March 4. The committee recommends the appointment of Daniel L. Turner, New York City, to serve as consulting engineer in charge of studies relating to traffic and transportation in Pittsburgh.

As to the appointment of an advisory commission to serve under Mr. Turner, the committee recommended that this commission be composed of five members, each one of whom shall represent one or more organizations in the city. The committee also suggests that the necessary funds and forces to enable Mr. Turner to carry on the work assigned to him can be provided for by Council after Mr. Turner has had an opportunity to form an opinion as to his requirements.

$110,000,000 for Subways

New York Commission Indicates It Is Ready to Advertise Bids for New Construction

Steps were taken on March 11 by the New York Transit Commission to bring about the speedy beginning of the construction of the Brooklyn crosstown and Washington Heights subways. On that day the Transit Commission formally notified the Board of Estimate that it was ready to proceed with such construction and requested that the board appropriate $110,000,000, the estimated cost, either directly or by reserving that amount out of the city's borrowing margin.

Both bodies have approved the routes of both subways, except for one section in Brooklyn, for which the commission has presented alternative routes in Fulton Street and Lafayette Avenue and has expressed its willingness to accept either route the board may select.

The commission's letter to the board was signed by George McAneny, chairman. It announces that the commission is ready to advertise at once for bids on the first section of the Brooklyn crosstown subway, and will be ready to advertise for bids on many other sections in June and July. In view of agreement with the board's transit committee on every point that had been in dispute between the board and the commission, the members of the commission expressed the view that there was no reason why the board should not begin to "say it with shovels" this spring, and that there was an excellent prospect of going on with the rest of the commission's program for the construction of new subways.

The length and estimated cost of construction of the new routes are given in the accompanying table.

	Length in Feet	Estimated Cost
MAIN BROOKLYN CROSSTOWN LINE		
Construction		$22,600,000
Station finish		1,400,000
Trackwork		620,000
Total	28,620	$24,620,000
THE FULTON STREET LINE		
Construction		$3,600,000
Station finish		350,000
Trackwork		200,000
Total	10,550	$9,150,000
THE LAFAYETTE AVENUE ALTERNATIVE		
Construction		$6,350,000
Station finish		250,000
Trackwork		175,000
Total	9,300	$6,775,000
WEST SIDE LINE—NORTH OF 59TH ST.		
Construction		$42,200,000
Station finish		1,000,000
Trackwork		1,000,000
Total	33,865	$44,200,000
WEST SIDE LINE EXTENSIONS, SOUTH		
Construction		$10,000,000
Station finish		480,000
Trackwork		340,000
Total	10,900	$10,820,000
Grand total	93,235	$95,565,000

Long-Term Trackless Franchise at Rochester

The Common Council of Rochester, N. Y., on March 11 approved the franchise for the operation of the crosstown trackless trolley line for a period of twenty-five years. This line is operated by the Rochester Railways Coordinated Bus Lines, Inc., a subsidiary of the New York State Railways. The franchise includes transfer privileges to all city bus and trolley lines.

The trackless line was started on Nov. 1, 1923, and has won popular approval. It connects the large industrial and residential sections on either side of the Genesee River, via the Driving Park Avenue bridge.

Recommendations for Rapid Transit in Detroit

Col. Sidney D. Waldon, chairman of the Detroit Rapid Transit Commission, commented recently on the situation there. He said that the rapid transit studies there indicate that the comprehensive system for Detroit ultimately will include occupancy of the so-called Dix-High-Waterloo thoroughfare or a similar combination of streets in about the same locality. The recommendation is made that the thoroughfare be condemned and widened to 106 ft. or 120 ft. to permit the construction of a four-track rapid transit line beneath the right-of-way. The fact that there must be crosstown lines to relieve congestion at the center of the city is emphasized by Major John P. Hallihan, transit engineer in charge of the rapid transit studies for the city, in a supplementary report to acting Mayor Martin.

The following recommendations are summarized from Major Hallihan's report:

1. There should be a crosstown avenue in about the location of the proposed Dix-High-Waterloo route.
2. Sections of the Dix-High-Waterloo route offer certain advantages in connection with outside thoroughfares that make those sections of much greater importance today than when the route was originally laid out.
3. Any main crosstown thoroughfare now or hereafter adopted should be, first of all, continuous; should avoid all offsets, sharp turns and bad alignments; should directly cross and not occupy other thoroughfares, and should have a minimum width of 106 ft., and preferably 120 feet.

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4. The width of 80 ft. now considered for Dix-High-Waterloo is insufficient along certain sections, notably the one from Michigan eastward across Woodward to Gratiot Avenue, and should be increased to 106 ft. or preferably, 120 ft.

$600 in Prizes for Ideas on Sound Public Relations

Six hundred dollars in prizes is being offered by *Forbes Magazine* for articles on "How Sound Public Relations Between Public Utilities and Communities Can Best Be Developed and Maintained." For the best articles the following cash prizes will be awarded: First prize, $300; second prize, $200; third prize, $100. By "best" article *Forbes* does not mean the best from the standpoint of literary excellence, but the best in the reasons and ideas presented on the subject. Ideas should be based on present and past experience. The contest closes on May 1. The awards will be announced by the magazine in the issue of May 24. The manuscripts will be passed upon by B. C. Forbes and two other judges representing the National Electric Light Association.

City Councils of Virginia Still Have Jurisdiction

The third attempt to remove the bus and general transportation business from the jurisdiction of city councils in Virginia has failed. In other words, the General Assembly has adjourned without acting on a bill giving the courts of record the right to reverse decisions of city councils in matters pertaining to competition in transportation on city streets.

The bill was so drawn as to give the court the right to cancel any franchise or other agreement if the court found that a city council had granted a new transportation concern the right to operate in competition with an old one in territory where the facilities offered by the senior line were adequate.

The measure was introduced late in the session. It took the place of two other bills somewhat similar in substance which were defeated. The third bill appeared at one time to be likely to pass, having been favorably reported.

Georgia Railway Can't Meet Wage Demands, Says Arkwright

Final arguments in the hearing for higher wages for employees of the Georgia Railway & Power Company, Atlanta, Ga., were presented to the board of arbitration in its last public meeting at the Fulton County Court House on March 6. Edward McMorrow, a member of the executive board of the Amalgamated Association, made the closing plea for the workers.

Preston S. Arkwright was the principal witness for the company. He stated that the company was not able to meet the new demands as it had been when the war labor board adjusted the Atlanta wage scale in 1918, and that any increase in wages must fall directly upon the public which uses the cars. He asserted that financially the company was not in a position even to consider the merits of the appeal for more wages.

Kansas Courts to Be Permitted to Interpret Law Prohibiting Strikes

The provision of the Kansas Industrial Relations Court act which prohibited strikes by coal miners must stand or fall on the decision of the Kansas courts. This the Supreme Court held on March 10 in the case of August Dorchy. The decision of the lower court was reversed.

Justice Brandeis, delivering the opinion, said the Supreme Court could, if it desired, pass upon the validity of the section in question, but that it would rather leave that point to the State courts, and would accept their decision. He declared that the lower courts should not have passed upon the question.

The case arose out of the soft coal strike. The union officials convicted of calling a strike contended that a state could not arbitrarily declare any particular industry to be an essential one.

It will be recalled that in the famous Wolff Packing Company case the United States Supreme Court passed upon the constitutionality of certain parts of the Kansas Industrial Court act, but it does not appear that the State court passed upon the question whether Section 19 (the one under attack), being an ultimate part of the system of compulsory arbitration held to be invalid, falls with it. Justice Brandeis says that in order that the State courts may pass upon this question, its judgment in this case, which was rendered before our decision in the Wolff Packing Company case, should be vacated.

To accomplish that end the judgment of the State Supreme Court was reversed. It was explained that this reversal was largely a technical proceeding, however, designed merely to permit the Kansas Supreme Court again to pass on Section 19, taking into consideration this time the principles laid down by the United States Supreme Court in the Wolff case.

Fellowship in Transportation Offered at Yale

The Graduate School of Yale University announces that the Strathcona Memorial Fellowship in Transportation, of $1,000, is offered annually for advanced work in transportation, with special reference to the construction, equipment and operation of railroads, the problems connected with the efficient transportation of passengers and freight and the financial and legislative questions involved. The holder of the fellowship must be a man who has obtained his first degree from an institution of high standing. In making the award, preference is given in accordance with the will of Lord Strathcona to such persons or to sons of such persons as have been, for at least two years, connected in some manner with the railways of the Northwest.

Applications for this fellowship should be addressed to the dean of the graduate school of Yale University, New Haven, Conn., before May 1, on blanks which may be obtained from the dean, and should be accompanied by a statement of the applicant's education and practical experience, a statement of the particular field of interest to the applicant and his reasons and purposes for desiring the fellowship, letters of recommendation and reprints of articles or publications by the applicant.

Kewanee Public Utilities Service Company Incorporated

The Kewanee Public Utilities Service Company, Kewanee, Ill., has been incorporated with the idea in mind of operating the Kewanee & Galva Electric Railway, the Kewanee Street Railway and the gas and electric plants in Kewanee. B. F. Lyons of Beloit, Wis., is president of the corporation. Mr. Lyons has already submitted a proposition to the City Council of Kewanee to take over the utilities mentioned. Reference to his plan for reclaiming the railway was made in the ELECTRIC RAILWAY JOURNAL, issue of March 1.

Wage Request of Capital Traction Employees Denied

Trainmen and bus operators of the Capital Traction Company, Washington, D. C., have been denied a wage increase from 56 cents to 70 cents an hour. All other employees were refused the 25 per cent advance sought. Arbitration is the next step. The present agreement has two more years to run, but provision is made whereby the schedule may be considered at the end of each year. When the agreement now in existence was signed last March it gave motormen and conductors 50 cents an hour for the first year, 52 cents an hour for the second year, 54 cents for the third year and 56 cents thereafter.

John H. Cookman, secretary of the Amalgamated union, in making known the application for an increase cited the increase in the cost of living since the last wage advance. In announcing the rejection of the petition by the company, George E. Hamilton, president, said that he did not believe any increase in wages was justified under present conditions and that conferences to discuss such increase would achieve no useful purpose.

Wages Advanced Two and One-Half Cents in Augusta

A compromise wage scale granting the trainmen of the Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., an increase of 2½ cents an hour was agreed to recently by the board of arbitrators. The men had asked for a 5-cent advance. The new scale is effective as of Jan. 1, 1924.

According to the new agreement trainmen operating one-man cars, who received a voluntary increase of 5 cents an hour when placed in charge of the new cars, will now receive 52½ cents an hour instead of 45 cents. The company, it was stated, voluntarily increased its trainmen who were placed in charge of the new cars, for it was realized that the operation of the one-man cars would call for more strenuous labor. The scale was consequently increased from 45 to 50 cents an hour. The operators of the old cars requiring both motorman and conductor were retained on the 45-cent scale.

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Plan Joint Station of "L" and Pennsylvania Railroad

Plans for connecting the New York division of the Pennsylvania Railroad with the Frankford Elevated Railway at Harrowgate were discussed recently by Pennsylvania Railroad officials and representatives of business organizations in the northeast section of Philadelphia. The business men outlined a plan to replace the present Frankford Junction station with a new structure at Kensington Avenue, thereby virtually linking the Pennsylvania's New York passenger traffic with the Frankford Elevated Railway. Vice-president C. S. Krick of the Pennsylvania Railroad said this would be expensive and difficult to do. A more practicable plan, he explained, would be to have the proposed new station at or near Erie Avenue, and to connect it with the Frankford "L" by a sidewalk for passengers.

"Co-ordinated Transportation" in New Jersey Explained

How the street cars and the buses can be hitched together to give a co-ordinated transportation service is told by the Public Service Railway, Newark, N. J., in a pamphlet called "Street Cars and Buses." The pamphlet is being mailed direct to the patrons of the railway. On a separate card attached to the pamphlet the company solicits the customer's support if the plan seems favorable to him. The patrons are urged to read the pamphlet carefully so that they will know how the company proposes to operate both agencies of transportation in co-operation, what the benefits will be to the public and the present evils that will be eliminated. The company says that "co-ordinated transportation buses would not use the public street for a garage, and would maintain schedule and headways that would relieve, instead of increase, congestion." The pamphlet illustrates the lesson of the inconvenience and congestion caused by competition and contrasts by means of pictures the difference when co-ordinated service is established.

Opponents of Elevated Construction Win in New York

An agreement has been reached by the New York Transit Commission and the Brooklyn-Manhattan Transit Corporation which will end the long dispute regarding the Fourteenth Street-Eastern District rapid transit line and the elevating of the tracks in the Bushwick section of Brooklyn. Instead of having that portion of the line east of Montrose Avenue elevated the line will be continued as a subway, thereby conforming with the request of Brooklyn citizens. The Transit Commission on March 11 approved the modification of the plans and has submitted them to the Board of Estimate and Apportionment.

The Board of Estimate, in approving the route some time ago, voted against an elevated structure from Montrose Avenue to the present elevated structure at East New York, but the subway officials, claiming to be held by the terms of contract No. 4, refused to accept a subway in lieu of the elevated line specified in the contract.

The first portion of the new line, from Fourteenth Street and Sixth Avenue to Montrose Avenue in Brooklyn, is expected to be ready for operation during the summer.

Paving Relief Measure Defeated

So far as the passing of new bills is concerned the session of the New Jersey Legislature is at an end. In the discussion during the closing hours the Thompson bill was defeated in the House. The intent of this measure was to permit municipalities to relieve the electric railways of all or any part of the cost of paving and keeping in repair pavements between street railway tracks and within 18 in. on either side. Three bills were passed that had been introduced by Senator Smith allowing the Board of Public Utility Commissioners to specify the date on which orders should become effective and increasing and clarifying the power of the board to order a resumption of service discontinued through suspensions.

$491,000 Spent in Des Moines—Facts Advertised Widely

The Des Moines City Railway completed during 1923 a remarkable program of construction and betterment. In its entirety the year's program contemplated an expenditure of $665,470. This was all accomplished with the exception of the failure to complete the Crocker Street line and the non-arrival of the new car bodies which had been counted upon during the late months of the year. This brought the actual expenditures in new capital down to $491,090.

With its idea of placing all available information before the car-riding public the company has recently been using half-page advertisements to tell just what the expenditures for construction and equipment covered.

In the advertisements the figures were given in detail. Recapitulated by departments they were as follows:

Total way and structures		$343,978
Equipment		238,550
Power		82,942
Grand total		665,470
Deduct		
Uncompleted work Crocker line	$78,430	
New car bodies not received	95,950	
		$174,380
Net expenditure of new capital		$491,090

The new car bodies are expected soon. They will be mounted on the trucks and will be put in service as rapidly as possible.

While this major construction program was under way 30,000,000 passengers were carried. Another important work of the year was the quiet, consistent campaign in the interest of customer ownership. This resulted in the addition of more than 400 stockholders. The offering consisted of an issue of $750,000 of 7 per cent preferred stock. A special effort was made to attract small investors.

Louisville Motorman Shot by Automobile Bandits

Dan Criswell, as he was affectionately known to all of the boys on the Chestnut Street line of the Louisville Railway and to many others, was shot and fatally injured by automobile bandits at Madison and Forty-second Streets at 1:30 o'clock Saturday morning, Feb. 23.

Two men boarded Dan's car at the end of the line for the return trip into town. Before Dan had time to start the car one of the men commanded him to wait for the third man. At the same time, the second man told him to stick his hands up, and before Dan had time to turn, shot him through the back. Although suffering from a bullet through the body, just below the heart, Dan started his car after the bandits and fired twice through the car window, the hold-up men returning the fire, which punctured several car windows. Dan fell exhausted after pursuing the men half a block. He was discovered by two automobile drivers and the crew of a westbound car, and they removed him to SS. Mary and Elizabeth Hospital. At 11 o'clock that night Dan passed away. He leaves a widow and five children.

To increase the probability of capture of the assailants the company has offered a reward of $1,000.

In addition to the above reward, C. T. Wingate, conductor at Twenty-fifth and Market carhouse, recently elected a director of the company to represent the employees on the board, together with some of his co-workers, are circulating a subscription list with the intent of offering a separate additional award.

Bus and Subway Bills Introduced in Philadelphia

Ordinances were introduced in the City Council at Philadelphia, Pa., on March 6 appropriating $44,213,647 for the Broad Street subway. At the same session Councilman Apt introduced a new bus franchise bill, which would require the Rural Transit Company, a subsidiary of the Philadelphia Rapid Transit Company, to pay the city annually 5 per cent of its gross receipts, after July, 1927. Both these ordinances were referred to the Council's committee on transportation. The Broad Street subway ordinances were sent to the Council by Mayor Kendrick with a communication of Director Ehlers of the Department of City Transit and a brief message from the Mayor, requesting favorable consideration for these ordinances.

Another measure introduced authorized the transit department to contract for what is known as Step No. 1 in the transit plans. This includes the Broad Street subway, with its connecting line running on Ridge Avenue.

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Michigan Company Hopes to Use Truck as Feeder

F. W. Brown, general superintendent of the Michigan Railroad, has outlined a program which is expected to save the railway considerable money, enable trucking firms to give up long hauls and give the manufacturer, farm producer and other shippers quicker and more economical service.

Mr. Brown now is negotiating with a trucking firm in Detroit doing long distance hauling to eliminate these long trips, which often extend more than 100 miles into the state, and confine the activity of the motor trucks to the towns and cities and to concentrated rural districts.

Under the plan the truck firm would pick up the goods at one end, load them into the cars of the Michigan Railroad and after the interurban had made the haul, say, between Detroit and Grand Rapids, the truck representatives in Grand Rapids would enter the car and distribute the goods.

The Michigan Railroad's part in the shipment would consist merely in sealing the car when the truck firm had loaded it and in delivering that car on the interurban siding at the point of destination. Since all goods under the plan are to be carried in carload lots a shipment of miscellaneous freight would be billed as one item to the truck company instead of in forty or fifty items as is now the case. Instead of having to notify the recipients of freight in each case, the railroad would simply have to notify the truck company that the car had arrived and the company would do the rest, since it is to operate locally in every center from which the Michigan Railroad now ships freight. Among other things this plan would allow the railroad to pursue its natural function, eliminate the bugbear of long hauls for the truck company and lead to more freight business for the railroad. It would be particularly advantageous in the winter when snows often prohibit efficient trucking on the roads. Thus where a truck going from Grand Rapids to Detroit might in winter require several days for the trip the railroad could take a loaded car to Detroit during a single night and the truck feeder could make deliveries the following day, giving twenty-four-hour freight service over a distance of more than 150 miles.

Rerouting and Extensions in Toledo Partly Approved

The Council committee on railroads and telegraphs at Toledo, Ohio, has approved a large part of the general Community Traction Company rerouting and extension plan submitted a week ago by Street Railway Commissioner W. E. Cann. Decision was delayed on the establishment of the double-deck bus line on Collingwood and Madison Avenues, the abandonment of part of the Michigan line, the rerouting of Long Belt and Nebraska-Lagrange lines.

Extensions of the Bancroft line to Ottawa Park, East Broadway line through the New York Central subway, the Cherry line to Fitch, the laying of double track in Summit Street extension and the establishment of the trackless trolley crosstown line were all approved.

The final draft of the plan will be submitted to Council only after a very thorough discussion and attempt to line up all sides to put through the constructive features of the plan.

Quartet Helps Railway Relations

The Inspectors' Quartet of the Louisville Railway recently put on an evening program at the radio broadcasting station, WHAS, of the Louisville *Courier Journal*. The company received 186 letters and telegrams complimenting the quartet. These singing trainmen are the ones who contributed to the banquet entertainment at the Midyear Dinner of the American Electric Railway Association at St. Louis. They have three or four engagements a week in Louisville and it is believed they have unquestionably helped to create a better spirit toward the railway on the part of the local public.

Radio Party on Twenty-fifth Anniversary

The United Railways & Electric Company, Baltimore, Md., celebrated its twenty-fifth anniversary on March 4 by giving a radio birthday party. The United took charge for the evening of Station WEAR of the Baltimore *News* and presented a program entirely by its officers and employees, even the announcing being done by a company man.

It was a most diversified program, including brief talks by President C. D. Emmons and other company personages, band, chorus and solo numbers. That it was enjoyed was testified to by the large number of letters and postcards received by the company from patrons who listened in and who wrote commending the company for its enterprise as well as for a delightful evening's entertainment.

News Notes

Another Urge to Ride in Non-Rush Hours.—Another city is joining the ranks calling attention to shoppers and pleasure seekers to return home in the evening before the usual rush hour crowds. A recent New Orleans editorial writer states that it is impossible to arrange arbitrarily the closing of business hours, but it is possible for women shoppers and pleasure seekers in general, to use the cars in off-rush periods. The editorial suggests to the theater managers one way out of the difficulty by earlier matinees. Instead of their starting at 2:30 as is usual, the writer suggests a 2 o'clock performance, so that the theater patrons might be permitted to reach home before the evening rush hour begins.

Railway Official Subject of Article.—An appreciation of James P. Barnes, president of the Louisville Railway, is contributed by E. F. Kelley to the January number of the *Tech Engineering News*. Mr. Kelley recounts an interesting narrative on an outstanding figure in the electric railway field "through secretary's eyes." This number also includes articles on "Putting Radio to Work" and the "Hydro-Electric Power Plants of California," and treats of other subjects of interest to the engineers.

Working Toward Saving Line.—Efforts are being made to prevent the abandonment of the Meadville-Linesville Line of the Northwestern Electric Service Company of Erie, Pa. To this end a special committee has been appointed representing local civic bodies, it having been announced previously that the line was not a paying venture, that to put it back in proper condition would cost thousands of dollars and that service was likely to be abandoned at any time.

Company Won't Pay for Paving.—Clark V. Wood, president of the Springfield Street Railway, Springfield, Mass., has informed the town of Palmer that the company will not conform to terms calling for the cementing of Main Street in Three Rivers Village, for which $15,000 was appropriated by the town. The company is called upon to pay for the cement between the rails and for 18 in. on either side. Rather than do this, Mr. Wood says the company will discontinue the line running to Three Rivers.

New Interurban Under Consideration.—John H. Carpenter of Florence, Ala., and associates are securing options on right-of-way for an interurban railway from Florence, Ala., to Nashville, Tenn., by way of Mount Pleasant and Franklin, Tenn. The standard gage railroad operated with gasoline from Mount Pleasant to Franklin, Tenn., is owned by John H. Carpenter and the Howard estate. This track will be used as a part of the proposed new interurban line. The line would serve the Wilson Dam district and the Muscle Shoals territory.

$114,505 in Pensions. — During the year 1923 there was paid to employees on the pension list of the Boston Elevated Railways, Boston, Mass., $114,505. Fifty-seven men were added to the list and thirty were taken from the list by death. There are 243 men on the pension roll at the present time.

Seek Wage Advance.—The employees of the Lehigh Valley Transit Company, Easton, Pa., have asked for an increase in pay from 6 cents to 8 cents an hour and changes in working conditions. The three-year men are now being paid 55 cents an hour.

A Real Achievement in Service.—A record of 4,500 years of service is the boast of the Portland Railway, Light & Power Company, Portland, Ore. Inspired with one idea, namely, service to the public, 187 employees of this company have stuck to their cars for a period of twenty years or more of continuous service. Recently these men, members of the Twenty-Year Club, celebrated their loyalty at a dinner at the Chamber of Commerce. Though known as the Twenty-Year Club, some of the men have given forty years of their best efforts to accommodating the company's patrons and co-operating with their company.

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Financial and Corporate

Good Showing by Eastern Massachusetts

Gross Revenue Up $100,000—All Fixed Charges and Preferred Dividends Covered

Net income of the Eastern Massachusetts Street Railway, Boston, for the year ended Dec. 31, 1923, after all charges, was $878,583, a decrease of $181,259 over 1922.

According to the annual report presented to the stockholders on March 3 gross receipts from car fares in 1923 were $10,006,150, an increase of $16,422 over similar receipts of the previous year. On Sept. 1, however, the Hyde Park division was taken over by the Boston Elevated with a decrease during the last four months of the year of approximately $17,000 in gross receipts.

COMPARATIVE INCOME OF EASTERN MASSACHUSETTS STREET RAILWAY

Statement of Public Trustees for Years Ended Dec. 31

	1923	1922
Passenger revenue	$10,006,153	$9,989,728
Auto bus revenue	76,389	16,359
Freight and other revenue	46,033	40,107
Rentals, advertising, etc.	233,741	252,892
Interest and other income	350,389	413,578
Total revenue	$10,712,705	$10,712,663
Expenses:		
Way and structures	$1,811,202	$1,879,506
Equipment	1,395,813	1,245,256
Power	1,219,869	1,082,151
Car operation	2,461,327	2,337,343
Injuries and damages	365,093	356,701
Insurance	84,810	162,588
Law expense	15,757	13,546
Rent of tracks	68,521	77,258
General wages and expenses	246,322	247,127
Pensions and group insurance	77,404	33,696
Stationery and printing	41,423	41,984
Stores and garage expenses	104,814	212,777
Miscellaneous expense	51,430	54,673
Auto bus expense	116,729	13,484
Total operating expenses	$8,060,514	$7,758,090
Total operating expenses and taxes	$8,436,019	$8,154,914
Gross income	2,276,686	2,557,749
Interest and rentals	1,398,152	1,497,956
Net income	$878,533	$1,059,792

Operating expenses include charges for depreciation amounting to $848,214 in 1923 and $848,753 in 1922. During the year $509,119 of the reserve was applied to reconstruction and amortization.

Although at the end of June there was an increase over the corresponding period of 1922 of more than $317,000, this gain was almost entirely wiped out by the end of 1923. In no month since June did the passenger revenues of the present year equal those of the corresponding months of 1922. Industrial depression in the shoe and textile centers, increased use of privately owned automobiles and unseasonable weather conditions during the summer and fall all contributed to this result. During the year there have been no material changes in the rates of fares. The average fare is 6.9 cents.

There was a substantial increase in auto bus revenue due to the installation of a larger number of buses. Interest and other income declined more than $63,000, due to the application of large portions of reserve funds and the consequent disposal of securities. Other revenue items did not show material changes from the previous year. Total revenues from all sources for 1923 exceeded those of 1922 by $42.39.

There was an increase of $302,423 in total operating expenses in 1923. Higher wages, an advance in price of fuel oil used for power and extension of auto bus operation account for the major portion. An increase of nearly $44,000 in pensions and group insurance is due to the fact that group insurance for the productive force was in effect during only the last two months of 1922. Way and structures, insurance, and stores and garage expenses show material savings. The item of taxes shows a reduction of about $21,000 due to decrease in net income. A substantial reduction was made in fixed charges.

The comparative expense in track and line was $1,510,182 in 1923 and $1,602,198 in 1922.

Trackwork representing $301,547 was considered to offset depreciation to that amount and additional work costing $190,406 was charged to the "rehabilitation" account. The unexpected balance of the "rehabilitation" fund is $270,548.

Fifty new double-truck passenger cars were ordered in 1923 for delivery in October, but only a few of these were actually received in time to be put in service during the year. They will all be in operation early in 1924. These new cars cost approximately $612,000.

It is expected that by Aug. 1 all routes included in the signal improvement program will be fully equipped. The estimated cost is $200,000.

By an award of a board of arbitration wages of all productive employees, numbering about 2,100, were increased 3½ cents an hour, effective from May 1, 1923, to May 1, 1924. This award increases payrolls about $200,000 per annum.

This company is now regularly operating thirty-one buses which serve in a large degree as feeders to the railway lines. Bus equipment investment for the year was $148,502. This auxiliary service is supplied principally in sparsely settled sections where there are no heavy peak loads such as street railway cars can better handle. Receipts on bus lines naturally are relatively small, and operation for the year shows a loss of about $40,000. The trustees say that even if this feeder system should continue to result in financial loss, providing the loss is not too great to be absorbed by the earnings of the railway district in which the buses are operated, the good will of the public will be adequate compensation.

The dividends started in 1922 on the first preferred and sinking fund stocks were continued in 1923 by the payment of 3 per cent on Feb. 1 and Aug. 1 on these issues. In addition a 6 per cent dividend was paid on preferred B stock on Feb. 1 and 3 per cent on the same stock on Aug. 15. The adjustment stock received 5 per cent in two installments of 2½ per cent each, paid May 15 and Dec. 1. Total dividend payments for the year were $959,852. The trustees also declared dividends of 3 per cent each on the first preferred and preferred B stocks, payable Feb. 1 and Feb. 15, 1924, respectively.

During the year funded obligations of the company to the amount of $1,000,000 were retired and canceled as follows:

Serial bonds due Jan. 1, 1923	$300,000
Serial bonds due Feb. 1, 1923	90,000
Lowell, Lawrence & Haverhill bonds due June 1, 1923	479,000
Bay State equipment trust notes due Aug. 1, 1923	131,000

The company elected not to exercise its option to extend $689,000 of Brockton Street Railway bonds due Oct. 1, 1924, and provision will be made to pay them at maturity.

During the year the city of Boston took by eminent domain that portion of the company known as the Hyde Park Division and leased it to the Boston Elevated Railway for operation. The company was awarded $310,000 for this property, and it secured about $15,000 additional from salvage for power house machinery. This taking resulted in an investment loss to the company of $326,980.

Dividends and Surplus Up on New York State Railways

A comparative statement of the earnings and expenses of the New York State Railways, Rochester, for the years ended Dec. 31, 1923, and 1922, follows:

SUMMARY OF OPERATIONS OF NEW YORK STATE RAILWAYS

	1923	1922
Railway operating revenues	$10,800,517	$10,500,220
Railway operating expenses (including depreciation)	7,708,178	7,687
Net revenue railway operations	$3,092,339	$2,813,203
Net revenue auxiliary operations	2,482	1,544
Net operating revenue	$3,094,821	$2,814,747
Taxes assignable to railway operations	797,122	705,382
Operating income	$2,297,699	$2,109,365
Non-operating income	76,869	97,421
Gross income	$2,374,568	$2,206,786
Deductions from gross income	1,451,177	1,435,517
Net income	$923,391	$771,269
Sinking fund appropriations	34,129	34,740
Dividends preferred stock	(5%) 193,125	(5%) 193,125
Earned on common stock	(3.49%) $696,136	(2.72%) 543,403
Dividends common stock	(2½%) 448,762	(1½%) 299,175
Surplus	$247,374	$244,228

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North Shore's Best Year

$686,864 Net Income Reported for 1923 by Chicago-Milwaukee Line—An Increase of 32.61 per Cent

The year 1923 was the most successful in the history of the Chicago, North Shore & Milwaukee Railroad. Operating revenues increased $937,320, or 18.71 per cent over the year 1922, while the increase in the net income was $168,935, or 32.61 per cent. Gross revenues from freight and merchandise despatch business increased $294,661, or 39.88 per cent.

Participation shareholders met on Feb. 27, 1923, and by unanimous vote adopted the plan previously announced for the financial reorganization of the company. A new corporation was formed under the name of the Chicago, North Shore & Milwaukee Railroad, with an authorized capital stock distributed as follows:

Prior lien 7 per cent cumulative stock...	$10,000,000
Preferred 6 per cent non-cumulative stock	5,000,000
Common stock.....	5,000,000

All of the preferred and common stock, together with $2,684,208 of five-year, non-interest bearing promissory notes, were delivered to the participation shareholders in exchange for their shares in the proportion provided for in the trust agreement under which the participation shares were issued.

A quarterly dividend of 1½ per cent on the preferred stock was paid Oct. 25

COMPARATIVE INCOME ACCOUNT OF NORTH SHORE LINE, INCLUDING OPERATION OF CHICAGO & MILWAUKEE ELECTRIC RAILWAY

Operating revenue:	1923	1922
Passenger and special car revenue	$4,836,531	$4,214,151
Freight and express revenue.	1,033,479	738,817
Miscellaneous revenue.....	75,261	54,983
Total.....	$5,945,271	$5,007,951
Operating expenses:		
Way and structures.....	538,588	429,280
Equipment.....	405,220	342,850
Power.....	529,480	483,317
Conducting transportation...	1,878,229	1,533,246
Traffic.....	179,504	154,794
General and miscellaneous...	933,399	834,104
Total.....	$4,464,420	$3,777,592
Net revenue—railway operation.....	$1,480,851	1,230,359
Net auxiliary operating revenue.....	11,444	8,731
Net revenue from operation..	$1,492,295	$1,239,090
Taxes assignable to railway operation.....	279,448	248,937
Operating income.....	$1,212,847	990,153
Non-operating income.....	26,625	14,560
Gross income.....	1,239,472	1,004,713
Fixed charges.....	552,608	486,784
Net income.....	$686,864	$517,929

to stockholders of record Oct. 10. Quarterly dividends on the prior lien and preferred stocks were declared payable Jan. 2 to stockholders of record Dec. 17.

Under authority of the Illinois Commerce Commission and the Wisconsin Railroad Commission, the company issued $1,500,000 of the new prior lien 7 per cent cumulative stock, partially to reimburse the treasury of the company for capital expenditures made in 1923. The stock is being sold at the par value of $100 a share.

More than two-thirds of this stock has been sold to employees and customers of the company, residents of the territory tributary to the road.

During the year additional equipment was acquired costing $649,000. This was financed through an equipment trust amounting to $557,000, the balance of the purchase price being paid by the company.

To provide funds for additions and betterments $1,000,000 of 6½ per cent three-year secured sinking fund notes were sold. First mortgage bonds to the amount of $902,000 were issued and deposited as part of the security for the notes above mentioned.

Equipment notes amounting to $142,000 were paid during the year and

COMPARATIVE INCOME STATEMENT OF NORTH SHORE LINE, CONTRASTING YEARS 1916 AND 1923

	1916	1923
Operating revenue.....	$1,157,191	$5,945,272
Operating expenses.....	714,887	4,464,421
Net revenue—railway operation.....	442,304	1,480,851
Net auxiliary operating revenue.....	.....	11,444
Net revenue from operation.	442,304	1,492,295
Taxes assignable to railway operation.....	66,038	279,448
Operating income.....	376,266	1,212,847
Non-operating income.....	6,208	26,626
Gross income.....	382,474	1,239,473
Fixed charges.....	237,996	552,608
Net income.....	144,478	686,865

$110,900 secured sinking fund notes were retired.

It will be recalled that the North Shore Line has the distinction of being the first winner of the Coffin medal, thus adding materially to the value of the award.

Attention is directed in the report to the additions made during the year to the rolling stock equipment.

The record for safe operation was maintained during the year.

Relations between the company and its employees and customers are very satisfactory. The management says there is evidence that the feeling of good will toward the company in the various communities it serves increases year by year.

Offer Made for Ohio Interurban

An offer of $172,500 is understood to have been made in behalf of the Northern Ohio Traction & Light Company for the property of the Cleveland, Alliance & Mahoning Valley Railroad, now in receivership. It had not been intended to announce the offer until after the deal was closed, but the news became public following a meeting of bondholders, at which the offer was announced and a statement made to the bondholders indicating the amount of money it would be necessary for them to furnish in order to continue operation. Bonds to the amount of $1,116,000 are outstanding against the property, and the bondholders are said to be opposed to advancing any new money.

On March 14 confirmation was secured in New York of the statement that the Common Pleas Court of Cleveland had confirmed the purchase of the road by the Northern Ohio Electric Corporation, acting for the Northern Ohio Traction & Light Company. The price was $172,500.

The Cleveland, Alliance & Mahoning Valley Railroad, 45 miles long, runs through Alliance, Ravenna and Warren.

Toledo & Western Sold

Willys-Overland Company and Wabash Buy Line Extending from Toledo to Pioneer

Announcement of the sale of the Toledo & Western Railroad to the Willys-Overland Automobile Company and the Wabash Railroad was made at Toledo recently. As a result the Toledo & Western Railway has been incorporated with a capital of $500,000. John N. Willys is president; J. F. Taussig, president of the Wabash Railroad, executive vice-president; A. B. Qualy, secretary, and J. H. Gerkens, treasurer. The latter officers are both executives at the Willys-Overland plant in Toledo. The new company will spend about $1,000,000 for improvements to the property and in new connections.

The property sold consists of a line from Toledo west to Pioneer, Ohio, and a branch north to Adrian, Mich. The road, in the shape of a "Y," intersects the Wabash railroad at Adrian and at Franklin, a junction point near Alvordton, Ohio. The Willys-Overland company will operate the line largely in the interests of improving its freight-handling facilities. At the present time all its shipments have to be made over the New York Central system. The new Wabash connection will provide another outlet through which shipments can be made on a fast line to the Eastern markets.

More than 300 acres of land were purchased in Toledo to provide a new freight right-of-way into the local plant. Willys also owned an old spur of the Detroit, Toledo & Ironton. This will serve for part of the freight route, which will be only about 2 miles in length from the plant to the Toledo Terminal Railroad and Toledo & Western junction point. The new freight line will open up a big territory for new industries and provide transportation facilities from the automobile plant into a new residence district not supplied with electric traction service at present.

The road has been operated by the Henry L. Doherty interests for thirteen years, the last two under receivership. The receivers have until April 5 to wind up their affairs. It was purchased some months ago by Frank Coates, on behalf of the Doherty interests, for $600,000 at special master's sale. Since the purchase the electric power distributing facilities have been separated from the railroad and grouped under the Toledo Suburban Electric Company, a newly incorporated company. The Toledo & Western property has been operated at only a very slight loss in the last few years.

Merger Bill Appears Again in Washington

The District Commissioners at Washington have sent to Congress for introduction a revised bill designed to bring about a merger of the two local railways and the Potomac Electric Power Company.

The bill considered by the last session of Congress calls for the collection of a certain percentage of any moneys earned by the company in excess of a

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fair return on valuation. The revised measure changes this to a direct tax of 20 per cent on the operating income without regard to valuation.

The bill relieves the company of paying the salaries of crossing policemen, which amounts to $38,000 a year for the Capital Traction Company and $60,000 for the Washington Railway & Electric Company.

The new bill requires the companies to continue to pay the cost of paving between tracks.

Plan Announced for Readjusting Financial Structure of New Jersey Corporation

Thomas N. McCarter, president of the Public Service Corporation of New Jersey, announced on March 14 a plan for the readjustment of the corporation's financial structure as affecting certain securities and intercompany relations. The plan has already gone before the Board of Public Utility Commissioners. The purpose behind it is to permit the company to meet the requirements of service to the public, to strengthen and improve the position of security holders and to provide an adequate means of procuring new capital for necessary extension and development.

Consummation of the plan will not disturb the relationship which the corporation now bears to its subsidiary companies or to the public; nor will it affect the holders of securities of the underlying electric, gas and railway properties, except to improve their position by facilitating the development of these properties. It will make possible the financing by the corporation itself of the capital requirements of the railway properties until the credit of the railway is re-established, while the electric and gas activities will be placed in position to finance themselves independently.

In general terms the plan provides for a series of financial operations designed to remove the present mortgage restrictions which cramp the capital expansion of the underlying companies and it will at the same time increase the borrowing capacity of the parent corporation.

The details of the plan regarding changes in the outstanding securities, announced briefly, are largely of interest to the holders of the securities of the Public Service Corporation, to whom they are addressed. It does appear of general interest to note that among other things the plan contemplates the consolidation of Public Service Electric Company, Public Service Gas Company, United Electric Company of New Jersey and several smaller companies, practically all of whose stocks are now owned by the Public Service Corporation, into a new company to be known as the Public Service Electric & Gas Company, all of whose common stock will be owned by the Public Service Corporation. Further announcement will be made by the company to the security holders when the precise details of the plan are finally settled. It will be recalled that Mr. McCarter recently announced that the capital requirements of the company this year would be $34,000,000.

$3,000,000 of Boston Elevated Bonds Offered

Harris, Forbes & Company, New York, N. Y., as members of a syndicate are offering for subscription $3,000,000 of Boston Elevated Railway 6 per cent ten-year gold bonds. The bonds are dated June 1, 1923, and are due June 1, 1933. They are in coupon form in denomination of $1,000 each. The issuance of the bonds has been approved by the Department of Public Utilities of Massachusetts. Of the proceeds of the issue $700,000 will be used to reimburse the company for money used to pay at maturity on Jan. 1, 1923, a like amount of West End Street Railway debenture 4½ per cent bonds. The balance will be used to provide for extensions to the company's power station in South Boston, for new shops in Everett and for the George Street storehouses in Somerville. The offering price is 103 and interest, yielding 5.60 per cent.

Missouri, Oklahoma and Ohio Properties Merged

Formal action in organizing the Missouri Power & Light Company, was taken at Mexico, Mo., on Feb. 28, when the directors and all common and preferred stockholders of the Missouri Utilities Company voted to change the name of the company and form the new organization.

In the formation of the new company the electric, railway, gas and bridge properties at Jefferson City, properties of the North Missouri Light & Power Company, from Hannibal down the river, and properties of the North American Light & Power Company in Oklahoma and Ohio, including the Cahokia Gas & Oil Company, a corporation of Illinois, were taken over, in addition to the properties of the Missouri Utilities Company in Missouri.

The North American Light & Power Company owns all of the common stock of the Missouri Power & Light Company and common stock of the Illinois Traction Company, which controls the Illinois Power & Light Corporation.

Many improvements are contemplated in the properties, particularly additions and extensions to the generating plant and transmission lines.

Approval of Purchase of New York Interurban Sought

The Venango Public Service Corporation, a Pennsylvania company, operating railway lines in northwestern Pennsylvania through ownership of the Northwestern Electric Service Company, has applied to the New York Public Service Commission for authority to acquire and purchase such amounts of the capital stock of the Warren & Jamestown Street Railway as have been or may hereafter be tendered to it and all the stock of the Carroll Electric Light & Power Company.

The Warren & Jamestown Street Railway operates a 22-mile electric railway, 9 miles of which is in New York State. It is controlled by the same interests that administer the affairs of the Warren Street Railway. The stock of that company, as noted recently in the ELECTRIC RAILWAY JOURNAL, is in process of transfer to the Penn Public Service Corporation.

Auction Sales in New York.—At the public auction rooms of A. H. Muller & Sons this week there were sold $26,000 Second Avenue Railroad 6 per cent receiver's certificates, 39 per cent.

Seattle Falls Down Again in January.—Operating revenues of the Seattle Municipal Railway in January were $8,351 and the operating expenses $8,520, leaving an operating deficit of $169. This was increased to $3,554 by the inclusion of other charges.

Bond Issue Authorized.—Permission has been granted by the Georgia Public Service Commission to the Gainesville Railway to issue $100,000 in bonds and $15,000 in additional stock, following the recent purchase by it of the railway properties at that city. The company purchased the property from the Georgia Railway & Power Company, Atlanta.

Partial Abandonment Authorized.—Abandonment of a portion of electric railway from a point near the intersection of Standard Avenue and Scofield Street, Richmond, has been authorized by the California Railroad Commission on the application of trustees of the San Francisco-Oakland Terminal Railways.

Wants to Consolidate and Issue Bonds.—The United Railways & Electric Company, Baltimore, Md., has applied to the Public Service Commission for permission to consolidate its suburban lines under the name of the Maryland Electric Railways. Approval is also asked of the issue of $4,000,000 mortgage bonds, already sold, under a $25,000,000 mortgage on the properties of the consolidated company.

Line Officially Abandoned.—Daniel P. Abercrombie, receiver for the Connecticut Valley Street Railway, announces the line has officially stopped operating. Efforts are being made to induce the court to permit a private sale of the Greenfield & Turners Falls division, which was to be disposed of by public auction.

Permission Sought to Abandon Camden Line.—The Board of Public Utility Commissioners of New Jersey expects to hear on March 17 an application of the Public Service Railway for permission to abandon the Fairview extension from Broadway and Warren Street, Gloucester, to Collings Avenue and Mount Ephriam Avenue, Camden. The petition sets forth that the revenue from the extension is appoximately $11 a day or $4,000 a year, while the overhead cost is approximately $20,950, exclusive of superintendence, depreciation, general and miscellaneous taxes, fixed charges and return on capital.

Payment of Dividend on "L" Authorized.—The directors of the Interborough Rapid Transit Company, New York, have ordered the payment on April 1 of a quarterly dividend of $1 a share on the stock of the Manhattan Elevated Railway. The payment due on this issue in December was omitted because the Interborough system showed a deficit in the quarter ended Sept. 30.

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Traffic and Transportation

Seven-Cent Fare in Clayton Temporarily

The United Railways, St. Louis, Mo., has put into effect temporarily a 7-cent fare between points in St. Louis and the courthouse square in Clayton, Mo., with the proviso that it is applicable only to rides on a single transfer between the Kirkwood-Ferguson and Olive-University lines. The Missouri Public Service Commission recently, acting on a complaint lodged by residents of Clayton, ordered the company to equalize the rate of fare from Clayton to St. Louis with that charged between the Maplewood, Mo., loop and St. Louis. A 7-cent fare was charged on the latter trip, while from the Clayton courthouse to points in St. Louis the charge was 14 cents. The United Railways has applied for a new hearing on the question and has announced that in the meantime Clayton will have the 7-cent rate with the restrictions named.

Col. Albert T. Perkins, general manager for the United Railways, stated that if it was necessary to maintain the same rate between Maplewood and St. Louis as between Clayton and St. Louis the company would be forced to raise the Maplewood rate. The company could not profitably maintain a 7-cent rate from the courthouse in Clayton to all points in St. Louis with the same transfer privileges as on the St. Louis lines.

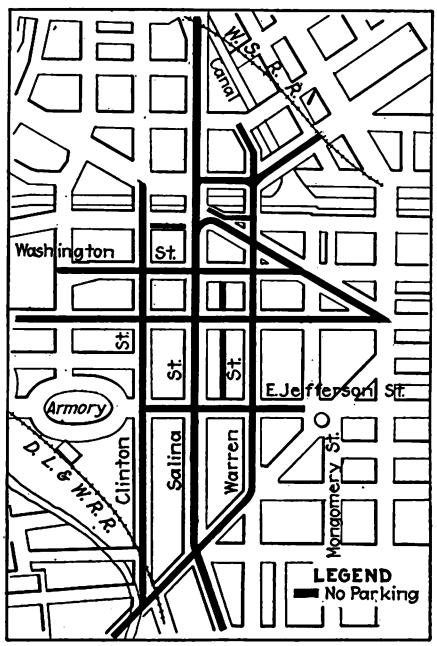
Passholders at Terre Haute Are Steady Customers

Statistics show the user of the pass on the Terre Haute city lines of the Terre Haute, Indianapolis & Eastern Traction Company to be the company's steadiest customer. The pass has been in use in Terre Haute since May 1, 1922. Since then Terre Haute has had its industrial ups and downs because of its dependence on the amount of activity in the surrounding coal mines. During the latter months of 1923 a high percentage of mine idleness was reflected in lower earnings on the electric railway. This gave the opportunity to see how differently the cash and pass riders are affected. The cash fare is 5 cents, while the pass sells at the high price of twenty fares. Hence the pass appeals only to frequent riders and those who like to use the cars for mere convenience.

A comparison of the sixteen weeks ended Dec. 30, 1923, with the corresponding period of 1922 shows that while the cash fares suffered a decline of 4.47 per cent, pass revenue dropped only 1.68 per cent. Moreover, the average gross rides per pass also showed a decline, indicating that because of lesser prosperity the passholder took fewer off-peak rides than before. In the 1923 period the holder of the pass averaged only 31.5 gross rides compared with 34.7 in the 1922 period, a decline of 9.3 per cent. The number of actual net, or origin-to-destination, rides in each case was about 20 per cent less, inasmuch as pass riders are always counted as revenue riders whether on a through or a transfer ride. While the pass revenue declined only 1.68 per cent, the total gross rides on passes declined by 10.68 per cent.

Opinion Divided Over Non-Parking Regulation in Syracuse

Syracuse is another city which has vigorously taken up the parking evil. Jurisdiction in this matter rests with the municipal commissioner of public safety and on Jan. 1, 1924, on the recommendation of the Safety Council, which is a branch of the Chamber of Commerce, he put in force a non-parking regulation covering a number of the important streets in the downtown district. The streets thus covered are shown by the accompanying map and the regulation is defended on the grounds of safety and the necessity for providing clear streets for the operation of the fire department. Parking is prohibited on the streets shown from 8 a.m. to 6:30 p.m., and under the ruling of the corporation counsel a parking car is one which is not loading or unloading.



District in Which Parking Is Prohibited in Syracuse

Vehicle and street car movement on the streets is much more free than before the regulation was adopted, but the opinion of the downtown merchants and business houses is divided on the effect of the regulation on business. The Syracuse *Journal* of Feb. 16 contains the results of a poll of eighty-five leading business houses. Of these fifty-one favor a thirty-minute parking regulation, seventeen favor some sort of parking regulation, five are for no parking, twelve refused to be quoted on the parking limit. In regard to the effect on business forty-eight said their business was being injured by the present regulations, sixteen said their business was not affected and the others were not sure.

Bus Operation Over Unserved Streets Suggested

Peter Witt, who was recently called to Trenton, N. J., to make a survey of trolley and bus operation, has recommended that bus franchises granted to the Central Transportation Company, a subsidiary of the Trenton & Mercer County Traction Corporation, should provide for the operation of the machines over thoroughfares now unserved by trolley cars; that there should be transfer privileges from trolley to bus and that no revenue from the Trenton car riders should be used to make up deficits on the bus lines. Mr. Witt also recommended that bus franchises which are granted to bus companies other than the Central Transportation Company should be only short term grants and other companies should be denied the right to compete with the present system of transportation.

Bus Fares Advanced in Spartanburg

Increased bus fares in the city of Spartanburg and an application to the commission for an increase in railway fares on the suburban lines are the outstanding developments in the continued controversy between the South Carolina Gas & Electric Company and the city of Spartanburg. Since the decision of the South Carolina Supreme Court ordering the company to resume its railway service, the company has decided to appeal to the United States Supreme Court. This action is now pending. As the attorneys have three months from the date of the order to file the appeal, the action will be consummated on or before April 14. Meanwhile the company is continuing the operation of four buses in the city proper and two street cars on the suburban lines.

The bus fares on the South Carolina Gas & Electric Company's lines went up from 5 to 10 cents on Feb. 25, following the decision of the Railroad Commission to refuse to consider a petition filed by the company asking for the authorization of an increase in rates. Ticket books for school children and adults are sold at special rates. The commission refused the petition on the ground that the litigation between the city of Spartanburg and the company was pending in the federal courts, and on the further grounds that in a recent decision the Supreme Court of South Carolina had held that the Railroad Commission had not the authority to approve the substitution of buses for trolley cars on its lines.

George B. Tripp, president of the company, said that the company could not be expected to continue the bus operations unless the income received

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from fares equaled at least actual operating expenses, even if the income was not large enough to pay for any depreciation, or provide for a reasonable return on the investment.

A hearing will take place on March 27 on the petition of the company for an increase in fares on its suburban lines. The increase will include a 10-cent fare from the city limits to Glendale and vice versa, in the first zone; a 10-cent fare from Glendale to Clifton and vice versa, in the second zone. School children in actual attendance at school will be allowed to purchase commutation tickets in books of sixteen for $1, and in books of four tickets for 25 cents. Adult passengers will be allowed to purchase tickets in books of twelve for $1 or three tickets for 25 cents. These tickets will be accepted as fare in each zone.

Special Limited Service in Ohio

Business on the Red Egg Lines—the Columbus, Newark & Zanesville Electric Railway and the Indiana, Columbus & Eastern Traction Company—is on the upward trend. In the past month and a half eight new fast trains have been placed in service.

Two fast trains, the Capital City Flier and the Gem City Flier, make the run between Dayton and Columbus, a distance of about 100 miles, in two hours and twenty minutes, with only one stop at Springfield, Ohio. Special equipment is used on these limiteds, such as large and heavy cars, making for safety and comfort, particular consideration having been given to the route over which they operate and the high-speed schedule. These trains make connections at Dayton for Indianapolis, Ind.

Following the success of the Capital City and the Gem City Fliers, the Indiana, Columbus & Eastern added two more high-speed trains between Columbus and Dayton. Operating in connection with the Dayton & Western and the Terre Haute, Indianapolis & Eastern, this added service provides through transportation from Columbus to Indianapolis. These trains are known as the Hoosier Special and the Buckeye Special.

After the addition of the first two fliers on the Indiana, Columbus & Eastern came the announcement of four new fast trains on the Columbus, Zanesville & Newark Electric Railway. That company has selected the Indian names of the Shawnee, the Muskigum, the Wyandotte and the Miami for these trains as the country through which this line is laid abounds in rich Indian lore. Only two stops are made by these cars between Columbus and Zanesville, namely, at Newark and Hebron. The trip is made in two hours.

Arthur V. Bland, director of the public relations department of the Red Egg Lines, says that the addition of these eight new trains is only the forerunner of a better and more complete service for the near future. Another change just announced is the moving of the freight departments of these roads to the Interurban Terminal Building at Columbus, Ohio.

Illinois Road Wants Bus Grant Between Aurora and Elgin

An application for authority to operate motor vehicles for passenger and freight service between Aurora and Elgin has been filed with the Illinois Commerce Commission at Springfield by the Aurora, Elgin & Fox River Electric Company, which now operates an electric interurban line between the two cities. The proposed line, it is announced, would follow a route along both the east and west river roads and would in no way interfere with the service of the electric railroad.

At the present time there is no railroad operating all the way between Aurora and Elgin on the one side of the river. There is a direct automobile road on each side. Some residents in outlying districts have difficulty in getting to the interurban stations when they want to go to Aurora or Elgin. With the buses in operation they could ride in them to either of the cities, or to intermediate points. By operating motor vehicles the company would be adding to the present service by providing transportation for those whose homes are a long distance from the electric line.

Six-Cent Fare Measure Extended

The Council of Richmond, Va., has just extended the 6-cent fare ordinance. This measure allows the Virginia Railway & Power Company to charge a 6-cent fare, although franchise requirements fix the fare at 5 cents. The extension is for a period of six months, effective on April 12, when the present 6-cent ordinance is due to expire.

Politics, long the interfering factor in an agreement between the company and the city on the new blanket franchise asked by the company, will probably delay action on this vital measure for at least three months longer. The franchise is before the committee on streets of the Council. The election takes place in the spring, however, and action is being put off so that the franchise issue shall not become involved in the fate of local politicians.

Connecticut Fares Remain Unchanged Temporarily

As a result of the hearing before the Public Utilities Commission on March 11 fares on the lines of the Connecticut Company will remain unchanged until April 14 to permit the counsels for the protesting cities to study the mass of evidence submitted by the Connecticut Company. At the hearing George D. Watrous, chief counsel for the company, argued that there was no reason for treating the Bridgeport division or the city of Bridgeport differently from other cities; that the results of operation neither demanded nor warranted it. Rather was uniformity sought.

The hearing was called to consider petitions from the cities of New Haven, Hartford, Waterbury, Meriden, Stamford and New Britain, which were seeking a reduction of the 8½-cent ticket charge put into effect on Feb. 10. The cash fare is 10 cents.

Permits for Parallel Operation Approved.—The Board of Public Utility Commissioners of New Jersey has granted an application of the Public Service Transportation Company, a subsidiary of the Public Service Corporation, operating the Public Service Railway, for municipal permits to operate four buses between the Pennsylvania Railroad ferries and Forty-fourth Street and Westfield Avenue, Camden. The route parallels in the same streets tracks of the Public Service Railway over the entire distance.

Planning a Clubhouse in Seattle.—Plans are being furthered for the erection of a $100,000 clubhouse for the use of Seattle Municipal Railway trainmen and their families. A recent mass meeting was held to stimulate interest in the campaign to raise funds for this purpose.

Eight Cents Cash Rate.—According to a recent ruling of the Oklahoma State Corporation Commission, the Muskogee Electric Traction Company, Muskogee, Okla., will charge 8 cents for cash fares with two tickets for 15 cents. The order also allows fourteen tickets for $1 and fixes the fares for school children at 4 cents each where twenty-five tickets are purchased at a time.

Applies for Bus Right.—The Jefferson Traction Company, Punxsutawney, Pa., has applied to the Public Service Commission for permission to replace its railway service between Punxsutawney and Big Run with bus service. If the petition is granted the work of removing the car tracks will be started in about two months.

Operates to Beach.—The San Diego Electric Railway, San Diego, Cal., made a trial trip over its new short line to the beaches on Feb. 22. A two-car electric made a fast trip from the heart of the city to Pacific Beach, a distance of 12 miles. The trip was made exactly four months after construction was begun. The company promises service to Mission Beach by May 1 and to La Jolla by July 1.

Commission's Operating Recommendations Accepted.—At the annual meeting of the Union Traction Company of Indiana President Brady reported on the recommendations made by the Public Service Commission as a result of its investigation of the Alfont collision on Feb. 2. The directors instructed the officers of the company to notify the commission that the company would comply with the recommendations of the commission, subject to minor modifications, in the interest of good and safe practice. The recommendations referred to relate to rules and practices in the operation of interurban trains and block signals.

Five-Cent Fare for Trial Period.—The Danville Traction & Power Company, Danville, Va., will go back to the 5-cent fare on April 6 for a ten-day trial period, during which time a careful check of the patronage will be made. If the increase in patronage justifies it, the 5-cent fare will continue, otherwise it will be withdrawn and the present 7-cent fare resumed. Should the fare experiment fail the traction officials will ask permission to use one-man cars.

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Personal Items

Auto Maker Heads Electirc Line in Ohio

Mr. Willys Has Been Made President of the Toledo & Western Railroad, Recently Acquired

John N. Willys, president of the Willys-Overland Company, has been elected president of the Toledo & Western Railroad, an electric road which the Willys-Overland interests and the Wabash Railroad have acquired. Thus is the entrance marked of another motor manufacturer into the field of railroading. Mr. Ford in his purchase got a right-of-way and two streaks of rust, which he is engaged in converting into a real railroad and in electrifying. Mr. Willys, on the other hand, gets a fully equipped electric railroad fairly up to date in its appointments and capable of being turned immediately to his use.

J. N. Willys

To the automobile world the career of Mr. Willys is well known. To most men in the electric railway field, however, John N. Willys is probably nothing more than a name linked inseparably with a make of automobile. Mr. Willys entered the automobile industry as a selling agent in Elmira, N. Y. In the dark days of December, 1907, he became uneasy about the non-delivery of Overland cars for which he had booked 500 orders. He went to Indianapolis and there was coolly told by the manager, "We are going into the hands of the receiver tomorrow morning." He then decided to save the company by a money-raising campaign which was a success, and within eight years John N. Willys, saver of the Overland company, was offered $80,000,000 for his share of the company.

In January, 1908, the reorganization was accomplished and Mr. Willys became president the following year. The institution was moved from Indianapolis to Toledo and Mr. Willys became its active head, carrying, in addition to the title of president, that of treasurer and general manager. Under Mr. Willys' guidance the Willys-Overland Company rose to a prominent place in the automotive industry, which position it has held continuously.

Mr. Willys was born in 1873 in Canandaigua, N. Y. He was doing well in his studies and working in a law office when his father died and he had to give up his college dreams. Bicycles were beginning to make their appearance and he saw in them a profitable outlet for his ingenuity as a salesman. He bought a sample bicycle and was duly authorized as a local agent for the manufacturers, and at eighteen he had organized a sales company. Gradually he worked into the wholesale distribution of bicycles and at the age of twenty-seven did a business of $500,000 a year. Then came the automobile and his entrance into that field.

Howard R. Whitney Appointed Vice-President

Howard R. Whitney, Springfield, Mass., was appointed vice-president in charge of operations of the Worcester Consolidated and the Springfield Street Railway, effective March 1. This represents an advance from the office of assistant to the president. Mr. Whitney has been connected with these companies nearly ten years.

Mr. Whitney entered the employ of the Worcester and Springfield companies on Dec. 1, 1914, as engineer of maintenance of way, in charge of tracks and bridges, and a year later extended the scope of his duties to the charge of structures as well, thereby gaining a thorough knowledge of the entire physical properties of the two systems. He was appointed special assistant to the president in December, 1917, and early in 1919 was given the title of assistant. His latest promotion comes as a recognition of his ability in conserving the properties and promoting general efficiency on the systems. He was graduated from Tufts College in 1905 in civil engineering, and was first employed in construction of bridges and maintenance of track for the Missouri Pacific Railroad. Later he became construction engineer for the Central Vermont Railroad's subsidiary, the Southern New England Railroad, with headquarters in Woonsocket, while the projected extension from Palmer, Mass., to Providence, R. I., was being built. After that he was employed in the Boston & Maine's maintenance of way department, and then for one year by a Nashua, N. H., contracting firm.

A. B. Coryell has been appointed general superintendent and purchasing agent of the Windsor, Essex & Lake Shore Rapid Railway, Kingsville, Ont., effective April 1. Mr. Coryell was formerly general superintendent of the Muskogee Electric Traction and the Shawnee & Tecumseh Traction Company in Oklahoma.

F. A. Healy Interurban Pioneer

Accounting Official Helped to Bring Together Properties in Ohio Recently Segregated

F. A. Healy, secretary-treasurer of the Ohio Electric Railway, Springfield, Ohio, and subsidiary systems since the organization of the holding company in 1907, was largely instrumental in developing the property until it became one of the most extensive interurban systems in the Middle West, with more than 500 miles of track covering Ohio and extending into Indiana.

With the segregation of the Ohio Electric System properties in 1921, Mr. Healy again became secretary-treasurer of the Indiana, Columbus & Eastern and leased lines and for a few months following the retirement of J. H. McClure as active receiver he took over the work of the general manager in addition to his other duties.

In point of service Mr. Healy is one of the veterans of the interurban business. He entered the field in the Middle West when development was still in its infancy and assisted in extending the trackage of the Ohio Electric system to all parts of the State.

F. A. Healy

He was born in 1861 at Moline, Ill., and at the age of nineteen entered the offices of the Atchison, Topeka & Santa Fé Railroad. He was consecutively office boy and clerk and assistant chief clerk in the auditor's office. In 1888 he became chief clerk in the auditor's office of the Southern California Railway with headquarters at Los Angeles. In 1893 he became auditor and general freight and passenger agent of the Santa Fé, Prescott & Phoenix Railway with headquarters at Prescott, Ariz.

He then became an expert accountant and served successively as general auditor for the South Carolina & Georgia Railroad, Augusta Southern Railway, Ohio River & Charleston Railroad and auditor for the receiver of the Lake Champlain & Ogdensburg Railroad. He was engaged as an expert accountant on properties controlled by Charles Parsons, then president of the above companies, and from December, 1899, to December, 1906, he was auditor of the Atlanta & West Point Railroad

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and the Western Railway of Alabama with headquarters at Atlanta, Ga.

In 1906 he assumed the position which he now holds, taking part, during his eighteen years in office, in the development of the Ohio Electric Railway property to a high peak as a unit and also witnessing the segregation of the properties and their operation as separate entities under the changing economic conditions of the present day.

Obituary

Alfred H. Smith

Alfred H. Smith, president of the New York Central Lines and one of the best known railroad men in the United States, was killed on March 8 when he was thrown from his horse in Central Park. Mr. Smith met his death in pulling up suddenly to avoid running into a woman, mounted on a horse, who had ridden across his path.

Mr. Smith was indirectly interested in electric railway affairs through the participation by his company in the joint ownership with the Delaware & Hudson Company of the Schenectady Railway and the ownership by the New York Central of a controlling interest in the New York State Railways, also the ownership by the New York Central of the New York & Harlem Railroad, operating a surface line in New York City. In fact, Mr. Smith was president of the New York & Harlem and a director of each of the others.

Alfred H. Smith was everywhere beloved. He had risen from the ranks, but he came into prominence as an executive after the *entrepreneur* stage in railroading had passed and so he found the task ahead of him one very largely of administration. How well he succeeded as an administrator and executive is shown by the position of the New York Central today both as a money earner and as a public institution. Evidence of his broadminded and liberal attitude toward labor was furnished on many occasions, notably at the recent inquiry by the State of New York into the causes and conduct of the strike on the lines of the Schenectady Railway. The extent of the appreciation of Mr. Smith's unusual ability in circles outside of the railroad world is strikingly instanced by the expressions of deep regret at his untimely death contained in the numerous editorials appearing in the daily press all over the country.

T. W. Passailaigue

Theodore W. Passailaigue, vice-president of the Charleston Consolidated Railway & Lighting Company, Charleston, S. C., died recently, in his sixty-third year. His career with Charleston railways dates back to 1876, when he began service with the Enterprise Railway, a horse car line, at the age of fifteen. He entered service as an office boy, and from this position he was steadily advanced until he was promoted to succeed the late Alfred Ravenel as president of the company.

When the Enterprise Railway was absorbed by the Consolidated Company's interests, which instituted the first electric railway system in Charleston, Mr. Passailaigue was made general superintendent of the system. He was elected vice-president of the Charleston Consolidated Railway, Gas & Electric Company in 1917 and vice-president of the Charleston Consolidated Railway & Lighting Company in 1922, the latter being the operating company.

Mr. Passailaigue had been a member of the American Electric Railway Association since 1884 and was a regular attendant at the annual meetings. He was a member of the city board of school commissioners for twenty years.

John M. Roach

John M. Roach, a member of the board of operation of the Chicago Surface Lines, first vice-president of the Chicago Railways and formerly president of that company, died on March 7 at Fort Myers, Fla. Mr. Roach was long one of the outstanding figures of the electric railway industry. He was president of the American Electric Railway Association in 1899 and 1900, and at the convention of the association in Chicago in 1922 he was one of the seven former heads of the association introduced at the session on Oct. 4 given over to the reunion of the past-presidents.

J. M. Roach

Mr. Roach had an unusual capacity for work and organization. His knowledge of men was, perhaps, his strongest characteristic, and while he had been out of active management of the electric railways in Chicago for the last ten years, he was still loved by thousands of the men who served under him and who are still with the properties there.

He saw the introduction of the cable system in Chicago in 1882 and the trolley system beginning in 1890. It was during his administration that the Chicago properties were rehabilitated beginning in 1908. The record of reconstruction work there completed in three years is said to have been unequaled in traction history.

Mr. Roach began his career in Chicago as a conductor. That was in 1872 in the employ of the North Chicago Street Railway. Because he understood the basic things—his job, his fellow employees, and the human beings who reluctantly handed him their fares—there was promotion to assistant superintendent, superintendent, vice-president and general manager of the West Chicago Street Railway, vice-president and general manager of the system embraced in the Union Traction Company, and president of the three other Chicago companies, then president of the Chicago Railways for six years. In 1914 he concluded to retire from active participation in the management of the Chicago properties. At that time he became a director of the Chicago Surface Lines, but continued as vice-president and director of the Chicago Railways. His fiftieth anniversary of Chicago railway service occurred in 1922. In honor of that event Mr. Roach was the guest of honor at a dinner in December, 1922. Directors of the several companies, heads of departments and old-time friends made up the party of sixty who took part in the testimonial.

Mr. Roach was born in Lowell, Ohio, in 1852. At the age of eighteen, he was attracted by the story of gold discoveries in Montana and went with a party of young men from his home in Belvidere, Ill., on the long western trip on horseback. Visions of wealth vanished after an attempt at mining, and the young man then tried his hand at ranching and newspaper work. In October, 1872, he went to Chicago and was at once attracted by the possibilities of advancement in street railway work. He had a letter of introduction which would have secured a position in the office of the general manager of the company, but he expressed preference for employment as a conductor "so he could learn the business from the car up." How well he succeeded the record of his achievements testifies.

E. E. McCall

Edward E. McCall, former Supreme Court Justice, ex-Public Service Commission chairman and at one time Democratic candidate for Mayor of New York, died on March 12. Mr. McCall was fifty-nine years old.

To Mr. McCall in his office as chairman of the Public Service Commission fell the duty of bringing to a consummation the plans of the then city and state authorities for a far-spreading development of New York City's transit system and the signing of the actual contracts that made this development possible. To his part in this work Judge McCall brought his wide experience in public life, the judicial training of the bench and a personal ability and efficiency far from the usual order.

The appointment of Mr. McCall to the commission met with much adverse comment. He signed the contracts, but was almost constantly under fire from his political opponents and finally was removed from office by Governor Whitman, a Republican.

On March 12 the commission said:

> To him is due the profoundly grateful acknowledgment of the people of the city of New York for all that he accomplished in their name and in their interest, for the unvarying rectitude of his conduct in office, for the signal administrative ability he brought to bear upon the affairs of the commission he headed and for his consistent devotion to the high duties that were given him.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

American Brake Shoe Business Diversified

Good Year for Brake Shoe & Foundry Company—Less Than One-Quarter of Its Sales Were of Brake Shoes

The annual report of President Joseph B. Terbell of the American Brake Shoe & Foundry Company to stockholders, dated March 1, 1924, shows the extent to which this company has expanded in various lines since its organization in 1901. At that time it was almost exclusively a manufacturer of brakeshoes for steam and electric railways. Now the sales of brake shoes amount to less than one-quarter of the combined sales of the entire company.

National Car Wheel Taken Over

The company as now organized includes the American Malleable Company, Dominion Brake Shoe Company, Ltd., Southern Foundry & Machine Company and Southern Wheel Company, and it also owns more than a 75 per cent interest in American Manganese Steel Company, American Brake Shoe & Foundry Company of California, American Forge Company and Ramapo Ajax Corporation. It has also just completed negotiations for the purchase of the entire outstanding capital stock of the National Car Wheel Company, with plants at Pittsburgh, Pa.; Cleveland, Ohio; Rochester, N. Y., and Sayre, Pa.

It will be seen from this statement that the company has engaged extensively in the manufacture of forgings and of malleable, steel and manganese steel castings. While some of this product is for steam and electric railways, such as brake heads and journal boxes in the malleable castings, special track work and track fixtures in the manganese and steel castings, and for miscellaneous uses in forgings, a very large part goes to other industries, particularly automobile and mining. During the war at its Erie plant the company did a large amount of shell manufacture for the United States and British governments, as well as the manufacture of some cannon, but these works were turned over to the government at the end of the war.

Forty-one Industrial Plants

The American Brake Shoe & Foundry Company now has forty-one industrial plants in different parts of the country, exclusive of three plants in Canada, which manufacture material for the company. The purpose of having a large number is to reduce delivery freight charges. During 1923 new plants for the manufacture of brakeshoes were opened at Portsmouth, Va., and Houston, Tex., and the erection of an additional brakeshoe plant is under way at Kansas City.

The net earnings of the company for 1923, after depreciation and a reserve for federal taxes have been deducted, amount to $2,727,097, equivalent, after payment of 7 per cent dividends on the preferred stock, to $13.22 per share on the common stock. The dividend paid on the common stock was $5 a share and the company carried over the surplus for the year, $1,267,206. The annual report just issued is the most extensive ever made public by the company.

Registers for Every Requirement

Ohmer Fare Register Company Has Acquired Business of American Taximeter Company

The Ohmer Fare Register Company, Dayton, Ohio, has acquired the business of the American Taximeter Company, New York City. As a result the manufacture of the recording devices for which these two long-established companies are noted is to be concentrated at the plant of the Ohmer Fare Register Company at Dayton. Additional machinery and equipment will be installed. With the consolidation also of the sales and service forces of the two companies, the combined organization will be in a position to serve the transportation industry of American and foreign countries more efficiently than ever before.

Ohmer Company a Pioneer

The Ohmer Fare Register Company was organized in 1902 as the successor to the Ohmer Car Register Company and has widely distributed its fare registers for city and interurban railways and its receipt printing and issuing taximeter for taxicabs. John F. Ohmer, its founder, has been the guiding genius of the company in its twenty-two years of successful operation. He was the original inventor of the plurality fare indicating and recording fare register, has taken out more than 100 patents in his own name, and as a crowning achievement to his inventive career he conceived and constructed the Ohmer receipt printing and issuing taximeter. The Ohmer Fare Register Company now owns more than 300 patents covering its various products.

The American Taximeter Company was started in 1910 as a consolidation of the Jones Taximeter Company and the Franco-American Company. Francois Ducasse, its president, introduced in October, 1907, the first taximeters in this country when he imported French machines of the Popp make and installed them on the Darrecq taxicabs operated by the first motor cab company in this country, the New York Taxicab Company, and in which he was interested. Since that time Mr. Ducasse's company has built and distributed the Jones, Popp and Atco taximeters, superior instruments in the field of registering but non-printing taximeters, just as the Ohmer receipt issuing and printing taximeter is standard in its particular field.

The American Taximeter Company has also been a large manufacturer of the Dreadnaught Hub-O-Dometer, a mileage recording device that is installed on the hub of any vehicle, and the Dash-O-Dometer, an instrument devised to provide an accurate check on operating expenses of motor transports. This latter instrument will fill the needs of one branch of the commercial vehicle industry for which the Ohmer Truck Auditor is not intended. The manufacture and distribution of all of these devices formerly produced by the American Taximeter Company is being taken over by the Ohmer Fare Register Company. Thus the combined company will be in a position to fill every recording device need and requirement of the transportation industry.

Merger of Ball Bearing Makers Under Way

Plans for the proposed merger of the Marlin-Rockwell Corporation and the Gurney Ball Bearing Company are fast taking definite shape. The Marlin-Rockwell organization has called a special meeting of its stockholders for March 28, at which they will be requested to approve the terms under which it is proposed their corporation shall take over the Gurney Ball Bearing Company, Jamestown, N. Y.

For the property and other assets of the Gurney company, it is proposed that the Marlin-Rockwell shall issue $2,722,800 in 7 per cent cumulative preferred stock and 133,554 shares of no par value common stock. Marlin-Rockwell at the same time will assume all debts and other liabilities of the smaller company. Marlin-Rockwell stockholders will be requested to authorize the issuance of the amount of preferred stock mentioned above and at the same time authorize an increase in the no par value common stock from 89,251 to 222,805 shares.

Metal, Coal and Material Prices

Metals—New York	March 11, 1924
Copper, electrolytic, cents per lb	14.00
Copper wire base, cents per lb	16.375
Lead, cents per lb	9.00
Zinc, cents per lb	6.86
Tin, Straits, cents per lb	58.375
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.70
Somerset mine run, Boston, net tons	2.225
Pittsburgh mine run, Pittsburgh, net tons	2.125
Franklin, Ill., screenings, Chicago, net tons	1.825
Central, Ill., screenings, Chicago, net tons	1.625
Kansas screenings, Kansas City, net tons	2.25
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$6.75
Weatherproof wire base, N.Y., cents per lb	18.00
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal	$0.96
White lead, in oil (100-lb. keg), N.Y., cents per lb., carload lots	12.25
Turpentine, (bbl. lots), N. Y., per gal	$1.01

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Newspaper Account of Braking Tests Misleading

Inquiries have been provoked by recent reports in the Schenectady *Gazette* and several other daily papers regarding braking tests being carried out there. The newspaper accounts grew out of a test by the General Electric Company in that city of a car using the motors as generators for retarding the car, the energy being taken up by resistors. The connections employed in this particular test were somewhat different from those used previously, but there was really no occasion for the wide publicity which the event received. For many years the General Electric Company has supplied electric braking controllers for street car service. Very few of these are in use in this country, however, as the air brake fulfills the requirements much better.

Rolling Stock

Des Moines City Railway, Des Moines, Iowa, has received the second batch of ten cars which were ordered last July. The specifications of the first ten were given in the ELECTRIC RAILWAY JOURNAL, issue of Dec. 29, 1923. The specifications of the second group follow:

Number of cars received	Ten
Name of road	Des Moines City Railway
Date order was placed	July 1, 1923
Date of delivery	Feb. 10, 1924
Builder of car body	McGuire Cummings
Type of car	Passenger-semi-motor
Seating capacity	Forty-eight
Weight: Car body	20,000 lb.
Weight: Trucks	10,000 lb.
Weight: Equipment	8,000 lb.
Weight: Total	38,000 lb.
Length over all	46 ft.
Truck wheelbase	5 ft. 6 in.
Width over all	8 ft. 3 in.
Height, rail to trolley base	11 ft. 6 in.
Body	Semi steel
Interior trim	Cherry
Headlining	Agasote
Roof	Arch
Air brakes	G. E. straight
Armature bearings	Sleeve
Axles	Standard Steel Works
Bumpers	Channel
Car signal system	Faraday
Car trimmings	Brass
Center and side bearings	Plain
Conduits and junction boxes	Duraduct
Control	G.E.K.-35
Couplers	Portable
Curtain fixtures	Curtain Supply Company
Curtain material	Pantasote
Designation signs	Hunter
Door-operating mechanism	National Pneumatic Company
Wheelguards	H.B.
Gears and pinions	G. E. grade M
Hand brakes	Peacock
Heater equipment	Consolidated
Headlights	Golden Glow
Journal bearings	Plain
Journal boxes	McGuire-Cummings
Lightning arresters	G. E.
Motors, type and number	4-G.E. 247-1
Paint	Enamel
Registers	International
Sanders	Des Moines Railway standard
Sash fixtures	Dayton Manufacturing Co.
Seats	Heywood-Wakefield
Seating material	Cane
Springs	Railway Springs Company
Step treads	Kass-Feralun
Trolley base	U. S. No. 13-E
Trolley wheels	More Jones
Trucks	McGuire-Cummings
Ventilators	Utility
Wheels	26-in. rolled steel

New York State Railways through its subsidiary, the Rochester Co-ordinated Bus Lines, plans the purchase of additional trolley buses.

Track and Line

Cleveland Railway, Cleveland, Ohio, plans a crosstown line on 117th Street, the boundary between Cleveland and Lakewood. The cost is estimated at $100,000. The project waits on the approval of a bond issue.

Tennessee Electric Power Company, Nashville, Tenn., is carrying out a track improvement program in Chattanooga which calls for an expenditure of $60,000 during the year. The work includes the installation of new crossties and new rails.

Pacific Electric Railway, Los Angeles, Cal., has ordered from the Union Switch & Signal Company the materials for equipping the double-track line between Dominguez and San Pedro, using color light signals. Forty-two Style "N" light signals, 105 single impedance bond layouts, 130 a.c. relays and 94 vertical rotary switch circuit controllers will be required, the field installation being performed by the railway company's signal construction forces.

Power Houses, Shops and Buildings

Gardner & Templeton Street Railway, Gardner, Mass., is planning improvements in the East Templeton power house.

Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich., recently installed an automatic substation at Walker Station. Its success has led to the installation of a second substation at the Coopersville station.

Public Service Corporation, Newark, N. J., recently purchased a portion of the plant of the Rogers Locomotive Works in Paterson. It is said that extension of the car storage facilities in Paterson of the Public Service Railway is expected.

Municipal Railway, San Francisco, Cal., has prepared plans and specifications for an addition to its present Seventeenth Street carhouse. This addition will give needed office and car storage space.

Trade Notes

Harper & Taylor, Inc., Philadelphia, Pa., will conduct a general engineering business paying particular attention to the design, construction and operation of hydro-electric projects. An announcement to this effect was made recently by John L. Harper, vice-president and chief engineer of the Niagara Falls Power Company, and H. Birchard Taylor, vice-president of the William Cramp & Sons Ship & Engine Building Company. An office is also located at Niagara Falls.

Cornell S. Hawley, president of the Consolidated Car Heating Company, has recently returned from a transcontinental trip, during which he visited Chicago, Denver, Salt Lake City, Vancouver, Portland, Tacoma, Seattle, San Francisco and Los Angeles.

New Advertising Literature

Warren Webster & Company, Camden, N. J., have issued "Webster from the Air," an unusually attractive pamphlet containing some exceptionally interesting aerial photographs of representative American cities using Webster systems of steam heating. The pamphlet says the Webster engineering service is prepared to offer suggestions from the experience of practical engineers leading to satisfactory operation of the steam plant from the moment of its installation.

Gold Car Heating & Lighting Company, Brooklyn, N. Y., is distributing a catalog and instruction book of heater equipment. Diagrams are given for thermostatic control of electric heaters and the latest types of electric heaters are described in considerable detail. Rules are also given for figuring the number of heaters required for different sized cars.

"Steinmetz and His Discoverer" is the title of a twenty-four-page booklet recently written by John T. Broderick, an early associate of Dr. Steinmetz in the General Electric Company. Mr. Broderick points to E. Wilbur Rice, Jr., as the discoverer of Steinmetz and their meeting in a Yonkers workshop thirty years ago is described. An outline of the growth of the electrical industry during the past twenty years follows as a prelude to Mr. Broderick's description of the influence of the two men on electrical progress.

Irving Iron Works, Long Island City, N. Y., has issued catalog 4-A 96, which describes the Irving subway.

W. S. Godwin & Company, Baltimore, Md., have just issued a twenty-page booklet descriptive of their continuous steel ties and Godwin paving guards. The economies and advantages of the Godwin construction for paved railways are fully treated. The material described is illustrated in a series of diagrams.

John C. Dolph Company, Newark, N. J., has issued a post-card pamphlet giving information on its insulating varnishes with a revised price list.

Knickerbocker Portland Cement Company, New York, N. Y., has issued a pamphlet on "Twenty-one reasons for our sales policy."

The Pittsburgh Testing Laboratory, Pittsburgh, Pa., has issued bulletin No. 33, on the subject of "Creosoted Materials." The pamphlet contains a brief account on wood conservation and wood preservation.

National Paving Brick Manufacturers' Association, Cleveland, Ohio, has issued a ninety-two-page booklet describing the construction of vitrified brick pavements. Some recommended specifications are included for drainage, grading, bases, bedding, laying brick and filler. The pamphlet also gives some miscellaneous uses of vitrified brick with specifications for private drives, sewers, bridges, railroad and architectural purposes.

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New York, March 22, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 63
Number 12

Electric Railway Shops Are Behind the Times

A SILENT and little known but vitally important element that contributes much to the success or failure of the electric railway is the car repair shop. Even the management of the road is not always conscious of the part it plays in rendering adequate and reliable service at all times and under all conditions.

In the past few years attention of managements has been focused on the necessity for the use of modern, light-weight equipment. This has proved a good investment in practically every case, and a good advertisement for the railway purchasing it.

Often it is argued that the new cars require less maintenance, and so it is not necessary to have as complete shop equipment as for the older types of cars. There is a fallacy in this. Since the new cars almost invariably represent a much greater investment than the ones they replace, and since they have a greater earning power than their predecessors, it is doubly important that they be kept in active service as great a portion of the time as possible. While the repairs when the cars are brand new may be minor, the excellence with which the work is done at that time will determine to a considerable extent how long they can go without undergoing heavy repairs.

Modern shop equipment is available that makes it possible to handle the cars in the shop much more quickly, and to do the necessary repair work with far greater facility and at less cost, than the equipment used by past generations. Yet many shops are using tools that were purchased twenty or more years ago. In fact, in the survey carried out by the ELECTRIC RAILWAY JOURNAL and published in this issue, it was developed that but one-third of the shop tools of small, medium-sized and large properties were less than ten years old.

When it is considered that the period beginning with the commencement of the World War ten years ago has seen a most remarkable improvement of machine tools, particularly along the lines of more rapid production and greater precision of work, this statement indicates that the electric railway shops are even more out of date than is gathered from the figures alone.

The responsibility for this rests partly with the master mechanics, but in a larger measure with the executives who as a rule have listened with a deaf ear to the proposals of the master mechanics for expenditures for modern machine tools in order to reduce maintenance costs. The executives' excuse has been lack of money, but it is believed that that is no longer a good reason. Almost any railway can buy a machine or two a year, at least under present conditions, and gradually place the shop in position to reap the economies that modern tools make possible. For the fear that the electric railway was to be supplanted has passed. We know now that the bus is a supplement, not a substitute. So with this former deterrent out of the way, the shop's modernization program can get under way.

What the Survey of Machine Tools Developed

IT WAS typical of the answers submitted in reply to the questions upon which the JOURNAL'S survey of machine tools in electric railway shops was based, that most of the machine tools were old and few modern and efficient. In fact, some reports listed tools in service that were purchased as much as forty years ago—tools that actually antedate the electric railway itself. Other tools were of uncertain origin, having been in the shops so long that the present management knows nothing of the time or place of their purchase.

Still other replies indicated that second-hand tools had been bought in quantity. Most likely these tools, which had served their purpose for the original purchaser, were already worn or were unsuited to the work for which the road obtained them. Possibly the managements taking this action thought that great care had been used in the selection of the shop equipment, and that considerable money had been saved by getting something "just as good as new." Such tools might be a wise buy as a temporary substitute for the proper equipment, if the roads had not the money at the time to purchase modern equipment. But when such tools are continued in use for many years without thought of replacement, it does not indicate that the management has a clear idea of the functions of the mechanical department or of its importance in relation to the net earnings of the road.

Use the Shop Equipment to Good Advantage

PROBABLY the one thing that has been impressed on the shop foreman of the electric railway more than any other is the importance of getting the cars out of the shop without delay. A car in the shop earns nothing, and it is the car, not the shop, that makes the profits.

This attitude frequently has led to practices that are not efficient or economical. If the shop is not equipped with the proper machine tools, or if the tools best fitted to the job are busy on some other work, that is unfortunate, but the car must be turned out somehow! In this way it frequently happens that it is necessary to spend more money and do the work uneconomically and in a makeshift way.

There is a great difference between the electric railway repair shop and the manufacturing plant. While

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conditions such as those referred to exist in many railway shops, a manufacturing shop must make its products economically or else profits disappear and the factory goes out of business. With proper equipment and organization, however, it is possible to approximate manufacturing shop conditions in the railway repair shop.

The study of machine tool equipment made by this paper points the way to the selection of new, profit saving machines. That helps in one way to get shop costs down. Another remedial measure is to take steps to provide the older machines with modern cutting tools, as far as their strength and power will stand it. The correct form of tool, the proper material for the working part to get the most out of the machine, and the proper adjustment and grinding of the cutting edge, are all necessary. These are things that require little or no capital expenditure, but do take knowledge and skill on the part of the supervisory force.

Another element in reducing shop costs and getting production is a study of the work done in the shop. Nearly every electric railway has forms to be filled out, giving the individual cars held out of service and the reasons therefor. One car will be held for wheels, one for a broken equalizer bar, a third for journal brasses, etc. Of course, any railway with the least semblance of organization has on hand sufficient wheels, brasses, or material for equalizer bars. The real reason for the long periods in which cars are held out of service is not lack of material. It is that the organization, or the machinery, or the tools are in such condition that the necessary machine work cannot be done promptly. Here is where a live equipment man can well afford to devote his attention and determine just where the difficulties are that must be remedied to get the cars out of the shop.

Then the story must be put in proper shape and presented to the general manager in such form that it is a convincing argument for the proper action. Even though the manager does not see his way clear to purchase the much needed equipment and throw out the old machines, it will be to his advantage to know the real condition of his shop and to determine what improvements can be made now or in the near future that will gradually better conditions. More than likely the idea cannot be "sold" by the equipment man the first time, but repetition is necessary and ought ultimately to bring an O.K. Salesmen do not get their orders at the first call, usually, but have to come back again and again. The master mechanics have a selling job to do.

Keeping Records of Machine Tools

IN COLLECTING data relative to the machine tools used in electric railway shops a lack of records of this equipment was found. Some properties had lists of the tools, others had a card index of the machines with their location, type and size, detail dimensions, age, etc. But the majority of properties rely on the memory of someone, usually the master mechanic, for the authentic information as to what this or that machine is and its controlling dimensions and characteristics. This means, of course, that any question arising with regard to a machine can be answered only by taking the data off the machine itself—a practice that makes for delay.

A detailed record of each machine, made at the time it is installed, will facilitate inventories and lend intelligence generally to the use of the machine during its full life.

Rising Labor Costs Make Handling Machines Necessary

WE IN THE United States are justly proud of our high standards of living compared with those in other countries, and we speak with satisfaction of the enviable economic status of the American workman. The present situation is the result of a steady trend toward higher wages and shorter hours, a trend which has continued almost without interruption for many years, but especially since 1914.

In the abstract, this tendency is approved by nearly everyone. In concrete cases, however, approval is likely to be tempered by dismay at the increased labor costs. When increased wages and shorter hours can be arranged without making production more expensive, little opposition is encountered. The development of modern machinery has often made this possible.

In recent years the problem of rising wages has made construction and operating costs an acute problem in the electric railway industry. In the transportation department this has been solved to some extent by the one-man car, and by other means. In the shop, way, and line departments special handling machinery has made the time of the laborer more productive.

Great strides have been taken in this direction during the past few years. Observation on many properties shows that railways have been buying labor-saving machinery of nearly every description, and have found the investment to be well justified by the resultant saving in man-hours.

The collection of pictures from various parts of the country published in an eight-page group in this issue gives one an idea of the scope of materials handling machines which are applicable in the various departments of the electric railway field. Railways have had to conserve their earnings because they could not readily or materially increase their selling price, and this accounts for the great interest in labor-saving machines—an interest that is gaining headway rapidly as experience accumulates to show the savings possible.

An Urge from Headquarters May Improve Publicity

GOOD publicity is considered both necessary and helpful in building better public relations, yet there are many electric railway managements, even at this late date, who are not taking any part in the work. President Budd of the American Electric Railway Association recently said, in speaking to the Midyear Meeting at St. Louis, that any manager who is not doing his share in the general program of public relations work is derelict in his duty to his company and to the industry.

This lack of co-operation might be remedied in many localities if the suggestion were sent out from the main office to the local managers that they should report back periodically as to what they have been doing along these lines. In other words, there has not been the urge from the main office to do these things in many instances. On the other hand, every local manager should insist upon an appropriation for the purpose of executing locally his part in the general program to get a square deal for the electric railways.

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40% Are Over 20 Years Old

Only 28% of All Machine Tools Now in Use in Electric Railway Shops Have Been Purchased in the Last Ten Years—"Journal's" Survey of Conditions Shows that at Least 12,500 New Machine Tools Are Needed to Approach Modernization in This Department of the Industry

TO MODERNIZE electric railway shops in the United States, 12,500 new machine tools, including woodworking machines, are needed as a minimum. This is based on the assumption that at the very least all machine tools over 20 years old ought to be replaced. The number of such tools in the shops of the 821 electric railway operating companies is about 10,000, which is 40 per cent of the total number of machine tools of all ages in use in the industry. In addition, 2,500 more new machine tools are required to meet the expressed need of the master mechanics for new tools to supplement their present equipment.

This is believed to be a conservative estimate, because many machines less than 20 years old ought to be replaced too, and because many more new additional machine tools are needed than 2,500, as this number is based on a literal interpretation of the fact that no information on this point was supplied by 53 per cent of the master mechanics reporting.

Such a program as this of new machine tools would require expenditures aggregating some $15,000,000 to $20,000,000, which indicates the magnitude of the task that must be accomplished in modernizing the rolling stock maintenance facilities of the industry. As it is generally conceded that substantial economies are readily possible and would result from such a program, one may get an idea from the figures just read of the magnitude of the savings that are available. Or, to put it another way, one gets some appreciation of the losses which electric railways are suffering by continuing the use of the present obsolete, inefficient and small capacity machine tools.

Having known for a long time, but in a general way, that electric railway shops are very poorly equipped on the average, the JOURNAL undertook for this Annual Maintenance Number to derive a definite measure of how well or how poorly the shops actually are equipped. Information was gathered in from 62 properties in all parts of the country and of all sizes, the aim having been to include data from 25 companies in each of three classes: Class I, 5 to 50 cars; Class II, 100 to 300 cars, and Class III, 400 cars up. These data are summarized in the accompanying tables. With the actual data covering the 62 properties of all three classes as the basis, the total figures for the industry were roughly estimated.

The tables are self-explanatory so far as the data there are concerned. But it is by noting the blank spaces and the smallness of the figures opposite the items for some of the companies that one is able to discern to what extent the companies are equipped as to machine tools. The vertical columns show what the individual companies have and what they lack; the horizontal rows give a comparison among the several companies as to the extent of use of each type of machine tool equipment.

These first three tables do not take into account the suitability of the tools shown to be in use. A better idea of this is obtained by noting how long ago the present machines were manufactured. From the data collected from the 62 railways the date of manufacture is known for about 1,000 of the machines. Of these, but 14.2 per cent were purchased since 1920; 14 per cent are from 5 to 10 years old; 20.5 per cent are from 10 to 15 years old; 22.3 per cent are from 20 to 25 years old, and 18 per cent are more than 25 years old.

Some would claim that a machine tool that is more than 10 years old cannot be considered as of modern design. On that basis it might be said that more than two-thirds of the present machine tool equipment in electric railway shops could be replaced to the advantage of the railways.

The data collected also included a statement from the master mechanics as to tools that should be added to their present equipment in order that their maintenance work could be done efficiently. Thirty railways showed that they needed 191 new machine tools, as

Table I—Classification of Machine and Woodworking Tools in Seventeen Electric Railway Shops Maintaining from Twelve to Fifty Passenger Cars

Number passenger cars	12	16	16	22	24	25	26	37	39	42	43	44	46	47	50	50	50
Machine Shop																	
Emery wheel	1	1	1	1	2	1	1	1	2	2	1	2	1	1	3	2	3
Grinding machine		1				1		1			1						1
Grindstone	1	1	1	1	1		1	1	1				1	1	1	1	1
Drill press	1	1	1	1	3	2			2	2	1	2	1	1	2	4	3
Radial drill							1								1		
Wheel turning lathe				N	1	1	N	N		1				1	1	1	1
Heavy turret lathe																	2
Low swing axle lathe								N		1					1		1
Other lathes	1	1	2	1	2	2	1	1	2	1	4	2	3	1	3	4	3
Milling machine															1		
Shaper	N	1		1	1	1	1		1	1	1	1	1	1	1	1	2
Power hack saw	1	1	1	N	1	1	1		1	1	1	1	1	1	1	1	1
Planer			1		1	1			N		1						1
Punch press													1				1
Heavy duty punch and shear					N					1							
Horizontal boring mill										1					1		
Vertical boring mill					1		N	N			1				1		
Wheel press	1		1	N	1		N	N	1	1	1	1	1		1	1	1
Pipe cut. and thread. mach.				N	1			N	1	1							
Axle straightener								N		N	1						1
Bolt cutter						1	1	N		1	1	2	1	N	1	1	1
Key seat cutter								N									
Woodworking Shop																	
Band saw	1				1	1	1		1	1	1		1	1	1	1	1
Universal table saw					1	N	1						N		1	1	1
Wood planer					1	1	1			1	1		N	1	1	1	1
Double spindle planer											1				1		
Wood lathe					1		1			1					1	1	
Vertical mortiser					N				N	1			N		1	1	
Horizontal mortiser										1	1				1		
Rip and cut-off saws			1			1			1	1	1			1	2	1	
Resaw													N				
Shaper											1				1	1	
Power sander											1				1		
Joiner					N				1						1	1	1
Sticker																1	
Tenoner															1		
Saw filer and setter										1	1				1		1
Molding machine															1		
Glass cutting machine											1						

Note: N means additional tools needed to do maintenance work efficiently, as indicated by master mechanics.

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Table II—Classification of Machine and Woodworking Tools in Twenty Electric Railway Shops Maintaining from 114 to 277 Passenger Cars

No. passenger cars	114	123	126	126	132	137	140	146	146	150	175	182	189	191	218	218	230	232	276	277
Machine Shop																				
Emery wheels	2	2	2	2	2	2	2	2	2	4	2	4	1	2	2	2	8	2	3	1
Grinding machine	..	..	..	..	..	..	..	..	..	1	1	1	..	..	1	..	..	..	1	..
Grindstone	1	..	1	1	..	1	..	1	1	..	2	..	..	1	..	..	3	1	..	1
Drill press	3	1	1	3	3	2	2	3	3	3	4	3	2	3	2	2	4	2	3	4
Radial drill	..	1	1	..	N	1	1	..	..	..	1	..	1	..	..	N	..	..	1	..
Wheel turning lathe	N	..	1	..	1	..	1	1	..	..	2	1	1	..	1	1	..	..	1	..
Heavy turret lathe	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	3	..
Hand screw machine	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..
Low swing axle lathe	..	..	..	1	1	..	..	1	..	2	1	1	..	..	N	..	1	..	..	..
Other lathes	2	2	2	2	4	4	3	3	2	1	4	2	3	7	3	3	2	3	5	2
Milling machine	N	..	1	..	N	..	..	..	N	..	..	1	..	..	..	N	1	..	2	..
Shaper	1	1	1	1	1	1	1	1	..	1	2	1	1	1	1	1	1	1	1	1
Power hack saw	1	..	1	1	2	1	N	2	1	1	2	1	1	1	1	1	1	2	1	1
Planer	..	..	..	..	..	1	..	1	..	1	1	..	..	..	..	1	1	..	1	..
Punch press	..	..	..	..	N	..	..	..	..	..	1	..	..	..	N	..	..	..	1	..
Heavy duty punch and shears	..	..	..	..	..	1	..	..	..	..	..	1	N	..	..	..	..	..	..	1
Horizontal boring mill	..	1	..	..	..	..	..	1	1	..	..	1	..	..	..	1	1	..	..	..
Vertical boring mill	1	..	1	1	1	1	1	..	..	1	2	2	1	1	1	..	..	1	2	1
Wheel press	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Pipe cutting and threading machine	1	..	1	..	..	1	1	..	..	..	1	1	1	..	1	1	..	..	1	1
Axle straightener	1	..	N	..	1	..	..	..	..	1	1	1	..	1	..	..	1	..	..	1
Bolt cutter	1	1	1	N	1	..	..	..	1	..	1	1	..	1	1	..	..	1	1	1
Hydraulic press	..	..	..	..	..	1	..	..	..	..	..	..	..	..	1	..	1	1	..	..
Key seat cutter	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Wheel grinder	1	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..
Bearing boring machine	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Woodworking Shop																				
Band saw	1	1	1	1	1	1	1	1	1	1	..	1	..	1	1	1	1	1	1	1
Universal table saw	1	..	1	1	1	..	..	..	..	..	..	1	..	..	1	..	..	..	..	1
Wood planer	..	..	1	1	1	..	N	1	1	1	..	1	..	1	1	1	1	1	..	1
Double spindle planer	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	1
Wood lathe	..	1	1	1	1	1	1	1	1	..	..	1	..	..	1	..	..	..	..	1
Vertical mortiser	1	..	1	..	1	1	..	..	1	..	..	1	..	..	1	1	1	1	..	..
Horizontal mortiser	..	..	1	1	..	..	N	1	..	..	..	..	..	..	1	..	..	..	..	..
Swing saw	..	..	..	..	..	..	N	1	..	..	..	1	..	..	1	..	1	..	..	..
Rip and cut-off saws	..	1	1	1	..	1	1	1	1	1	..	..	..	1	1	1	1	1	1	2
Resaw	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..
Shaper	..	..	1	1	..	..	N	..	N	..	..	1	..	..	1	1	1	1	..	1
Power sander	..	..	..	1	..	..	N	..	1	..	..	2	..	..	1	..	2	..	..	2
Joiner	..	..	..	1	1	1	N	..	1	..	..	1	..	..	1	1	..	1	..	..
Sticker	..	1	..	..	..	..	N	..	..	..	..	..	..	..	1	..	..	..	..	..
Tenoner	..	..	1	1	..	..	..	..	..	..	..	1	..	1	1	..	..	..	..	1
Saw gummer	N	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..
Saw filer and setter	N	..	..	1	1	..	1	..	..	..	..	1	..	..	..	..	1	..	..	..
Universal wood worker	..	..	..	1	..	..	1	..	..	..	..	..	1	..	1	..	1	..	..	..
Molding machine	..	..	1	1	..	..	..	..	..	..	..	..	..	..	1	N	..	..	..	1
Post borer	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	N	..	..	..	..

Note: N means additional tools needed to do maintenance work efficiently, as indicated by master mechanics.

Table III—Classification of Machine and Woodworking Tools in Nineteen Electric Railway Shops Maintaining 400 Passenger Cars and Up

Number of passenger cars	400	407	409	410	416	438	445	500	600	629	653	738	755	807	1,030	1,398	1,466	1,500	2,343
Machine Shop																			
Emery wheels	5	2	3	3	2	1	4	4	6	1	2	5	5	2	7	10	1	9	2
Surface grinder	..	..	..	..	..	N	..	..	..	..	..	3	..	1	4	..	..	..	1
Grinding machine	1	2	1	..	1	..	N	1	3	..	1	2	3	2	3	5	3	4	1
Grindstone	..	1	1	1	2	1	..	..	..	..	..	1	..	1	..	2	1	1	2
Drill press	4	3	4	3	6	3	5	6	11	4	1	16	8	4	14	17	3	10	8
Radial drill	2	1	..	1	3	N	1	2	1	..	..	2	1	1	3	..	..	1	2
Wheel turning lathe	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	..	1	1	1
Heavy turret lathe	..	..	..	..	..	..	..	..	3	..	1	4	1	2	8	..	..	1	1
Hand screw machine	..	..	..	..	..	..	..	..	..	..	..	1	2	..	1	1	..	..	..
Low swing axle lathe	..	N	..	..	1	..	..	..	1	1	1	2	..	1	2	1	..	1	1
Other lathes	6	4	5	3	10	4	4	5	3	3	1	7	8	4	11	21	6	5	8
Milling machine	2	N	..	..	..	N	1	..	1	1	1	4	2	1	7	4	..	2	3
Shaper	2	1	1	1	2	2	2	2	2	2	1	5	3	1	1	3	1	2	2
Power hack saw	..	1	2	1	..	1	1	3	1	1	1	5	2	2	2	1	2	1	1
Planer	1	1	1	1	2	1	1	3	3	..	1	3	3	1	5	4	1	1	1
Punch press	1	..	1	..	..	..	1	1	1	..	..	2	N	2	1	4	..	1	1
Heavy-duty punch and shears	..	..	..	..	1	..	..	..	..	..	..	2	..	1	..	..	..	1	1
Horizontal boring mill	1	1	..	..	..	..	..	..	..	1	..	..	1	1	2	1	..	1	2
Vertical boring mill	1	1	1	1	1	N	1	1	1	1	2	2	2	2	3	3	1	2	3
Wheel press	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	2	2
Pipe cutting and threading machine	..	1	1	1	2	..	1	..	..	1	1	2	1	1	3	..	..	1	1
Axle straightener	1	1	..	1	1	1	1	1	..	..	..	1	1	1	1	1	1	..	2
Bolt cutter	1	1	..	1	2	1	..	2	1	..	..	3	..	2	2	3	1	1	1
Broaching press	1	N	..	..	..	N	..	..	..	..	..	..	..	..	2	1	..	..	1
Key seat cutter	..	N	..	..	..	..	..	..	..	..	..	1	1	..	1	1	..	1	..
Wheel grinder	..	..	..	..	..	..	1	1	..	..	..	..	1	1	..	2	..	..	..
Metal cutting saw	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	1
Hydraulic press	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1	..	..	..	..
Gear cutters	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	..	..	..
Tapping machine	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	..	..	..
Woodworking Shop																			
Band saw	2	1	1	1	3	1	2	2	3	1	1	3	2	2	2	4	2	2	2
Universal table saw	..	1	..	1	1	N	1	..	1	..	..	1	1	2	1	1	1	3	1
Wood planer	1	1	1	2	1	..	1	1	2	1	1	3	1	3	2	2	..	..	1
Double spindle planer	..	..	..	1	1	1	..	..	..	..	..	..	1	1	..	2	..	1	1
Wood lathe	2	1	1	1	1	1	1	1	1	..	1	3	2	1	2	2	3	1	1
Vertical mortiser	2	..	..	1	1	1	1	2	1	1	1	1	1	1	..	2	1	1	2
Horizontal mortiser	..	1	1	1	1	..	..	..	1	..	..	1	1	1	2	2	..	..	2
Jig saw	1	..	1	1	..	..	..	..	..	..	..	1	1	1	..	1	..	..	1
Swing saw	1	1	..	1	..	N	1	1	1	..	1	1	1	2	1	1	1	1	1
Rip and cut-off saws	1	1	2	1	3	1	N	2	..	..	..	2	3	3	5	5	..	..	3
Resaw	..	1	..	1	..	..	..	..	..	..	1	..	..	1	1	1	..	..	..
Shaper	1	1	2	1	1	N	1	1	1	1	1	1	1	1	1	5	1	1	2
Power sander	1	1	..	1	2	..	N	1	1	..	1	4	3	1	2	1	1	2	1
Joiner	1	1	1	1	2	2	1	1	2	1	..	2	2	1	4	2	1	1	2
Sticker	1	1	1	1	3	N	1	1	1	1	1	2	..	3	1	3	..	..	2
Tenoner	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	3
Saw gummer	..	..	..	1	3	..	..	..	..	..	..	1	1	1	..	1	..	..	..
Saw filer and setter	..	..	1	1	2	1	..	1	..	..	..	1	1	2	..	4	..	1	1
Universal wood worker	..	..	1	1	..	1	..	..	1	..	1	3	1	2	1	3	..	..	..
Power groover	..	..	..	1	..	..	..	..	..	..	..	1	..	..	..	2	..	1	..
Molding machine	..	1	..	1	..	..	..	1	2	1	..	2	1	..	1	1	1	1	1
Dovetail machine	..	..	..	..	..	..	..	..	..	..	..	1	..	..	1	..	..	1	..
Knife grinder	..	1	..	1	..	..	..	..	..	..	..	..	2	..	1	..	..	..	..
Post borer	..	..	1	..	1	..	1	1	..	..	..	1	1	..	..	..	..	3	1

Note: N means additional tools needed to do maintenance work efficiently, as indicated by master mechanics.

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listed in Table IV. The other 32 railways included in the study did not indicate the need of any additional tools. Assuming then that 191 is the total of additional machine tools needed by the 62 railways, it is estimated on this basis that the entire industry, if canvassed, would indicate its need for 2,500 additional new machine tools.

The 62 companies show a total of 1,893 machine tools of all types in their present shop equipment. This would indicate a total of approximately 25,000 machine tools in use in the electric railway field.

Of the total of 191 new machines shown to be needed by 30 companies 83 were for the machine shop, 55 for the carpenter shops, 23 for the forge shop, 15 for the armature room and 15 for the sheet metal shops. In the machine shops, particular need was expressed for additional surface grinders, wheel-turning lathes and other lathes, milling machines, axle straighteners and bolt cutters. In the woodworking shops the greatest need appears to be for universal table saws, wood shapers and power sanders. In the forge shops, bulldozers and shears are needed most. Armature rooms need banding lathes and the sheet metal shops need additional power shears.

Table IV—Additional Tools Needed by 30 Electric Railways to Carry On Maintenance Work More Efficiently

Machine Shop	
Emery Wheels	2
Surface Grinder	6
Grinding Machine	2
Grindstone	1
Drill Press	2
Radial Drill	4
Wheel Turning Lathe	7
Heavy Turret Lathe	2
Low Swing Axle Lathe	4
Other Lathes	5
Milling Machine	6
Shaper	2
Power Hack Saw	3
Planer	2
Punch Press	2
Punch and Shears	4
Vertical Boring Mill	4
Wheel Press	4
Pipe Cut. and Thread. Mach.	3
Axle Straightener	5
Bolt Cutter	5
Broaching Press	3
Key Seat Cutter	2
Air Hoist	1
Electric Welder	1
Babbitt Furnace	1
Total	83
Woodworking Shop	
Band Saw	1
Universal Table Saw	6
Wood Planer	4
Double Spindle Planer	2
Wood Lathe	1
Vertical Mortiser	4
Horizontal Mortiser	2
Jig Saw	1
Swing Saw	3
Rip Saw	3
Shaper	5
Power Sander	6
Joiner	2
Sticker	4
Tenoner	2
Saw Gummer	3
Saw Filer and Setter	3
Molding Machine	1
Boring Machine	1
Tool Grinder	1
Total	55
Forge Shop	
Forging Machine	1
Bulldozer	6
Steam Hammer	3
Air Hammer	3
Drop Forge Hammer	3
Punch and Shears	6
Belt Driven Hammer	1
Total	23
Armature Room	
Commutator Grooving Machine	2
Banding Lathe	6
Coil Winding Machines	2
Coil Presses	1
Commutator Lathe	1
Hydraulic Press	3
Total	15
Sheet Metal Shop	
Circle Cutter	2
Turning Machine	1
Setting Down Machine	1
Foot Power Shears	5
Foot Power Punch	1
Foot or Hand Break	2
Scroll Shears	1
Riveting Machine	2
Total	15

A by-product of Tables I, II and III is that they enable one to see just about what machines ought to be included in the equipment of electric railway shops of various sizes.

Big Track Job Quickly Done

THE rapidity with which trackwork can be done when a full equipment of plows, concrete breakers, etc., is used was shown by a job done by the Cleveland Railway. This job consisted in taking out and relaying 669 ft. of double track on East Ninth Street, between Euclid Avenue and Prospect Avenue, S.E. Approximately thirty-four and one-half working hours were consumed. Two shifts of sixty men each began work at 9 o'clock on a Saturday evening, and worked constantly until 5 o'clock on the following Monday morning when the first car operated over the new rail.

After taking up the pavement and removing the old tracks, a new double track, using 102-lb. rail, was laid, riveted and welded, and 4 in. of concrete poured over the International steel ties. During the progress of this work vehicular traffic, bound north and south at Cleveland's busiest corner, was not interrupted.

Acid in Lubricating Oil Advocated to Reduce Friction

THAT the addition of small quantities of organic acids to mineral lubricating oil reduces the friction in bearings was asserted by Dr. T. E. Stanton, director of the National Physical Laboratory, England, in a lecture before the last meeting of the International Air Congress in London. He took issue with the Reynolds theory of lubrication, which assumes that the value of oils as lubricants depends solely on their viscosity, and that the nature and composition of the rubbing surfaces have nothing to do with the efficiency of the bearing.

"Up to comparatively recently," said Dr. Stanton, "it has been common to state that the Reynolds theory is not concerned with the manner in which the film of oil is formed, but only with the conditions which exist when it is formed, and that it may well happen that when starting up machines from rest when the bearing surfaces are in contact, certain special characteristics of lubricants on bearing surfaces may be essential not only to prevent excessive wear; but to insure conditions favorable to the formation of a separating film.

"Gradually, however, it has become more and more certain that there can exist between rubbing surfaces a condition of steady lubrication whose characteristics are totally different from those to be expected from the application of the Reynolds theory. It is now recognized that solid surfaces having an adsorbed layer of lubricant of only one molecule in thickness can slide over each other with comparatively small frictional resistance. Further, it is known that adsorption is dependent upon the chemical constitution of the lubricant and that the greater the work done in the process of adsorption the less the frictional resistance on the surface to sliding. Acids, alcohol, and esters are more strongly adsorbed by water than are paraffins, and it is found that the former are the better lubricants."

Dr. Stanton then described a series of tests made on various types of bearings and gears, which indicated a marked superiority of the animal and vegetable oils over the mineral oils as regards the temperature at which the gears could be run without a serious increase in the friction. Tests were made with various kinds of animal, vegetable and mineral oils, including a petroleum product known as "Bayonne oil." The following observation was made:

"The effect was then tried of adding small percentages of organic acid to the Bayonne oil in order to find out whether any reduction of friction took place corresponding to that obtained in the worm-gear test previously carried out by the Lubricant and Lubrication Inquiry Committee. It was found that a 17 per cent reduction in the coefficient of friction was obtained by the addition of as little as 1 per cent of organic acid to the Bayonne oil, and that increasing the amount up to 5 per cent did not effect any further improvement."

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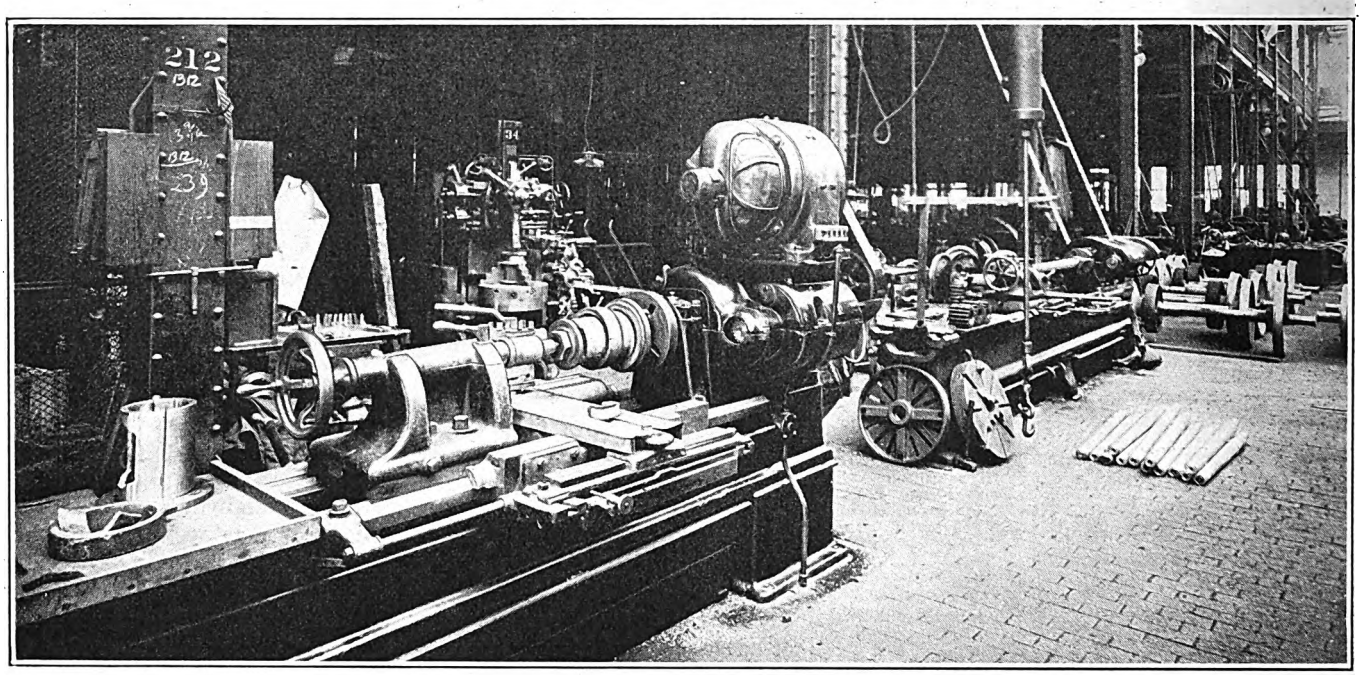
How Modern Machine Tools Cut Costs

Multiple-Cut, Low-Swing Lathes Reduce Time for Machining Axles to One-Quarter of that Required with Older Type Machines—Finishing Axle Surfaces by Grinding Reduces Time by 25 per Cent—New Type Boring Mill Turns Out Twice as Many Wheels per Day as the Average in Most Shops



Three Tools Used in Machining Bearings and Axles in Vincennes Shops of Chicago Surface Lines

IN A special search for new and particularly effective methods of applying modern machine tools to the maintenance work in electric railway shops, the editors of the JOURNAL have visited some fifty properties and have found a few examples that are described here. These have been selected from the practices found in the fifty shops because they showed a real effort to apply modern machine tools and methods to electric railway work. Some of the practices given show the application of new machine tools, while others describe new uses of old machine tools.

The use of modern machine tools has a direct bearing on the cost of labor and produces a further saving by reducing the time that cars must be held in the shop for repairs. There are certain classes of maintenance work that must be handled continually, and as a result the same kind of machine work is done repeatedly. In such cases the volume of this work may be sufficient so that a modern machine tool, particularly adapted for this single class of work, will prove a paying investment and make it possible to apply manufacturing methods to maintenance work with gratifying economies and production of better work.

The real function of an electric railway shop is to get the equipment back into service after repairs in the shortest space of time and with the lowest possible cost. The variety of work handled is necessarily very great, and it is not always practical to have the best machine with which to do each class of work. In talking with various shop foremen and master mechanics, however, the editors have been impressed with the fact that they are quite awake to the losses their companies are suffering because of the continued use of old machine tools, when new tools with far greater production capacity are available. The cost of new tools is quite an item, however, and many managements have not been willing to put any additional investment into the shop. Now, with widely improving financial conditions among the railways, more interest in shop economies through purchase of new machines is beginning to be evidenced.

By considering the various kinds and quantities of work done in maintaining electric equipment, such as the turning of wheels, machining of axles, finishing of bearings and building up and remachining of motor shell fits, one finds jobs that are done repeatedly, and in considerable quantities, by all railway shops. On the larger electric railway systems the quantity of each of these various classes of work is sufficient to keep certain machine tools in continuous operation on one class of work. These shops can therefore afford to have a machine particularly adapted for the individual work to be performed.

How Multiple Cutting Lathes Reduce Cost of Axle Machining

The amount of axle work done by various roads is considerable. In shops of the larger systems several lathes are kept busy continuously turning axles, and in most of the smaller shops this machine work constitutes a considerable proportion of the lathe work. Most railways purchase their axles from rough stock and finish them to the required dimensions. In addition, of course, there is considerable machine work required in refin-

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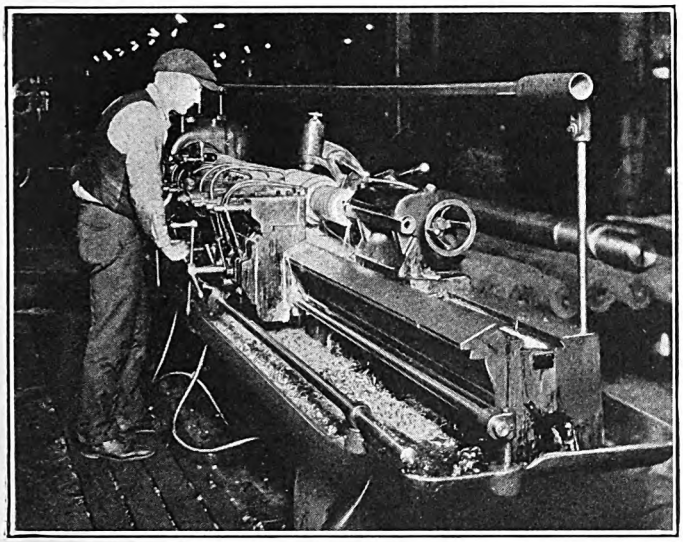
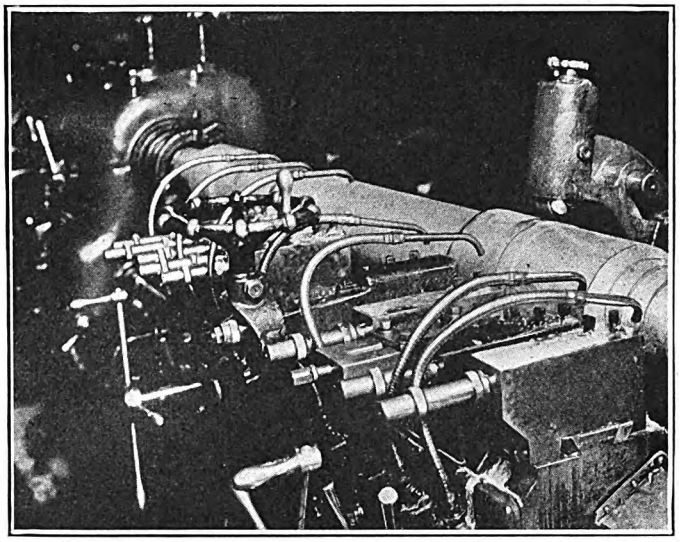


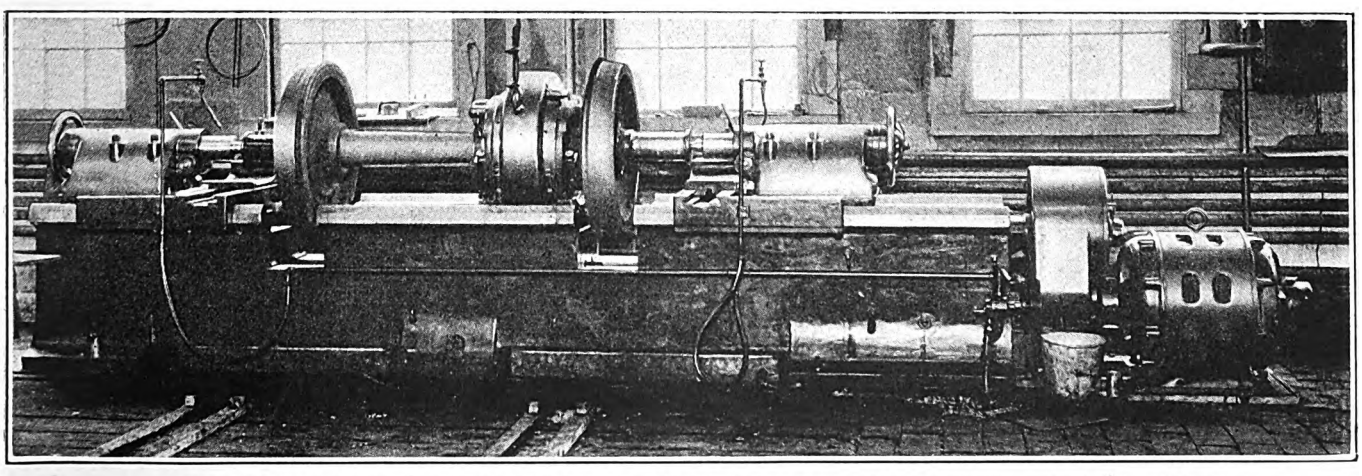


Machining a Large Subway Axle in a Lathe with Two Carriages and Six Tool Posts at One of the Shops of the Brooklyn-Manhattan Transit Corporation. The Illustration at the Right Shows Arrangement of Tools so that Six Surfaces on the Axle Are Finished at the Same Time

ishing worn axles. Axles for electric railway service have several shoulders and machined fits of various diameters, the finished part usually consisting of two journal fits, two machined surfaces for dust collars, two wheel fits, one gear fit and two axle bearing fits. In addition it is frequently necessary to rough turn the center part of the axle. There are thus nine finished fits of varying diameters and lengths. Where the amount of axle work is great enough a particular machine can be set aside for doing this. A lathe with 8-in. swing is sufficient since the finished diameters of axles are rarely more than 7 in.

The Brooklyn-Manhattan Transit Corporation, which maintains nearly 6,000 elevated, subway and surface cars in Brooklyn, New York, has recently purchased two Lo-Swing lathes from the Fitchburg Machine Works to be used exclusively for axle work. These lathes have an 8-in. swing and 108-in. length of bed. They are provided with two carriages with three tool posts on each, so that six tools can be used for cutting on the same piece at the same time. As a result of the use of this rapid production lathe, the time necessary to finish axles has been reduced to one-fourth of what it was originally, where ordinary low-swing engine lathes were used. An accompanying illustration shows one of these lathes in operation while turning a large subway car axle. The various finished fits for this type of axle are journals 5 x 9 in., dust guard surfaces $6\frac{1}{8}$ in. x 2 in., wheel fits $7\frac{7}{16}$ in. x $6\frac{1}{2}$ in., gear seats $7\frac{1}{2}$ in. x $6\frac{1}{8}$ in. and axle bearings $6\frac{1}{2}$ in. x $12\frac{3}{4}$ in. The total length of the axle is 7 ft. 1 in. The illustrations show this machine in operation just as the rough cuts at one end of the axle are being finished.

With the improved lathe equipment this size axle is now being turned for file finish and rolling of bearing fits in an average of two and one-half hours. With the lathes previously used the machining of this size axle required three hours for rough finishing and an additional nine hours for finishing cuts. In addition to provision for multiple-tools cutting simultaneously this type of lathe has a geared headstock, providing for six spindle speeds, and a geared feed with nine changes. The geared headstock is of rugged design, so as to withstand the severe strain imposed upon it when several tools are taking heavy cuts simultaneously. The clutch for starting and stopping the machine is on the driving pulley shaft and is operated by the shifter rod placed above the table. In order to give a rigid support to the tool holders, these are clamped directly to the carriage casting itself, which in turn bears directly on the bed of the lathe. This eliminates numerous intervening parts in the supports for the cutting tools



Lathe with Two Carriages and Machined Gaps in the Bed, Turning Journals of Axles with Wheels Mounted

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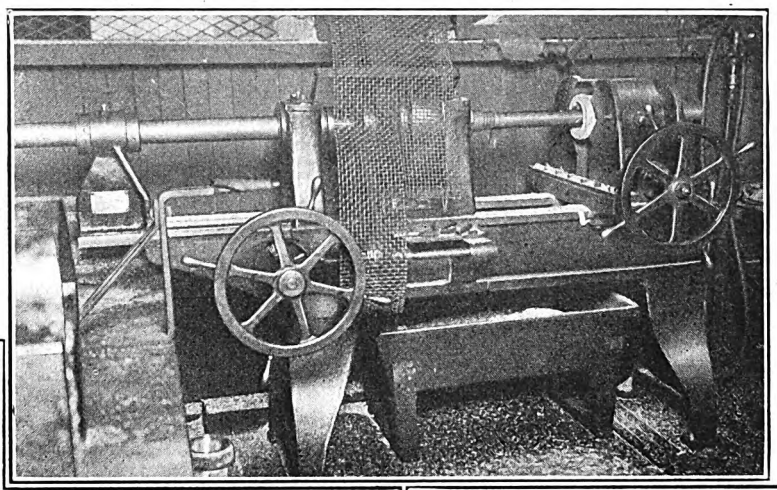
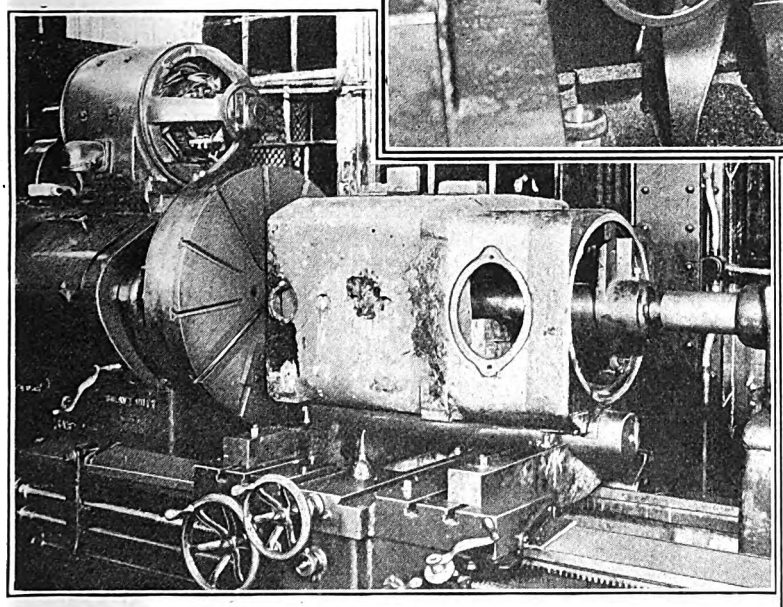
and avoids possibilities for vibration. The cutting tools do not extend across the bed of the lathe. This permits the carriage to be run past the tailstock, or back rest, without moving the tools from their positions. A geared pump is built into the head of the lathe for providing a continuous flow of cutting compound.

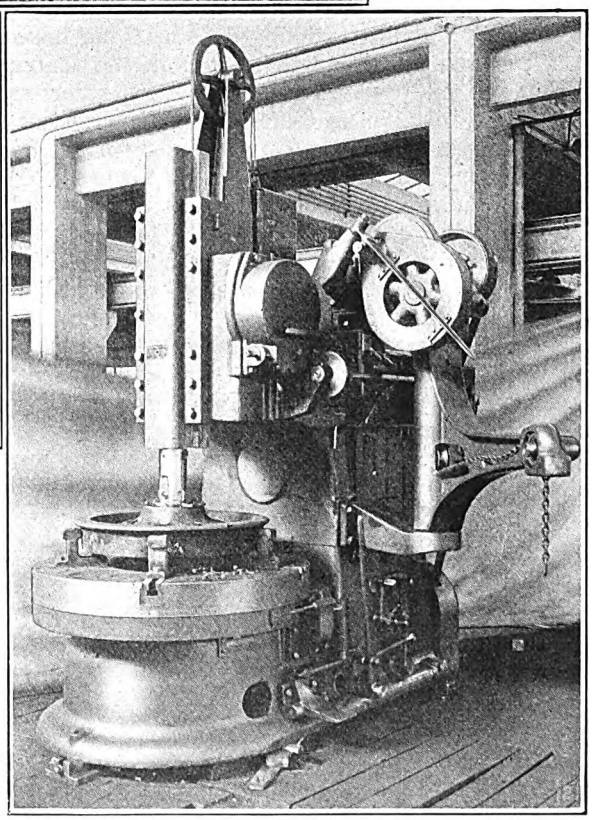
A modern multiple-cut, low-swing lathe is also used in the West Shops of the Chicago Surface Lines for machining armature shafts. This machine takes six simultaneous cuts on different sized shoulders and compared with the single tool method commonly used has almost three times the output.

After the machine work on axles is done in a lathe it is the usual practice in electric railway shops to file finish, burnish with rollers or to grind the finished surfaces of the various fits. An accurate smooth surface is most essential for this work, since if the bearing surfaces are rough the linings of bearings are ground out quickly and additional maintenance repairs to the bearings are soon needed. Various methods for file finishing and burnishing with rollers have been described frequently in the columns of this paper. Surface grinding for finishing the bearing faces is coming into more extensive use. An accompanying illustration shows an armature shaft being finished by grinding in the shop of the Chicago Surface Lines. The grinding machine used in this case saves 25 per cent of the time that was taken previously when axles were finished in a lathe. It is also claimed that there is greater accuracy of dimensions and smoothness of finish so that longer life of bearings results. Where wheels or gears are to be pressed on axles the grinding finish produces more uniform pressure for pressing on and a better fit on the shaft, as irregularities are eliminated. In the Chicago shop the entire shaft is finished on a grinder.

A few roads which have used the grinding methods called particular attention to the necessity of removing all emery from the surface, since if emery particles are left on the bearing faces there is a tendency for this to grind out the bearings themselves and so reduce their life. As the pressure employed, however, is not great, there is very little danger of the particles of emery becoming imbedded in the surface of the axle. The maintenance of journals requires returning bearing fits due to their becoming scored, cut or excessively worn, and unless the wheels are worn out so that their removal and replacement is necessary, it is often more convenient and economical to turn the journals with the wheels mounted on the axle. This method greatly increases the production as compared to that obtained when the wheels are pressed off the axle, the journals re-turned in an axle lathe, and the wheels again pressed on. There is also the difficulty and loss of time in this latter method of having to match the wheels and axles; also, when once the original tight fit between the wheels and axles is destroyed, a lower







Three Rapid Production Machine Tools that Obtain Marked Economies

Top—Universal jaw-type chuck used on machines for boring bearings in the Eastern Division shops of the Brooklyn-Manhattan Transit Corporation.

Left—Machining the armature housing fit in a motor shell in the Chicago Rapid Transit Company's shops.

Right—Car wheel borer with capacity of from ten to fifteen wheels per hour.

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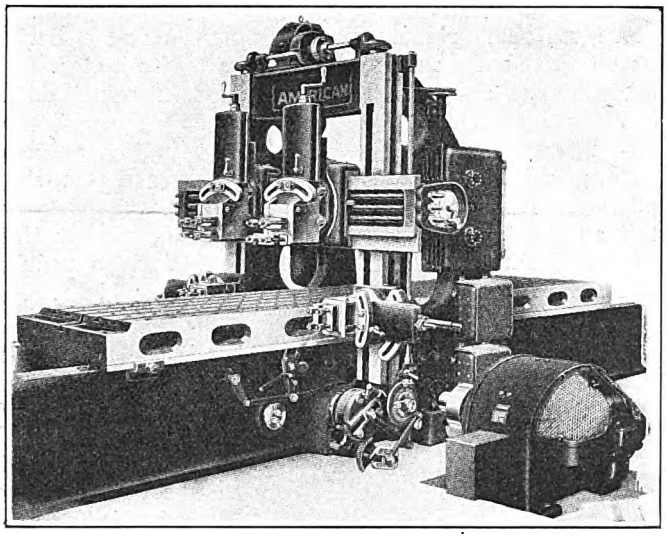


Multiple Tool Planer Suitable for Electric Railway Machine Shop Operation

pressure will force the wheels in position with newly machined axles and wheels, and the fit will be looser.

For this class of work several railways are considering the use of a combination journal truing and axle lathe, as manufactured by the Consolidated Machine Tool Corporation, Rochester, N. Y., and shown in an accompanying illustration. This machine has a headstock of the opening type located in the center of the lathe and the bed has machined gaps for swinging wheels up to 45 in. in diameter. When used as a journal truing machine the two carriages turn the journals at the same time with the wheels mounted. Finished filler blocks are furnished which, when inserted in the machined gap, give the carriage full travel between the driving head and the end of the machine, so that regular axle turning can be taken care of economically.

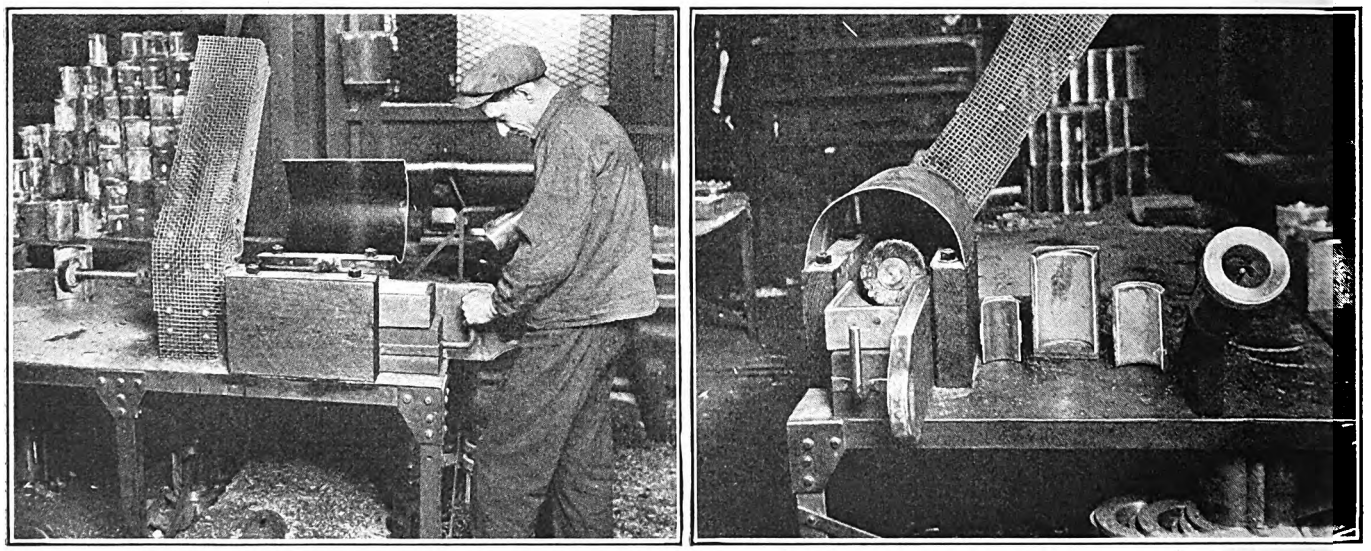
These lathes have a 27-in. swing over the bed, so that they will accommodate an axle with the gear mounted. In work which requires the re-truing of journals some users of this type of lathe are obtaining an average production of two sets of axles per hour; i.e., re-truing four journals. This, of course, exceeds the production that can be obtained where it is necessary to press wheels off and on again in order to turn the journals.

In the survey of machine tool equipment which has been made a considerable number of double-spindle lathes were found in use in electric railway shops. These double-purpose machines provide swings of either 24 in. or 48 in. in most cases. It is possible by using the high spindle to turn journal bearings in this type of lathe with the wheels and gears mounted. Some of the smaller railways which do not possess a wheel-turning lathe are using the two-spindle type for turning their wheels. While using the high spindle, but one wheel can be turned at a time and the cutting speed is quite slow, so that the average production is usually not more than two pairs of wheels per day. The changing from one spindle to the other takes considerable time, too, and entails a considerable amount of labor, so that most foremen do not favor the use of a double-purpose lathe where it is possible to purchase two single-purpose tools.

Improvements in Wheel Lathes and Boring Mills

The machine tool equipment required for wheel work was quite thoroughly treated in a series of articles on "Wheel, Gear and Axle Practice" which was published in the issues of this paper for Aug. 18, Oct. 27 and Nov. 17, 1923. Properties having steel wheels require an efficient wheel-turning lathe. The size of this is determined, of course, primarily by the size of the wheels which it is necessary to turn; probably either the 36-in. or the 42-in. size are in most general use. Several improvements have been made recently in wheel-turning lathes, particularly in regard to the shifting arrangement to save time in getting the wheels into position and also in the lathe equipment to permit taking heavier cuts with more rapid feed than with the old machines. These improvements of course speed up production and are of particular advantage.

A wheel press is necessary in almost every shop, and where steel wheels are used most properties favor a size of at least 400 tons capacity. At present a majority of the railways are using smaller presses, particularly the 300-ton size. But many have found difficulty in starting wheels when pressing off, and also in pressing off gears. Thus, with the smaller sizes of presses it is necessary to heat the wheels in order to start them, while with the 400-ton size a large number of these will start without the necessity of heating.



Left—Removing Excess Babbitt from Bearings with Circular Wire Brushes. Right—End View of Machine Shows the Brush and the Wedge Inserted to Remove Babbitt from Edge of Bearing

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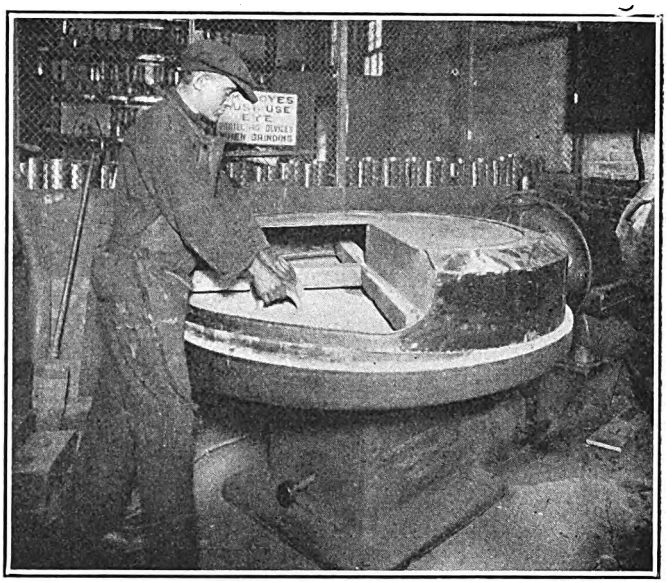
This of course saves considerable time and reduces the cost of the work considerably.

A boring mill is another piece of equipment which is necessary for wheel and gear work. The 36-in. or 42-in. sizes are most commonly used by electric railways. Modern boring mills have several new features that have been introduced within the past two or three years. One type just being introduced by the Consolidated Machine Tool Corporation of Rochester, N. Y., has an automatic chuck and independent power-driven rapid traverse to both the boring and facing spindles. This reduces the amount of labor and time required. The automatic chuck is controlled by a reversing friction clutch, so that it is unnecessary to stop or reverse the motor when closing or opening the chuck. When the driving clutch is thrown in, the table starts to rotate and the jaws move toward the center, gripping the wheel with the full driving force of the motor, and the heavier the cut the tighter the jaws will grip. When the bore is finished the table is stopped by means of a band brake operated by a foot pedal and the clutch is then thrown to the reverse direction, causing the jaws to open. This band brake also serves for stopping the table and allowing the operator to caliper the bore of the wheel, without loosening the grip of the jaws.

Six feeds are provided, which are obtained through selective, sliding gears. These may be changed while the machine is running. When the roughing cutter has passed through the wheel the operator can throw the proper speed lever so as to throw in the finishing speed without stopping the lathe. Two-in-one boring tools can be used with advantage. This machine is also made with a horizontal tool head for facing off the hubs of wheels, where this is required. Users of this machine are boring from ten to fifteen wheels an hour, which is extremely rapid production and twice the average obtained by most electric railway shops.

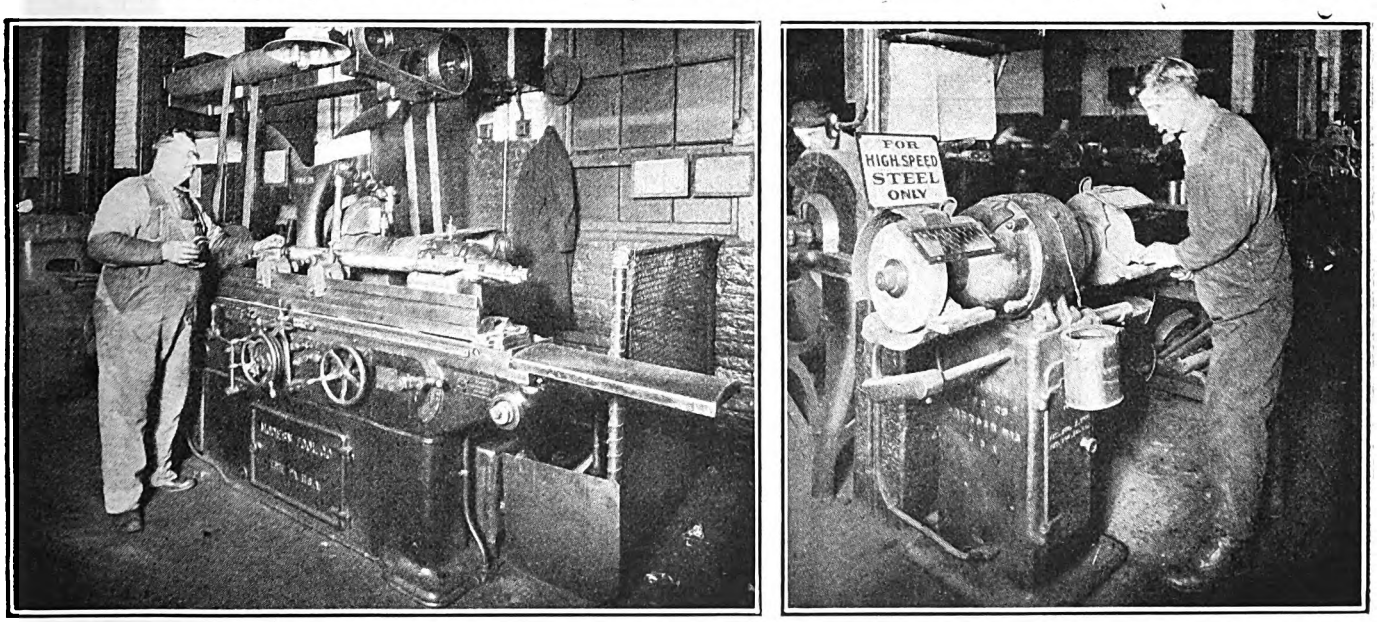
Another machine tool used to advantage in wheel and axle work is an axle straightener. Many railways are using some of their ordinary lathes with a special rigging for straightening axles, but in general much time is lost through the use of such devices, and the work is not done as satisfactorily nor efficiently as having a proper machine adapted to axle straightening.



Finishing Axle Bearing Shells by Use of a Surface Grinder Multiplies Production by Four

Axles are straightened on a small wheel press in the shops of the Cleveland Railways. A fixture for holding the axle between centers is mounted on rollers so it can be moved transversely across the bed of the wheel press. The base of the fixture is a 12-in. I-beam. Upon this are mounted head and tail stocks, each equipped with a center. The head stock contains a hand wheel which drives a dog through a train of gears. This is used to revolve the axle and determine the position of the bend. Attachments to the head and tail stocks of the wheel press apply the pressure to the axle at the proper points for straightening. The advantage of this application lies in the large amount of power available from the 200-ton press.

The use of keys in connection with wheel and gear work is decreasing, but many railways have shops provided with key seaters. Where the work requires such a machine it should be arranged to cut key ways up to 1 in. in size, and preferably should be a single-purpose machine. On roads with few cars it is pos-



Left—Armature Shafts Are Finished in a Grinding Machine with a Saving of 25 per Cent in Time and (Right) Emery Wheels Are Set Aside for Tool Grinding in the Shops of the Chicago Surface Lines

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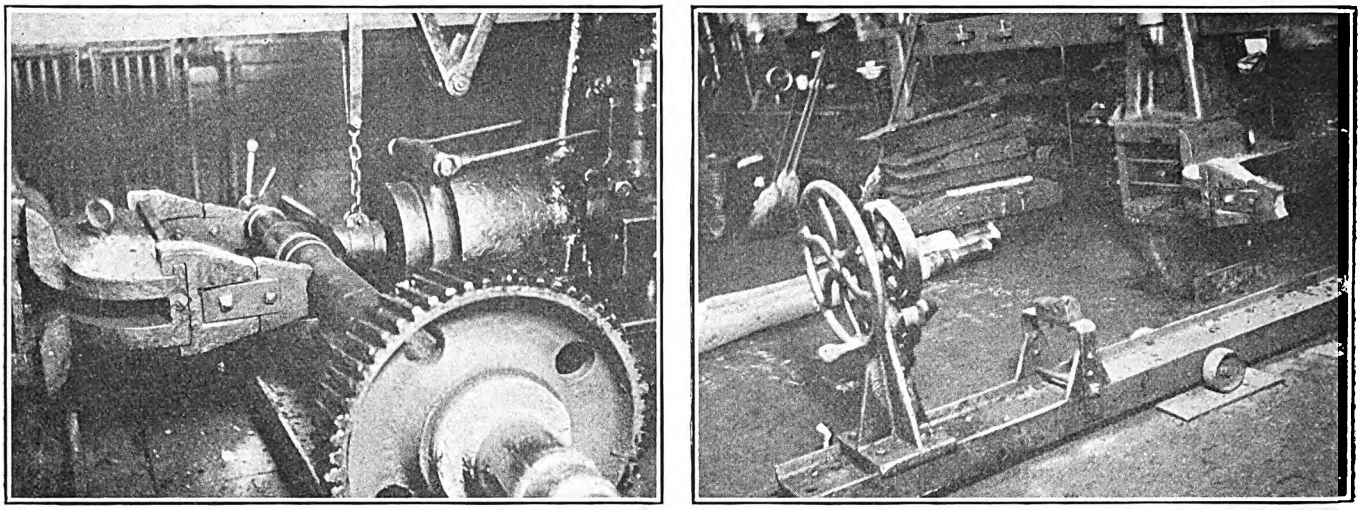


Left—Straightening an Axle on a 200-Ton Wheel Press at Harvard Shops, Cleveland. Right—The Fixture Used for Holding the Axle Between Centers While Being Straightened

sible to use a slotter for this class of work, and as a slotter is a very handy tool to have in any machine shop the average size road will find such a tool preferable to a key seater, particularly where the amount of work is limited.

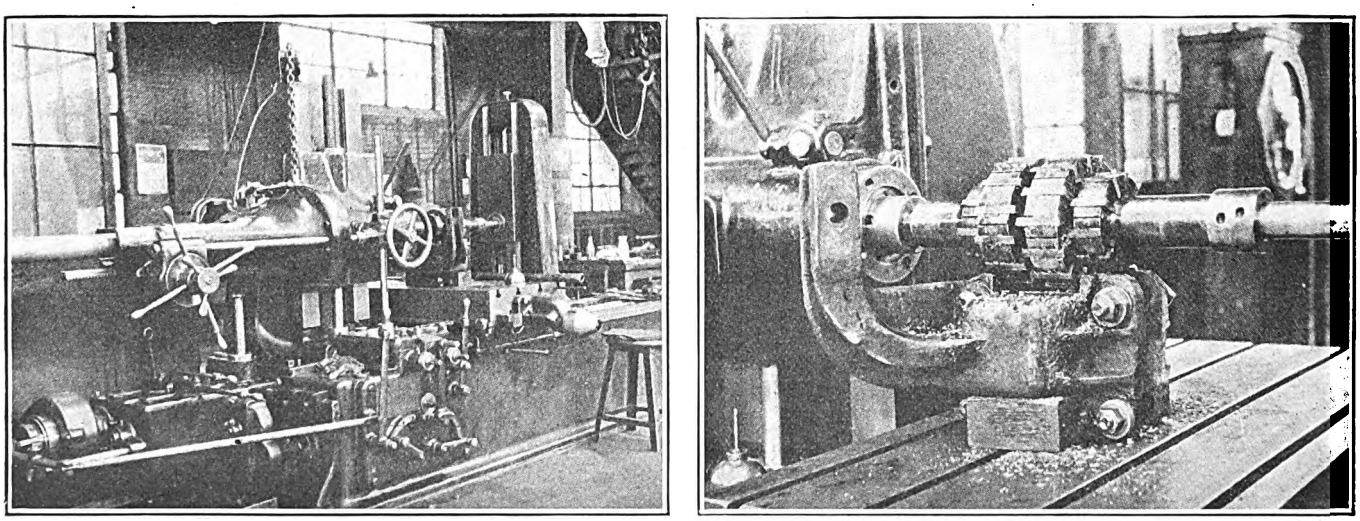
On the Pittsburgh Railways all key ways in armature shafts are cut with square bottom ends by means of a vertical head attachment to a universal milling machine. The machine used is a Milwaukee miller No. 1½, and when not in use for key ways is kept busy on other milling operations.

Efficient Methods of Machining Bearings

The machining of bearings is another important part of the work done by electric railway mchine shops. Some of the larger properties purchase the rough castings for bearings and machine the outside as well as the inside bearing surfaces. The majority of electric railways, however, buy their bearing shells machined on the outside and bore these out to fit the particular shaft to which they are to be applied. Bearings also constitute an item requiring a large amount of maintenance repairs. Probably the majority of bearings in use by electric railways are of a babbitted type, with either an iron or bronze shell. Solid bronze bearings are coming into more general use, particularly for armature and axle bearings. Bearing wear takes place not only on the inside bearing surface but also on the outside part that fits into the motor housing, and also on the end flanges. So while new bearings may require boring only, it is evident that the maintenance of bearings requires finishing of other parts as well.

The time consumed in machining a bearing is comparatively small, and it thus becomes of increasing importance to provide equipment so that the bearings can be chucked quickly and accurately. Otherwise, the time consumed in getting the bearing ready for the machining operation may take fully as long as the machining itself. This has resulted in a large number of special designs of bearing chucks being used; in fact, as one visits the various railway properties nearly every shop has its own particular design of bearing chucks, which some one has devised for facilitating this work. A large number of the various designs used have been described in the columns of this paper from time to time. Where various sizes and types of bearings are used the chucks usually consist of one master chuck and subordinate bushings to fit the various bearings.

The Pittsburgh Railways uses special centers for holding armature bearing shells while turning in a lathe. The shell is swung between two tapered centers. The live center is three-cornered and has a 60-deg. taper,



Left—Milling-Boring Machine in Harvard Shops, Cleveland. Right—Set-Up for Milling an Axle Bearing Cap on the Milling-Boring Machine

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the three corners engaging grooves in the end of the shell. This serves as the drive. The dead center also has a 60-deg. taper and revolves. Mounted in this manner, it is possible to finish the entire outside length of the bearing shell, because there is no driving dog to interfere with the travel of the cutting tool. This method has reduced the time previously consumed for this operation by 25 per cent.

The Pittsburgh Railways also uses a special mandrel and clamp for turning split axle bearings on the outside. This holds the halves together and makes it possible to turn the halves as a unit on centers in the lathe. This job is completed in two-thirds of one man-hour. The former method of chucking the bearings in a four-jawed chuck and turning required one man-hour per set of two halves.

Axle bearing collars are bored on a drill press. This is accomplished by mounting the collar on a simple fixture or chucking device. The boring bar with the cutting bit is fed through the shells by the hand feed on the drill press. The time required for this operation, including the "set-up," is one-half man-hour per bearing collar. The former method of boring on an engine lathe required one and one-half man-hours.

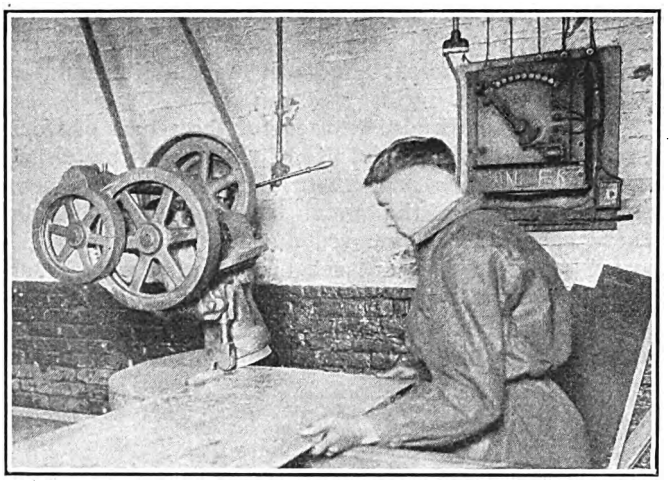
In Chicago a surface grinder is used for finishing the faces of axle bearing shells previous to sweating them together for turning. This method gives approximately four times the output per day which was formerly obtained by doing this job on a planer or shaper.

Some Special Machines Used in Bearing Work

Some electric railway shops have special bearing lathes and horizontal boring machines which have been purchased from machine tool manufacturers. An accompanying illustration shows a special boring machine used in several of the shops of the Brooklyn-Manhattan Transit Corporation for rough-boring bearings. These machines, of which the company has eight, were purchased from H. B. Underwood & Company and have tapered chucks for holding and centering the bearing and use a boring bar. This type of machine is very efficient, the chuck being arranged in two parts so that the jaws are separated or forced together by means of a screw with a hand wheel. The placing of a bearing in position for boring and its removal thus takes but a moment. The boring bar is provided with supports at either end, and the drive is through a pulley with bearings at the center of the lathe. The practice of the Brooklyn-Manhattan Transit Corporation is to rough-bore all bearings at one shop, but they are finish-bored at the maintenance shop, so as to fit the particular shaft to which they are to be applied. This company now purchases its bearings finished on the outside, so that the only machining operation is that of boring.

Railways which do the entire machine work on their bearings have frequent use for a turret lathe. Since the flanged portions of armature and axle bearings, as well as the outside and inside surfaces, require machining, several different tools are necessary. With the turret head, of course, the different tools can be placed in position and the various machining operations carried out without the necessity for rechucking the bearings. This saves time and labor and reduces the cost of the machine work.

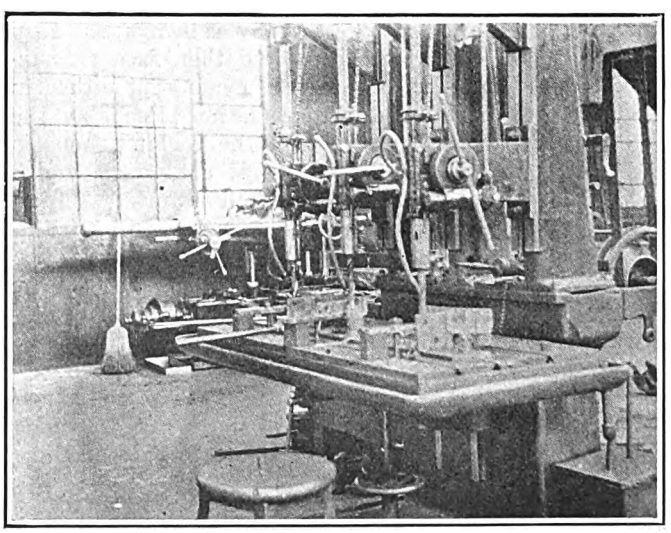
A discussion of the various special tools and methods used in connection with babbitting and finishing babbitted bearings would take more space than is available in this article, but a special use of a standard buffing machine for removing excess babbitt shows a new use of an old-type machine which introduces a good economy.



Serpentine Shear Handles Variety of Sheet Metals in C. S. L. Shop

An accompanying illustration shows a single-spindle machine, such as would be used for ordinary buffing work, belt-driven from the center and fitted with wire brushes instead of buffing wheels. This machine is used in the East New York repair shops of the Brooklyn-Manhattan Transit Corporation for removing the hard coating of babbitt, scale, dirt and oxide from axle and journal bearings immediately after the babbitting has been completed. By using wire brushes of the proper diameter all excess metal can be removed very rapidly. The boring operation, which is carried on afterward, is thus facilitated.

The operation of brushing out this material is performed by placing the bearings on a wooden block, which serves as a carriage. This wooden block has a handle at the end, so that the operator can force the bearings underneath the rotating wire brush to remove the babbitt. This method is also used for opening up the side clearance to provide space for the lubricating oil to enter when the bearing is in service. In this latter case, instead of the bearing being moved in central with the rotating brush, it is forced to one side by the use of a spacing board. The babbitt is thus removed from



Drilling Brake Shoe Heads on a Three-Spindle Drill Press in Harvard Shops, Cleveland

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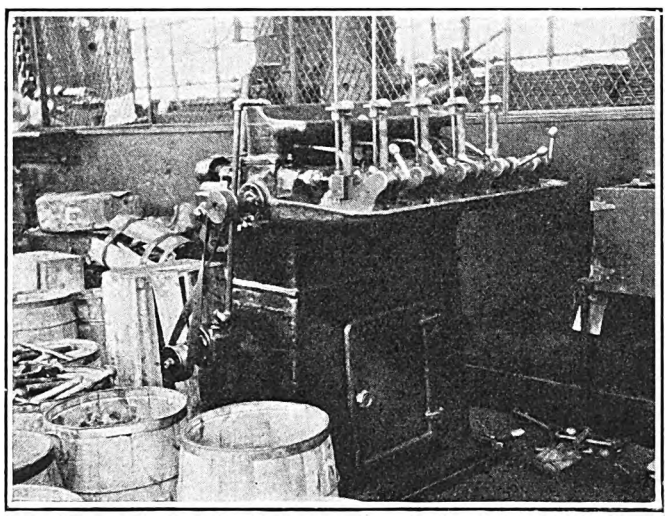
the side of the bearings, as would ordinarily be done by scraping, and the time necessary for finishing the bearing is cut to about one-tenth of what it would be by the old process.

This machine can also be used for the repair of worn bearings, where the useful life of the babbitt metal has not been entirely reached. In service, bearings wear on the crown and the metal is pushed to the side. Where bearings are removed and are again to be returned to service without rebabbitting the wire brush method is of particular advantage in opening up clearance at the side, instead of by scraping. The wire brushes also have an advantage in the quality of the



Drilling Holes in Brake Pins with Multiple-Spindle Horizontal Drill

finished surface, as it is much finer and without ridges, which sometimes occur when a bearing is scraped.

This machine constitutes a part of the equipment of the babbitt room and has a sheet iron hinged guard, which is closed down while the machine is being used so as to prevent any danger of flying particles injuring workmen.

SPECIAL TOOLS AND JIGS FACILITATE REBORING OF MOTOR SHELLS

One of the most important tasks of the electric railway machine shop is the machining operation necessary to take up the wear in the axle and armature bearing housings of railway motors. Many railways build up housing fits by electric welding and then face off surfaces on a planer and rebore the housing fit either in a boring mill, a radial drill or a lathe. Probably the great variety of methods used in the various shops is due to the railways trying to adapt equipment which they already have to the needs of this work. A high standard of machine work is necessary for this maintenance, as many of the motor and bearing failures can be traced directly to poor standards of work or to poor fitting of the frame parts. A loose housing permits vibration of the armature, which in turn causes sparking at the commutator, loosening of the brushholders, insulation failures, burnouts, hot bearings, scored armature shafts and armature failures, the repair of which greatly exceeds the cost of doing this major machine work properly.

A very complete method of rehabilitating motors as carried out in the shops of the Kansas City Railways was described in the ELECTRIC RAILWAY JOURNAL for May 20, 1922. After building up the various worn surfaces by welding, the Kansas City practice includes the planing off of the motor frames on a planer, the boring out of the housing fits on a horizontal boring mill and the redrilling of various housing bolt holes on a radial drill. A large assortment of jigs and fixtures are necessary in order to insure accuracy of the work.

In the shops of the Chicago Rapid Transit Company motor shells are rebored in a large swing lathe by supporting the motor on a special jig laid across the lathe carriage. In one of the shops in Brooklyn an engine lathe is used for reboring motor shells by the addition of a geared shaft, so that four bearing fits are bored at one time. In another shop in Brooklyn the boring is done on a horizontal boring mill which has been changed from a one-spindle to a two-spindle unit. This also provides for the boring of the four housing fits at the same time.

In the shops of the Philadelphia Rapid Transit Company a job of reboring some G.E.-80 motor shells was done on a vertical boring machine by providing a jig which was fastened to the motor shell, so that the entire shell, together with the jig as a unit, could be handled by a crane and placed in position for the boring operation and be moved from one boring position to the next without danger of causing inaccuracy of the boring.

In the shops of the Washington Railway & Electric Company, Washington, D. C., boring of motor shells is done on a radial drill, and in the Spokane United Railway Company's shops at Spokane, Wash., a McCabe 72-in. double-spindle lathe is used.

The Pittsburgh Railways uses a double-spindle horizontal boring machine for boring the axle and armature bearing housings of motor shells. The machine bores both bearing housings at both ends of the shell at the same time. This complete operation requires approximately three man-hours on this machine, while the same job on a single-spindle engine lathe would require nine man-hours. The time saving is effected by the elimination of three additional "set-ups" necessary on the ordinary engine lathe.

This gives an idea of the variety of methods and equipment used. An accurate comparison of the efficiency of the various methods is hard to determine, since the amount of rehabilitation work varies on different properties. In the methods where jigs are fitted to the motor complete the work includes not only the boring of the bearing fits but also motor shell caps and various redrilling of bolt holes. Some railways build up by welding and bore out to the original diameter, while others rebore to an enlarged diameter. The amount of work necessary is thus seen to vary widely with the different methods employed. It appears, however, that for the reboring operation alone a horizontal boring mill is the most efficient tool to use. This should be of double-spindle construction and should have an adjustment so that the distance between the spindles can be varied to suit various types of motors. The maximum distance between the spindles will be determined, of course, by the maximum distance between the armature and axle bearings on the motors being machined.

Another job on motor shells being carried out by the Philadelphia Rapid Transit Company is the finishing of some new end castings for motors. Originally these motors were of a non-ventilated type. The company is now replacing the end casting so as to provide for

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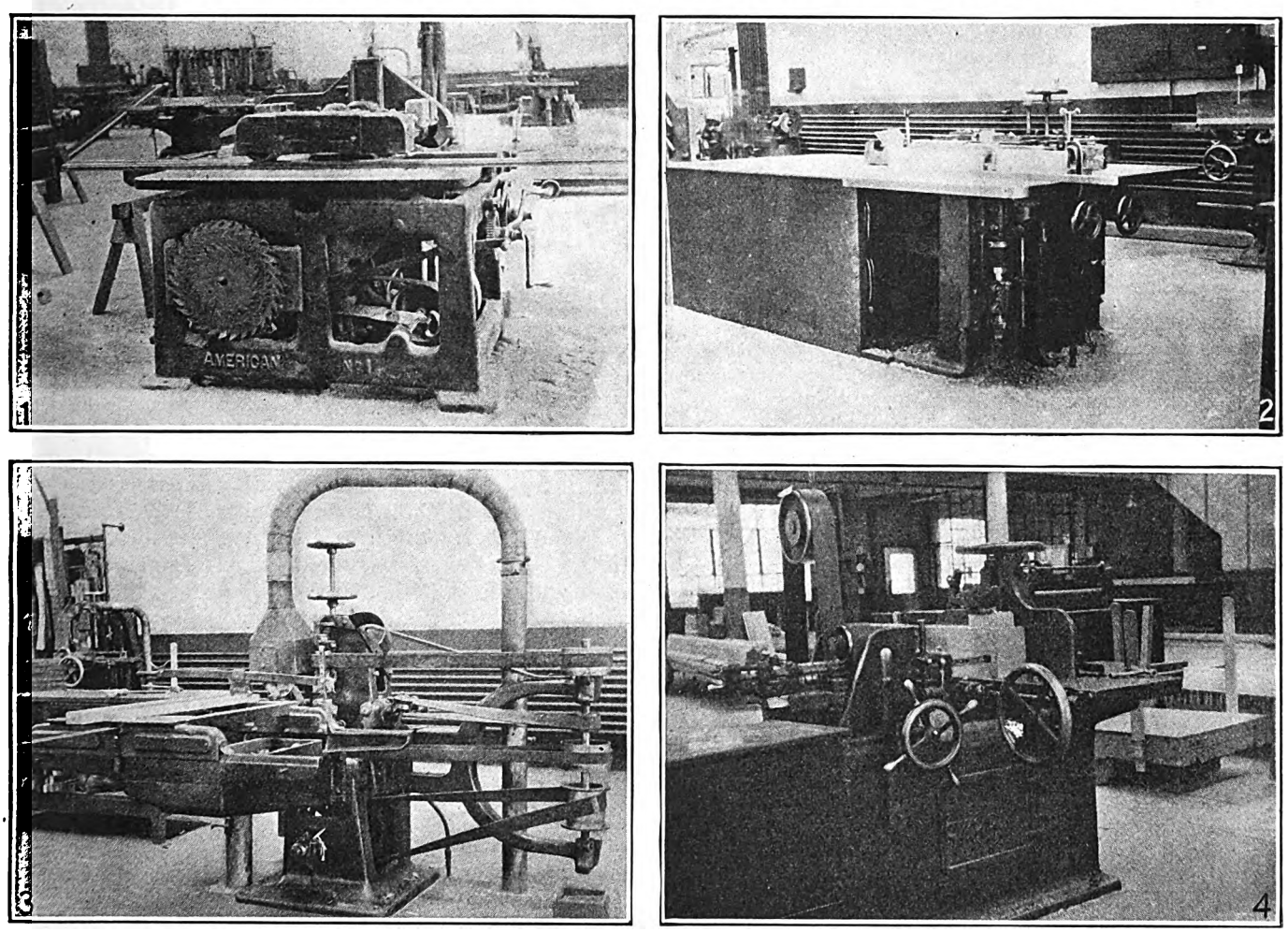
ventilation. This work is being done on a Bullard vertical turret lathe. A total of nine cutting tools are used in the machining operation and the vertical head is equipped with five tools and the side head with four tools. In addition to the machine work in the vertical turret lathe, a considerable amount of drilling and spot facing is necessary. This work is done on a radial drill. The economies resulting from the use of these modern tools in connection with this work are considerable, and after this particular machining job is finished the tools will be available for other work which can be done much more economically on this class of equipment than on other older machine tools.



Four of the Modern Woodworking Machines that Helped Eliminate 90 per Cent of the Hand Work in the Cleveland Railway Carpenter Shop

1. Self-feeding rip saw. 2. Double-spindle shaper. 3. Tenoning machine. 4. Hollow chisel mortiser

OTHER TOOLS THAT SHOW ECONOMY

Bolt-threading machines are tools that produce marked economies in connection with the maintenance of motor shells, as motor shell bolts become broken and the threads are burred so that it is necessary to rethread them or provide new threads in the various nuts used. Bolt-threading machines in railway shops are kept very busy on other maintenance repair work in addition to that required for motors. A large number of bolts are used on electric railway equipment, and in addition there are many threaded rods, such as brake levers, truck rods and coupler parts. Turnbuckles are used for adjustment in the brake rigging and these require tapping. As these have both a right and a left hand inside thread, reverse motion of the bolt-threading machine is required. As the air brake equipment on cars requires considerable pipe, a combined bolt and pipe threading machine is of advantage, particularly on the smaller properties, which would not have sufficient work to keep a single-purpose machine of each type busy. A size which will take 1½-in. stock is large enough for the work on the majority of electric railways.

A special machine for a number of machine operations is the milling and boring tool, known as the Lucas "Precision" No. 32 milling machine, as used in the shops of the Cleveland Railways. On the particular operation shown in the accompanying illustration the machine is being used as a milling machine for finishing Westinghouse No. 340 axle bearing caps. Four milling cutters are mounted on the spindle of the machine. The large cutter in the center has side cutting blades, in addition to the usual surface blades. With such a combination of milling cutters, it is possible to finish the bottom, sides and shoulders of the cast iron bearing cap at one operation, following the building up of the cap by electric welding. A saving of 20 per cent in time has resulted by the use of this machine rather than a shaper for performing this particular job.

This "Precision" machine is also used for finishing truck pedestal jaws. The side member of the truck frame is placed in the machine in such a position that

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the pedestal jaws are on top. A large size milling cutter finishes both sides and the top of the jaw. In doing this particular job the "Precision" machine effects a saving of 75 per cent in the time required to do the same operation on a shaper. The "Precision" milling-boring machine may also be used for boring 34-in. steel wheels.

Another job in the shops of the Cleveland Railways consists of drilling brake shoe heads for the brake pin on a three-spindle drill press. This operation is progressive and the machine is equipped with automatic feed and cutout. The cutout feature returns the drill to starting position. For this particular job of drilling the time required per head is approximately two and one-half minutes. When this work is done on a single-spindle drill press the time required for the operation is doubled.

Another drilling job consists of using a multiple-spindle horizontal drill for drilling cotter key holes in large size rods, bolts and brake pins. The machine has automatic feed and return for the drills. The action of the five drills is progressive, and the time required for drilling a ¼-in. hole in a 1-in. pin is one and one-half minutes. On a single-spindle drill press the same operation requires six minutes.

A serpentine shear has proved an extremely useful machine tool in the shops of the Chicago Surface Lines. Its cost is comparatively low and it will handle a wide range of sizes of sheet materials. The machine illustrated will take material up to ⅜ in. thick and can be used both for straight cuts and for making irregular shapes.

THE TOOL-SHARPENING MACHINES ARE KEPT SEPARATE

Emery wheels are set aside for grinding cutting tools in the Chicago shop. This results in improved workmanship and a considerable saving in expensive high-speed tool steel. For grinding castings and other rough work coarse-grained wheels on other grinders do faster work so that keeping the tool-grinding wheels separate is of advantage.

Modern machine tools are used in the woodworking department at the Harvard shops of the Cleveland Railways to such an extent that almost every operation in woodworking is performed by machine. A 12-in. molding machine which is capable of making almost anything out of wood is used for cutting tongued and grooved flooring, making floor strips, ceiling molding, car trim and other details of car construction. A hollow chisel mortiser is used for mortising buffer timbers and sills and members of the body underframe. In door construction and repair work the tenoning machine eliminates approximately 90 per cent of the time usually consumed by hand work. The machine cuts the tenon on the end of a door member and at the same time it cuts the recesses in the shoulder for receiving the molding of the mortised piece, thus saving additional handling.

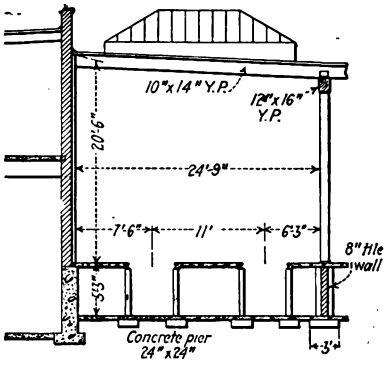
Cutting buffer timbers and sills is done on a self-feeding rip saw. It is possible with this machine to cut flooring out of large timbers.

A double-spindle shaper is used as a universal machine for cutting lighter work than the 12-in. molding machine. The double-spindle shaper, however, is capable of performing the same variety of work, being used for roughing out vestibule and car body corner posts and molding.

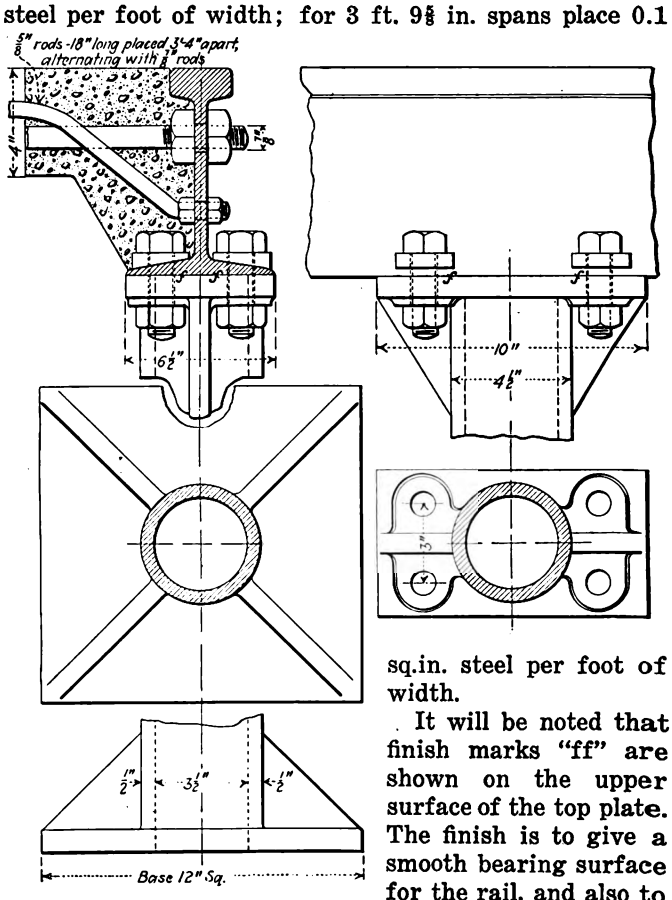
Carhouse Rails Supported on Cast-Iron Standards

IN THE United Electric Railways' new carhouse at East Providence, R. I., the rails in the pit section are supported on special cast-iron columns, of which details are shown in the accompanying illustrations. The general layout of the carhouse was covered in the issue of this paper for August 11, 1923, page 216.

A column is cast in pipe form, of 4½ in. outside diameter, with a square base and a rectangular top. The top is 10 in. long, measured along the rail, and 5½ in. wide, with four bossed holes for bolts to provide attachment to the rail, the base of which is drilled correspondingly. The columns are spaced about 10 ft. along the rail. The concrete runway which fills the space from track to track is of strongly reinforced concrete 4 in. thick. The reinforcing consists of ⅝-in. rods, 18 in. long, bent as shown, alternating with ⅞-in. tie rods for the rails spanning the complete width of the runway. The ⅝-in. rods are spaced 3 ft. 4 in. apart, alternating with the ⅞-in. rods, so that the distance between centers of adjacent rods is 20 in. The plans call for reinforcing of slab as follows: For 6 ft. 1¼ in. spans place 0.3 sq.in. steel per foot of width; for 3 ft. 9⅝ in. spans place 0.1 sq.in. steel per foot of width.



Cross-section of Part of East Providence Carhouse, Showing Rail and Walkway Construction



Details of Cast-Iron Column and Concrete Walkway Construction in East Providence

It will be noted that finish marks "ff" are shown on the upper surface of the top plate. The finish is to give a smooth bearing surface for the rail, and also to correct for inequalities in height.

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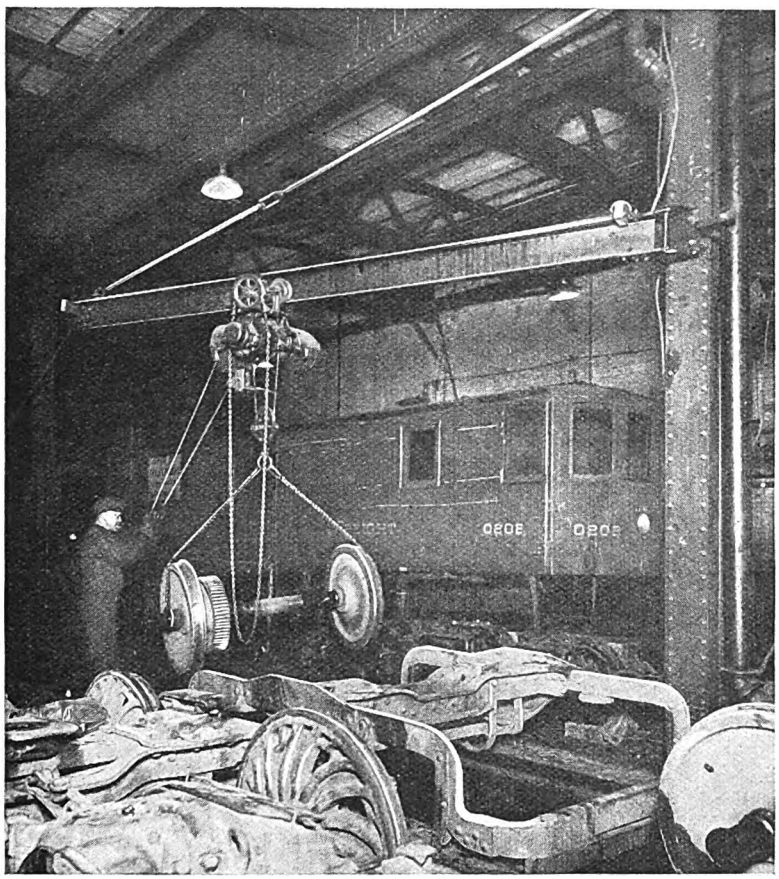
A Picture Story Showing Many Uses to Which

Special Handling Equipment

Can Be Put in Electric Railway Work



Electric Hoist on a 10-In. Swinging I-Beam, in the Shops of the Worcester Consolidated Street Railway. Motors, Wheels and Trucks Can Easily Be Moved from One Track to Another with This Apparatus

IN HANDLING MATERIAL and parts of every description, the electric railway industry has problems of peculiar difficulty compared with those of other industries. Much of the material to be handled and transported is extremely heavy. Wheels, axles, motor cases, rails, etc., are not only heavy but also unwieldy. On the other hand the electric railway has a distinct advantage in that it has electric power available to operate handling machinery, or compressors to provide an ample supply of compressed air.

Electric crane cars of various designs are used extensively. They have proved to be of great value as labor savers. For example, such a crane with a crew of one operator and two men can load or unload between 500 and 600 wooden ties per hour. Doing the same work by hand would require twelve men for some two and one-half hours. Moreover, the ties can be piled to a height of 18 ft. when the crane is used, compared with only 12 ft. when piled by hand. When handling cages of wood paving blocks a crane can dump approximately 18,000 blocks per hour. This would otherwise require twelve men for four hours.

It is the practice on some railways for the shop department to relieve the stores department of handling wheels, axles, motors and armature shafts. Special machinery is useful for transporting material from one portion of the storage yard to another, or from the storage yard to the shop. Pneumatic, electric and chain hoists are an essential part of such an arrangement. These are usually arranged to operate on an overhead monorail track of 8-in. or 10-in. I-beams. Switches and curves in the monorail system permit material to be transported quickly and easily around the shop.

Special handling machinery has been developed for various purposes. Electric shovels and caterpillar tractors are useful. Dump cars arranged to unload in the shortest possible time prevent interruptions to passenger car service. Loading machines can be used for numerous purposes.

A number of typical uses to which various electric railways are putting special handling equipment in the shops and yards, and on the street, are illustrated on the following pages.

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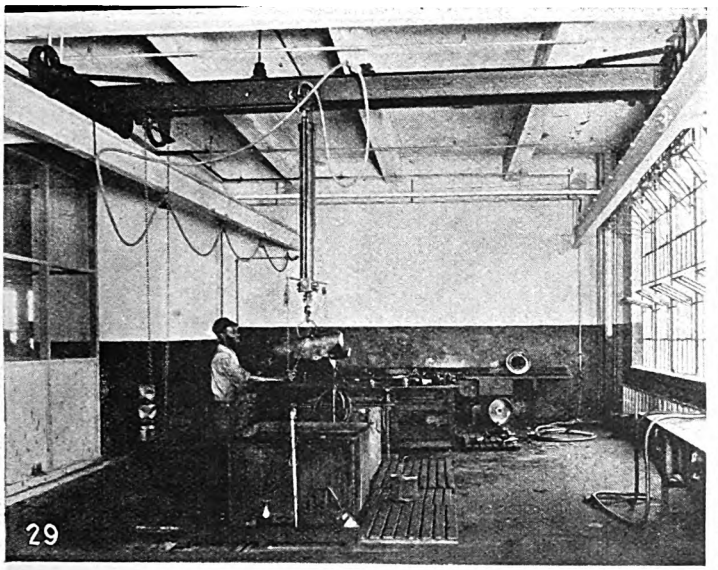
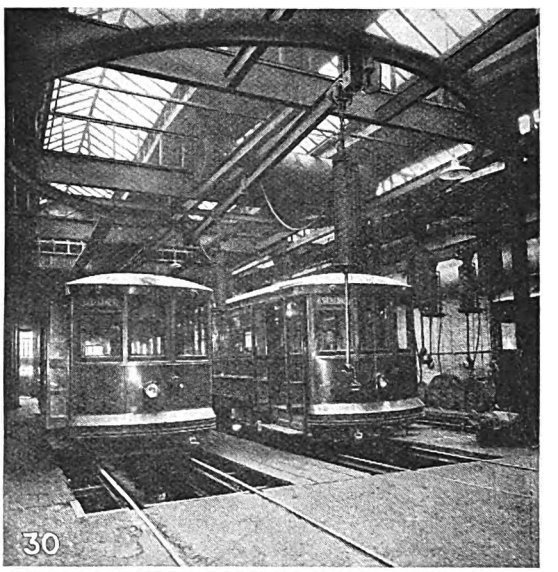
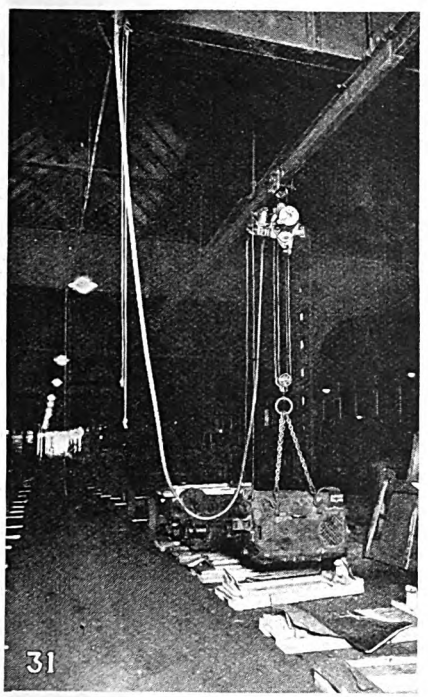






Hoists and Cranes Used in Shops

No. 29. This small capacity pneumatic hoist is convenient for handling such parts as gear cases, motor and armature bearings.

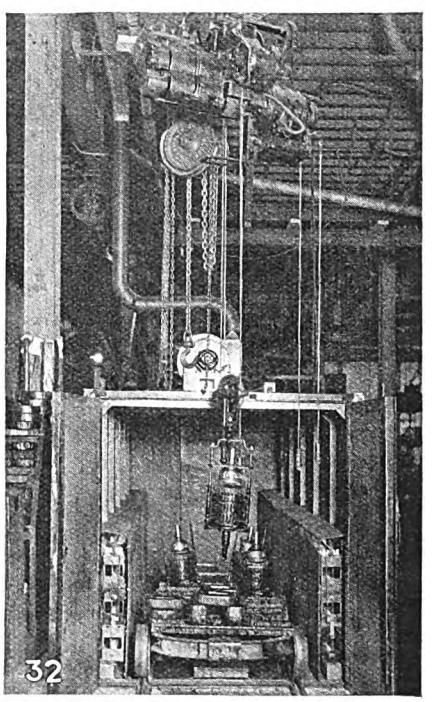
No. 30. Heavy air hoists used by the Saginaw Transit Company to raise car bodies from the trucks. These are mounted so as to hang just outside the car body and can raise a 40,000-lb. steel car.

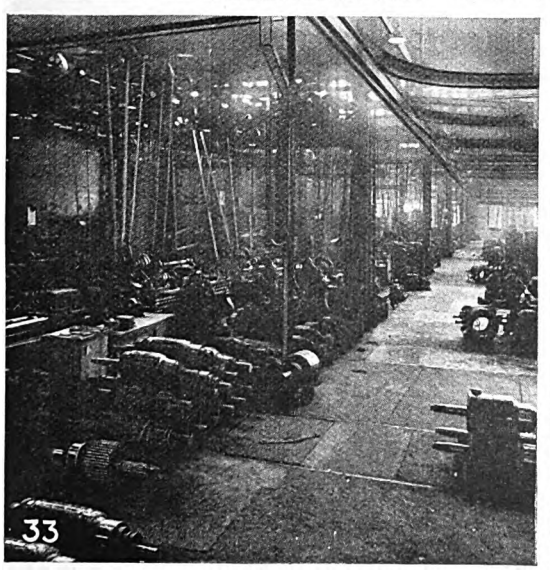
No. 31. Thor 2-ton pneumatic hoist used for handling car wheels, axles, motors and armature shafts, by the Chicago Rapid Transit Co. This hoist is one of two used on a monorail system.

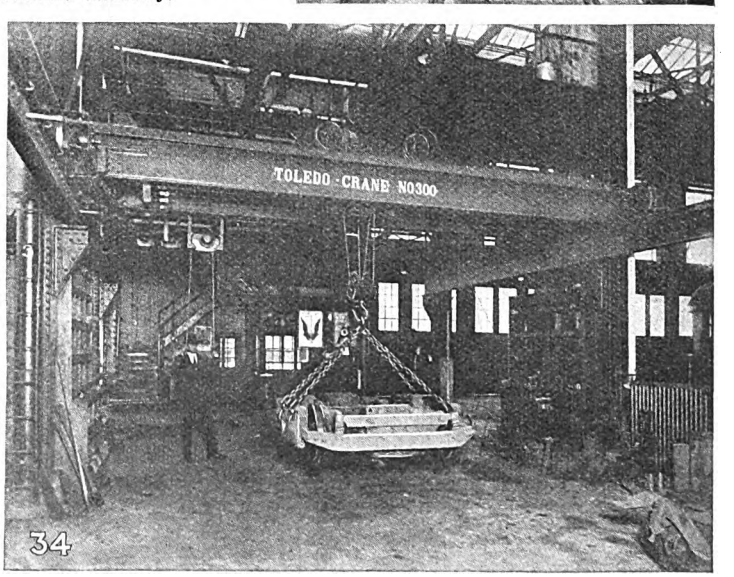
No. 32. In the shops of the Long Island Railroad the armature room is equipped with an overhead monorail system and pneumatic hoists.

No. 33. A complete monorail system has been installed in the shops of the United Railways of St. Louis. Each important machine tool handling heavy material is served by a jib crane with an air or chain hoist. Switches in the overhead rail system allow materials to be transported anywhere in the shop.

No. 34. Overhead Toledo crane used for handling motors, trucks, and other heavy parts in the shops of the Cleveland Railway.







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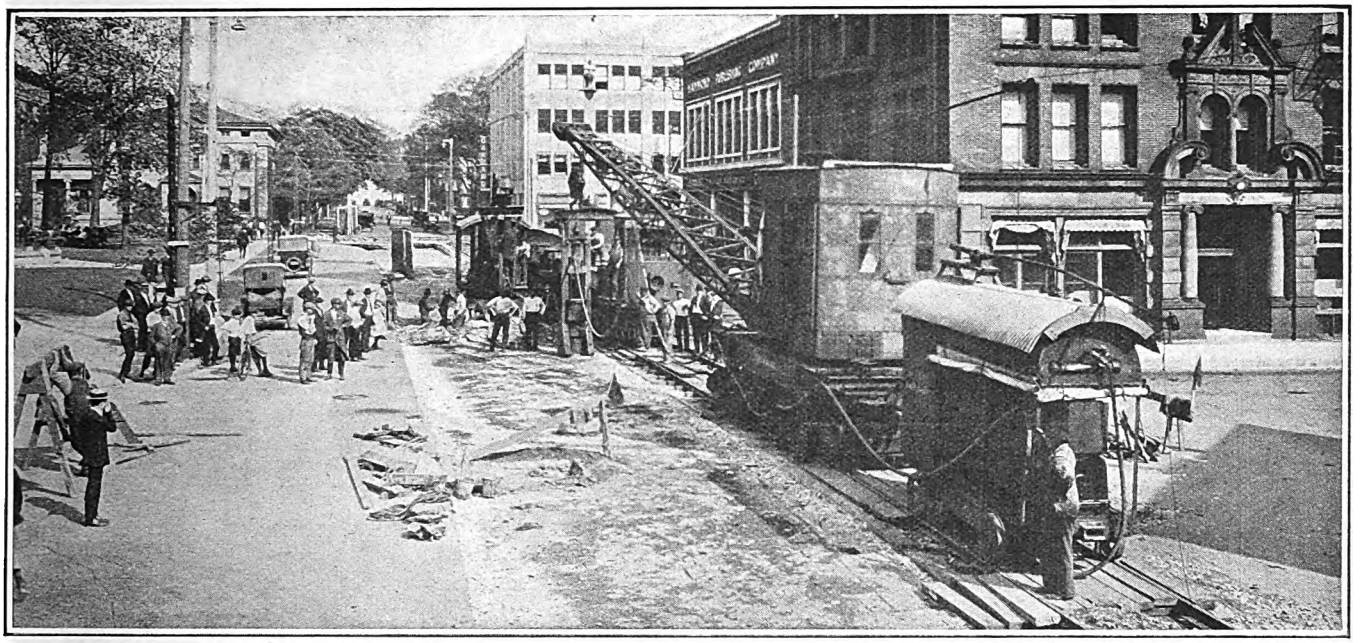


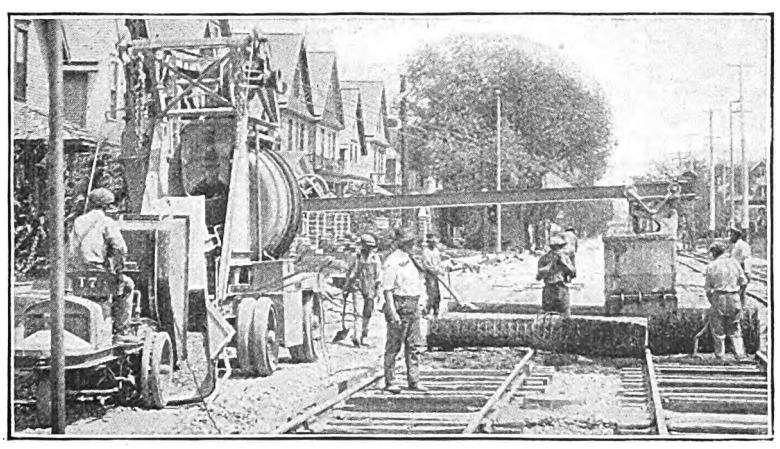
Large Air Compressor, Locomotive Crane, Air-Operated Pile Driver for Breaking Pavement, Work Car and Electric Shovel in Use in Reconstruction of Track on Oneida Street in the Center of Milwaukee

Keeping Track Machinery "on the Job"

Track Maintenance and Reconstruction in Milwaukee Expedited by the Use of a Large Variety of Machine Equipment in Charge of a Special Division—Each Job Is Charged at Predetermined Rental Rates to Cover Equipment Costs

SUBSTITUTION of machines for hand labor has been a consistent policy of the way and structures department of the Milwaukee Electric Railway & Light Company. A large variety of machine equipment has been acquired under the supervision of R. H. Pinkley, engineer of way and structures, as a means for expediting track maintenance and reconstruction. Intensive study of the various kinds of work carried out by the department has also led to the construction of special machines and to the development of improvements in standard construction machinery to increase their utility in track reconstruction work. Whenever possible, manufacturers have been induced to make improvements in their apparatus according to the department's suggestions, but in some cases entirely new machinery has been developed and constructed by the railway. When the purchase of new equipment is contemplated the selection is made so as to obtain machines adaptable to as wide a range of jobs as possible. The variety of work which can be handled by a proposed new machine is carefully considered and an estimate is made of the probable hours of use per season. At the same time the estimated fixed charges and operating costs are weighed against the saving in labor to be expected. Thus the purchase of expensive machinery which can be used only at infrequent intervals for short periods of time is avoided.

In addition to the care taken in the selection of new machinery, a consistent effort is made to secure maximum utilization of the equipment which is owned. As organization plays a large part in accomplishing this result, all machinery of the department is placed in direct charge of a special division, headed by a supervisor of equipment. The men of this division are carefully selected and are experienced in the operation, inspection and maintenance of the various machines used by the department. Machines are assigned to various jobs by the supervisor of equipment on request of the construction foremen. Trained operators are assigned to accompany each important machine. Each of these operators is responsible to the supervisor of equipment for the condition of his machine while on the job. On equipment which is kept in continuous service during the construction season, the operators are allowed an extra half hour morning and evening for inspection, cleaning and oiling. These trained mechanics take care



Reinforced Concrete Paving Is Facilitated by Use of Machinery. New Finishing Machine Now Under Construction Will Give Still Further Economies

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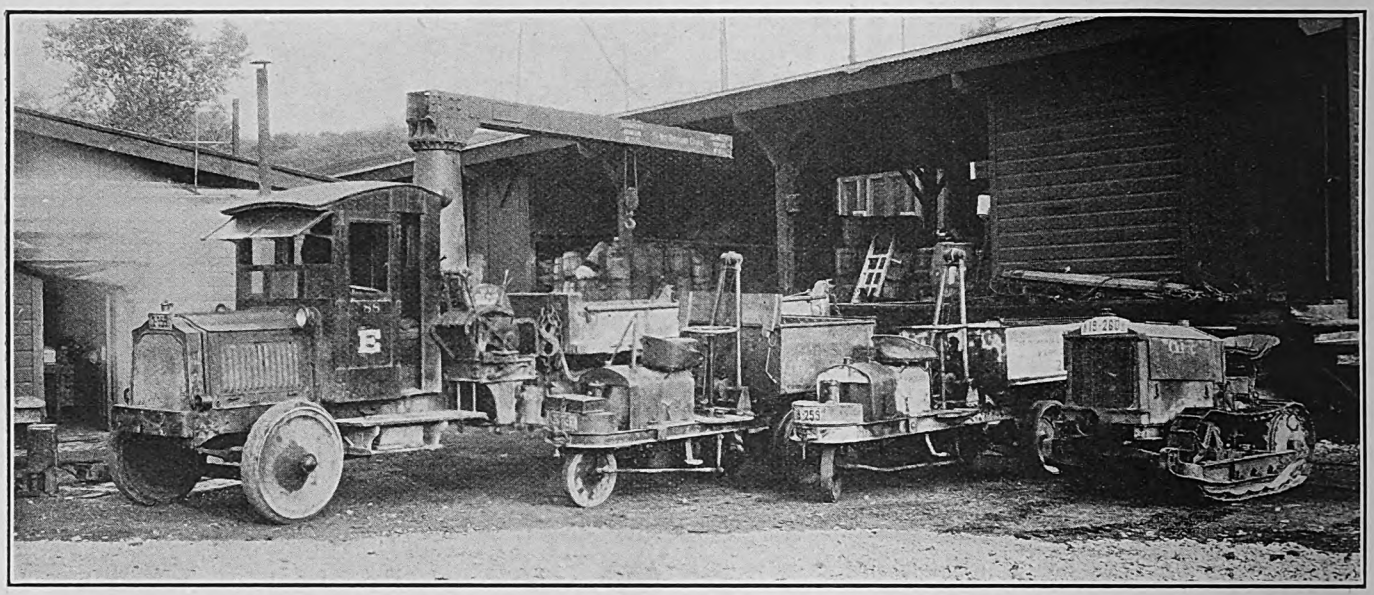
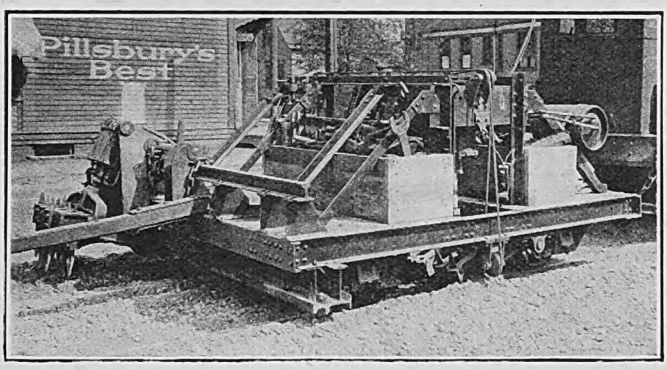
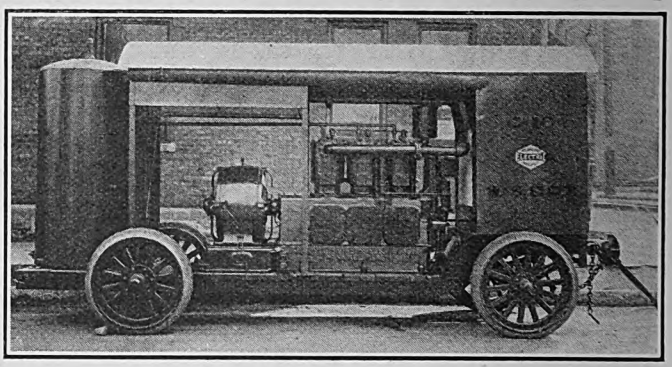


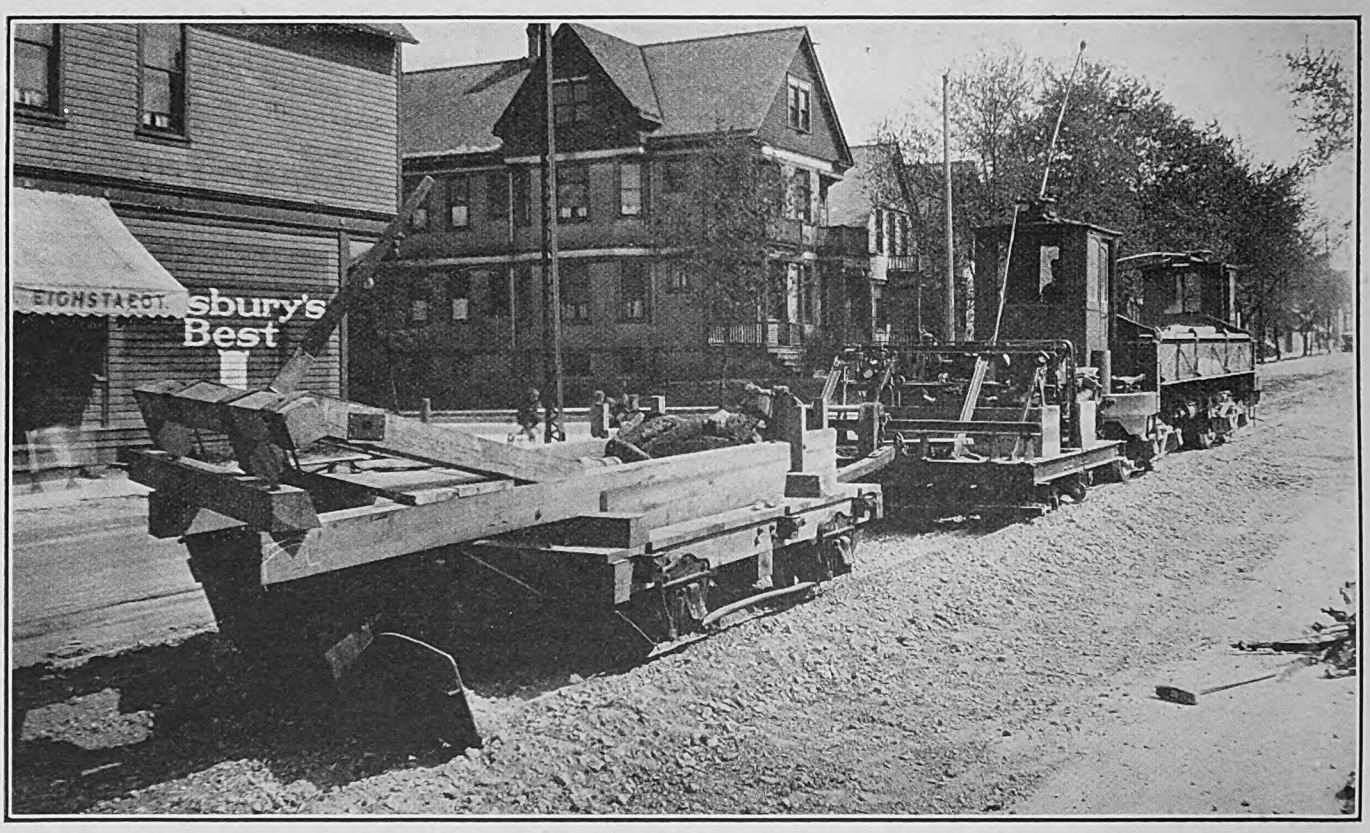
A Battery of Material-Handling Equipment Used by the Milwaukee Company in Trackwork



A Scarifier Built by T. M. E. R. & L. Co. Does Effective Work in Ripping Up Macadam Paving



Rubber Tires and Spring Mounting Cut Maintenance Costs on Equipment



The Scarifier Is Operated in a Train and Is Followed by a Scraper, Which Throws the Broken Paving to One Side of the Track

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of ordinary field repairs. In the event of a serious failure in the field additional mechanics are immediately assigned by the supervisor of equipment to transport repair parts and to aid in making repairs.

A carefully worked out system of accounting covers fixed charges and total operating costs of the way and structures equipment. The apportionment of the cost of each individual machine is calculated in the form of a rental charge which is made directly against the individual job on which the machine is used. This practice tends to stimulate the greatest possible utilization of existing equipment, as each job is charged with the day rate on the machines assigned to it until such time as they are released from the job by the construction foreman. This accounting method has an additional advantage in that it gives the true cost of any construction or reconstruction job, including all of the machine rental charges which would be made if the work were carried on by an independent contractor.

Differential Dump Cars Used in This Case to Haul Away from the Job Removed Paving Loaded by Electric Shovel

During winter months, when construction work is not in progress, the men of the equipment division are kept busy in the general inspection and overhaul of machinery belonging to the way and structures department. The number of men employed by this department varies between fifteen and twenty. Their work during the winter makes them intimately familiar with the design and construction of the various pieces of equipment which they are called upon to operate during the summer. They are particularly well fitted for taking care of emergency field repairs to their machines and to make frequent inspections so as to detect worn or weak parts before actual failure ties up the machine when it is required on a job.

A plan which was inaugurated during the winter of 1922-23 has been of additional value in impressing on the men of the department who handle its machinery the importance of proper care while this equipment is in the field. The various division foremen, equipment men and others in the way and structures department attended a school conducted under the direction of the general education department of the company. Instruction was given in some of the fundamental principles of mechanics and applied electrical practice. In addition, the importance of the proper maintenance and lubrication of track machinery was stressed. Damaged machines were used as examples to illustrate the effects of improper care. In view of the increasing use of machinery by the department it has been felt that this form of instruction is of immense value in impressing on employees the importance of proper care.

The supervisor of equipment and two of his assistants are provided with Ford roadsters equipped with wagon-box bodies and a supply of hand tools, so that during the construction season they are able to move rapidly between various jobs in order to take care of emergency repairs to equipment. When major shop repairs are required the work is done by regular shop forces, but in most cases one or more of the equipment specialists are assigned to the shop with the machine and supervise the repair work. The supervisor of equipment issues orders for such shop work and requisitions materials and parts that are required.

Various classes of work carried on by the way and structures department are handled by groups of specialists as far as possible. Each of these groups is headed by a supervisor, and the various groups of specialists take their place in any particular reconstruction job under the direction of a general foreman. Some of the more important classifications of work include the following: (1) Equipment; (2) bonding, welding and grinding; (3) special work repairs; (4) asphalt and bituminous pavement repairs; (5) concrete paving gang; (6) utility and work train service, under the head of a supervisor of utilities.

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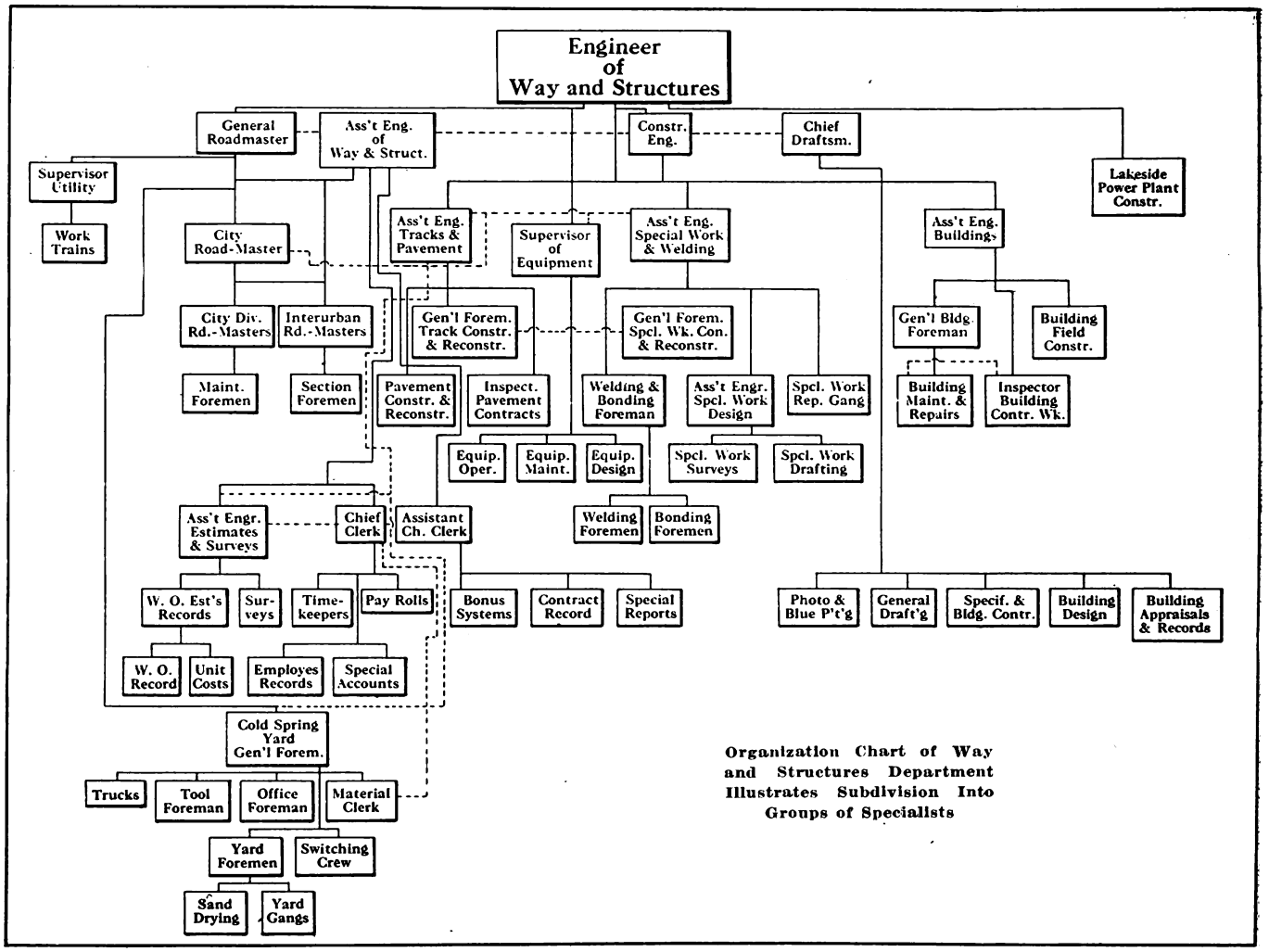
Similarly to the above classes of field forces, the staff forces of the department are subdivided into groups of specialists. Two of the more important of these groups are: (1) A civil engineering division, which does all survey work and civil engineering for the entire company, including the electrical properties; (2) a drafting division, which prepares all drawings for the department, designs special work layouts and special machines, prepares blue prints and photographs, and does all of the architectural work for the company. In addition to these, there is a building maintenance division and a building construction division. The maintenance of way forces are organized in territorial divisions, each headed by a division roadmaster. These include three city divisions and three interurban divisions. The general organization of the way and structures department is shown in the accompanying chart.



Organization Chart of Way and Structures Department Illustrates Subdivision Into Groups of Specialists

Since pneumatic tools are used in trackwork to a very wide extent a full complement of portable air compressors is required. These include one compressor of 225-cu.ft. per minute capacity, three 150-cu.ft. compressors, six 110-cu.ft. compressors and two 90-cu.ft. machines used for small maintenance work. Most of the compressors used are of a slow-speed type, considerably heavier than higher speed compressors of the same capacity. The slower speed machines, it is claimed, are more substantial in their construction and give lower maintenance. Most of them are mounted on spring-suspension, rubber-tired trailers to reduce vibration while they are being hauled from job to job by means of motor trucks. The 225-cu.ft. machine and one of the 150-cu.ft. machines are mounted on flanged wheels for operation on railway track.

An interesting development has been made in connection with the method of cooling these compressors. It was felt that water cooling for track department equipment of this kind was a source of considerable trouble, particularly in early spring or late fall, when carelessness during a sudden cold snap might result in cracked water jackets. Instead of using water, the compressed air is passed through cooling coils to the reservoir and then is led back through the cylinder jacket chambers to act as a cooling agent. It is reported that this plan gives satisfactory results.

Concrete breakers, tie tampers, jack hammers and pneumatic drills form the largest group of track tools requiring compressed air supply. For breaking up old concrete paving, a steam-hammer type pile driver has been found very effective. This is mounted on two supporting skids and moved from spot to spot by means of a crane car, as shown in an accompanying illustration. It is operated by air instead of steam and is available for use not only in breaking concrete but also for driving piling on various construction jobs around the property.

Both air and electric track drills and spike drivers are used. Since the adoption of concrete for paving, it has been considered important to obtain a type of track drill capable of being used in very close quarters so as to limit the size of openings required in the concrete paving for making track repairs. To meet this requirement a new type of close-quarter mechanical-drive drill

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TABLE I—ANNUAL MAINTENANCE AND FIXED CHARGES FOR TRACK EQUIPMENT IN PER CENT OF ORIGINAL COST, MILWAUKEE

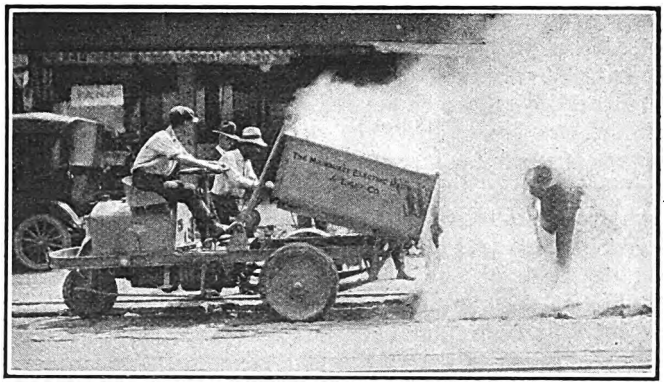
	Depreciation	Shop Repairs	Field Repairs	Storage and Incidentals	Insurance	Taxes	Total
Bonding machine	10½	6	10	3½	1	1	32
Air compressor, electric	12½	6	3	3½	1	1	24
Air compressor, gasoline	18½	6	7	3½	1	1	37½
Cement gun	7½	4	5	3½	1	1	22
Drill, electric track	10	5	10	3½	1	1	30½
Grinder	10½	5	10	3½	1	1	31
Hammers, air	15	5	5	3½	1	1	30½
Heater, tar and gravel	15	3	5	3½	1	1	28½
Hoist, electric	9½	5	3	3½	1	1	23
Loader, gasoline	15	10	6	3½	1	1	36½
Loader, electric snow	5	2	3	3½	1	1	15½
Mixer, electric	12½	12	4	3½	1	1	34
Mixer, gasoline	18½	13	8	3½	1	1	45½
Paint spray gun	10½	3	5	3½	1	1	24
Pump, gasoline	9½	2	4	3½	1	1	21
Roller	7½	5	3	3½	1	1	21
Saw, rail	7½	5	5	3½	1	1	23
Scarifier	12½	10	8	3½	1	1	36
Shovel, electric	10½	6	5	3½	1	1	27½
Signal, Nachod	7½	3	3	3½	1	1	19
Spike driver	5	3	4	3½	1	1	17½
Tampers, air	15	4	5	3½	1	1	29½
Trailer	9½	2	3	3½	1	1	20
Tractor, gas, wheeled	12½	9	5	3½	1	1	32
Tractor, caterpillar	15	15	10	3½	1	1	45½
Welding machine	10½	6	10	3½	1	1	32
Bucket, grab	10½	5	3	3½	1	1	24
Jim Crow	10½	2	3	3½	1	1	21

TABLE II—ESTIMATED ENERGY CONSUMPTION OF TRACK EQUIPMENT TO BE CHARGED AGAINST SPECIAL ACCOUNT FOR EACH DAY'S USE

Pieces of Equipment	Description	Hp. Motors Each	Kilowatt Capacity	Average Kw.-Hr. Daily
2	Bonding machine (Lincoln) 20 to 60 amp.	...	.....	15.
2	Compressor, 150-ft.	27	20.142	60.
3	Compressor, 110-ft.	20	14.92	45.
2	Compressor, 90-ft.	15	11.19	35.
1	Compressor, 10-ft. preheater	2	1.49	2.5
8	Drill, track—Duntley	1	0.74	2.
4	Drill, tie boring machine	½	0.373	1.
1	Drill, electric breast	1	0.746	0.5
2	Grinder, swing frame-shop built	3	2.238	5.
2	Grinder, Atlas rail	7½	5.595	14.
1	Grinder, Goldschmidt thermit	7½	5.595	15.
1	Grinder, Reciprocating rail	3½	2.611	6.
1	Grinder, Universal rotary	3½	2.611	6.
5	Grinder, Little Giant portable	1	0.746	2.
4	Grinder, flexible shaft	1½	1.119	2.
1	Hoist, P. & H. Co. 18 hp.	18	12.429	30.
2	Loader, B. & G. Co.	10	7.46	3.5
1	Mixer, Rex	15	11.19	20.
2	Mixer, Koehring, Nos. 14 and 14-E	15	11.19	15.
2	Mixer, Koehring, Nos. 6 and 14-E	7½ & 5	4.476	8.
1	Saw, rail, mounted on truck	1	0.746	2.
1	Scarifier—mounted on single-truck flat car	2	1.492	no power
2	Shovel, Thew electric	20	14.92	50.
1	Shovel, Thew electric caterpillar	20	14.92	50.
2	Signal, Nachod	...	.....	.....
6	Spike driver, Duntley Nos. 3 and 4	1	0.746	0.5
2	Welder, Lincoln Type W. 60 amp. and 35 amp.	...	.....	30.
2	Welder, General Electric	7½	5.595	15.

TABLE III—DAILY RENTAL RATES ON WAY AND STRUCTURES EQUIPMENT

Description	Days Use per Year	Daily Rental Rate
Bucket, grab	50	$2.00
Buster, concrete	75	0.75
Compressor, electric air, 150-ft.	150	6.75
Compressor, electric air, 110-ft.	150	5.00
Compressor, electric air, 90-ft.	150	4.00
Compressor, gasoline air, 90-ft.	150	4.00
Drill, Duntley electric	250	0.60
Drill, Little David air	250	0.60
Drill, tie boring, electric	100	0.45
Drill, tie boring, air	150	0.30
Grinder, swing frame	175	1.35
Grinder, Atlas rail	175	2.25
Grinder, Goldschmidt thermit	175	3.50
Grinder, Reciprocating rail	175	4.50
Grinder, Universal rotary	175	3.25
Grinder, Little Giant portable	100	0.35
Grinder, Little David air	100	0.45
Hammer, (Air Jackhammers)	75	0.70
Heater, combination tar and gravel	100	4.00
Heater, three-burner surface	50	1.00
Jim Crow, hydraulic	50	1.50
Kettle, type D tar and asphalt	100	2.00
Loader, electric (snow work)	100	2.75
Loader, gasoline	150	8.50
Mixer, electric concrete, 21-E Rex	150	13.50
Mixer, electric concrete, 14-E Koehring	125	6.75
Mixer, electric concrete, No. 6-6 Koehring	100	6.75
Mixer, gasoline concrete, (½-bag)	125	2.25
Mixer, electric concrete, (1-bag)	100	3.00
Roller, steam	125	3.50
Roller, gasoline	125	3.25
Scarifier on single-truck flat car	100	10.80
Shovel, Thew electric rail	100	16.40
Shovel, Thew caterpillar	150	21.00
Spike driver, Duntley No. 3 and No. 4 elect.	175	0.20
Tamper, Ingersoll-Rand air	50	1.00
Trailer, Lee four-wheel 3-ton	100	3.00
Tractor, Cleveland caterpillar	175	5.00
Tractor, three-wheel Clark	175	3.00
Welding machine, Lincoln and G. E.	175	3.25



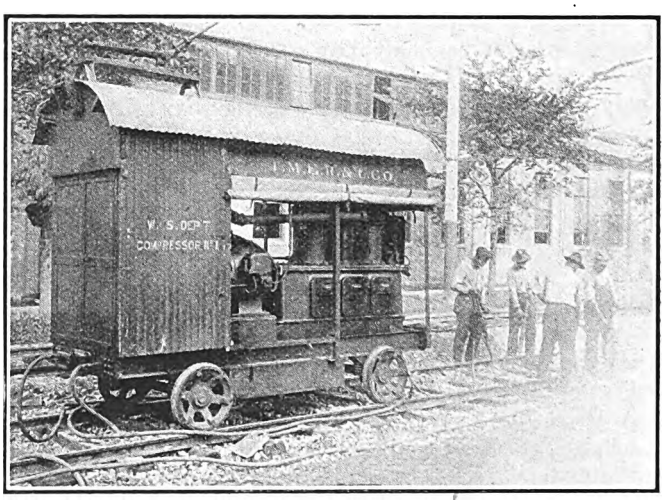
Hoist Dump Tractors Are Particularly Useful in Distributing Paving Material

has been developed and is being built in the company's shop. It is the intention to drive this drill by means of a flexible shaft from the motors on some of the rail grinders. All ties for tangent track are adzed and bored by machine in the material yard. A friction rail saw in the yard has also proved to be a considerable time and labor saver.

Several types of grinding equipments are utilized. Three Atlas rail grinders are used very largely to follow up top welding work such as that at cupped joints and special work repairs. A Goldschmidt grinder, in addition to its use for finishing thermit-welded joints, has been found particularly useful for grinding throatways in special work. In addition to this equipment, one reciprocating track grinder is used for removing rail corrugation and three specially designed and constructed portable swing frame grinders have been found particularly useful for roughing down thermit welds and for grinding the taper in special work throatways.

Considerable macadam and asphalt paving has been laid in the past. For tearing up macadam an air-controlled scarifier, shown in an accompanying illustration, has been found very effective. It consists of a heavily loaded trailer equipped with specially designed teeth that rip up the pavement. On asphalt a rugged knife clamped to the edge of a steam roller frame has been found to give very good results for cutting the pavement along a straight line at the edge of the track zone.

The scarifier is used in a train in which it is followed by a plow consisting of a heavy scraper mounted on a flat car. Following along behind the scarifier, this plow



Heavy-Duty, Slow-Speed Air Compressors Are Used for Field Work

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forces the material cut loose by the scarifier over to the outside of the track. The train with scarifier and plow may be seen in an accompanying photograph.

The Milwaukee company designed this scarifier when it had occasion a couple of years ago to remove 85,000 sq.yd. of paving. It comprises a heavy steel frame supporting castings which carry the scarifier teeth. These are raised and lowered by compressed air. They are arranged so as to take in the entire track zone of a single track or one side of a double track up to the middle of the dummy strip. The teeth can be set down to cut 3 in. deep in one passing, and the scarifier is used to cut down into the paving surface from 3 in. to 7 in. when removing old macadam or other material in preparation for building a new asphalt surface, or in going down to the tops of the ties for installing concrete pavement.

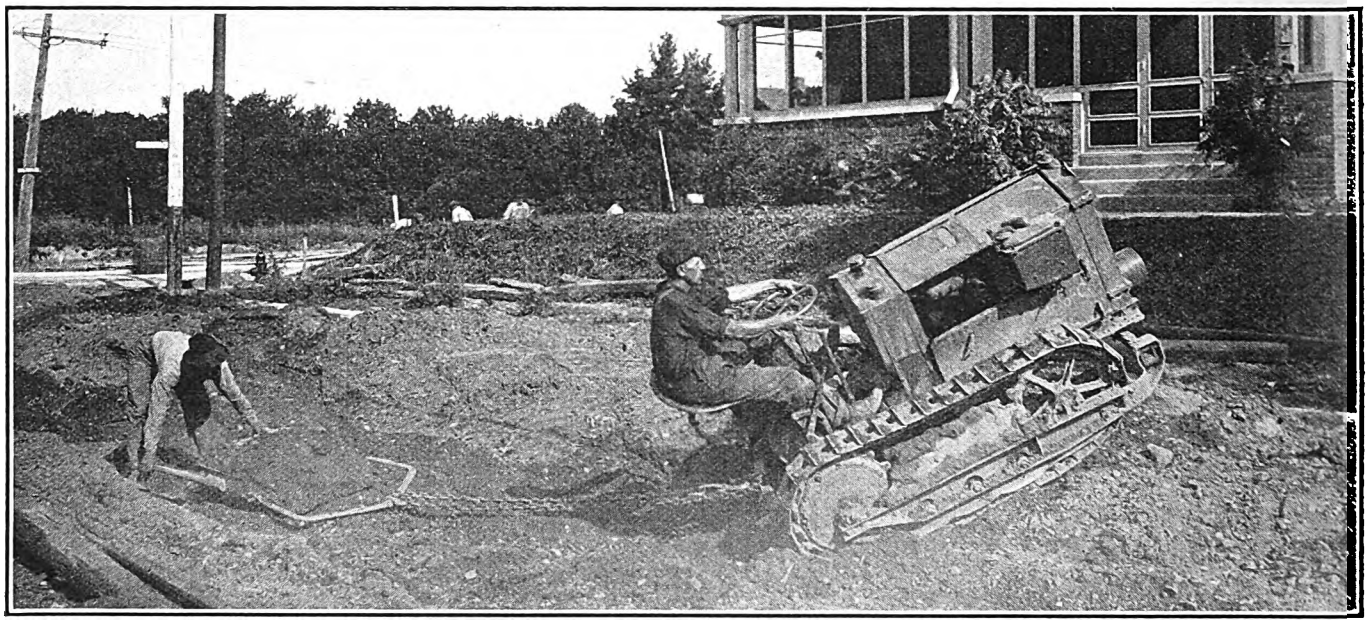
For handling the large quantities of heavy materials that are required in trackwork, a very complete group of equipment is available. A 3-ton derrick and a 15-ton electric drive Brownhoist locomotive crane with a 50-ft. boom are permanently located in the material yard for handling rails, ties and other heavy supplies. For construction work on the street a 15-ton Industrial derrick car, equipped with a 30-ft. boom and an extension boom for handling rails, is available. In addition, a 10-ton Brownhoist derrick car is used a great deal for handling heavy materials and in street construction work. It is equipped with a 30-ft. telescoping boom which can be extended to 45 ft. for handling rails. Three Thew electric shovels facilitate excavating work. One of these, equipped with a ⅝-cu.yd. bucket, is used for loading gravel at the company's own gravel pit, and two others, equipped with ¾-yd. buckets, are used in street construction work. One of the latter is mounted on flanged railway wheels and the other is equipped with caterpillar treads so that it can easily be manipulated around construction work. Two Cletrac caterpillar tractors have been found particularly serviceable for miscellaneous hauling. Equipped with snow plows, they are also available in the winter for clearing yards or other places not readily handled by the regular rail snow equipment.

Three-wheel Clark truck tractors with 1-yd. dump bodies are used in connection with concrete paving and also for handling materials used in construction work. Three of these have gravity dump bodies and on the remaining two the bodies are of the hoist dump type so that the load can be discharged as desired. An additional four-wheel tractor of 1-ton capacity with a gravity dump body has been found useful for opening and closing gangs on miscellaneous track repair work.

Several types and sizes of paving rollers are utilized. These include one 10-ton gasoline roller and two 7-ton rollers. One of the 7-ton machines is steam driven, while the second has been converted to electric drive and is operated by means of a cable mounted on a drum which takes up the slack as the roller is moved back and forth. An additional 5-ton Galion gasoline tandem roller is used in connection with asphalt repair work.

Extensive use of concrete has led to the adoption of a variety of mixers and paving machines together with material loaders for meeting the requirements of different types of jobs. A Rex chain belt 21-E mixer mounted on rubber tires is used for large paving reconstruction jobs. For large special work construction a No. 14 mixer equipped with a 20-ft. boom and distributor bucket gives good results. This machine is mounted on steel-tired wheels which are so arranged that flanged rims can be bolted on for operation on the track rails to reach all parts of the street opening. Two No. 6 Koehring pavers are particularly useful for small special work jobs and grouting work. Barber-Greene bucket loaders with measuring hoppers facilitate the work of handling gravel, sand and similar materials. A complete equipment of dump cars is used to transport paving and other materials. This consists of 7 Differential dump motor cars and 18 Differential trailers, one of which is the door chute type, together with six 20-yd. center dump, steel Koppel cars.

A new cement skip has just been developed for dumping a four-bag load into a Clark tractor so as to avoid tying up the tractor while individual bags are being emptied. A concrete finishing machine is also being completed in the railway company's shop and is designed to meet the special requirements of track zone paving.



The Tractor Speeds Up Grading and It Will Go Anywhere

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Rubber-tired equipment is used wherever possible, as it has been found that the hauling of heavy machinery over pavements by motor vehicles results in severe vibration and shock. The saving in maintenance which is obtained by applying rubber-tired wheels and spring suspension gives a substantial reduction in the wear and tear on equipment.

How Machine Costs Are Accounted For

The distribution of machine costs to various construction jobs on a rental basis, as mentioned earlier in this article, is accomplished by a simple accounting system which includes all of the various items of maintenance, operating cost and fixed charges. This was worked out after a detailed study of the subject was made by the way and structures department.

The former practice was to charge the cost of supplies and maintenance of the equipment into an annual tool work order which was cleared out annually to the various construction jobs in proportion to the pay-roll costs. This method provided no way of equitably distributing fixed charges on the equipment.

Under the new arrangement, fixed charges, depreciation, insurance and taxes, together with maintenance and operating costs, are all accumulated in a special account. Table I shows the rate of depreciation used for various types of equipment. The operating charges to the special account are divided into four general subdivisions as follows: (1) Miscellaneous supplies and expenses, including oil, grease, gasoline, waste and other materials and supplies used in the operation of the equipment; (2) power cost, based on the daily use of each machine; (3) maintenance of equipment, including repair parts, labor and sundries, but not general replacements or renewals of equipment; (4) maintenance of equipment buildings, fixtures and grounds, including all charges against buildings devoted exclusively to the storage of equipment used by the way and structures department.

Using the estimated number of days use per year as a basis, the total fixed charges, maintenance and operating costs for the various pieces of equipment as shown in Tables I and II have been compiled for each class of equipment to give a daily rental rate. From reports made by field men to the accounting department, each construction job is charged with all equipment on that particular job. As these charges are made, the general equipment special account is credited with corresponding amounts, so that at the end of the year the total annual cost of the equipment has been charged out against the individual jobs on which it was used. Minor adjustments in the estimated rental rates are made when required, so that the various charges balance with the special account at the end of each year.

Line Practices on Pittsburgh Railways

The Materials, Construction and Equipment Used by This Large City System, Together with the Maintenance and Emergency Organization Employed, Are Briefly and Helpfully Discussed — Recent Storm Tests Merit of Line Department's Work

By H. A. Pharo
Superintendent of Lines Pittsburgh Railways Company

THE Pittsburgh Railways Company, like many other large systems, is composed of several smaller properties which have been combined under one ownership and management. While under independent operation these companies had constructed their lines according to individual ideas. When the combination was effected, it was naturally expedient that methods of construction and materials be made uniform for the entire system.

A department of lines was organized under a superintendent and the system divided into eight districts or divisions with a line foreman in charge of each division. The personnel of each division are classified as linemen, emergency men, line helpers, emergency helpers, bonders, groundmen and drivers according to the character of their work. Each division has its own complement of tower vehicles and line cars, proportioned in number to the mileage of lines to be maintained over paving or T-rail trackage on private rights-of-way.

The duties of the department were originally confined to line construction and maintenance, but the passing years have broadened its scope until at the present time it is correlated more or less with the activities of all other operating departments. Some of the various responsibilities will be referred to in the succeeding paragraphs.

Line maintenance seems to be a more or less prosaic subject and does not generally arouse the enthusiastic interest accorded descriptions of smooth track, carefully planned carhouses, resplendent rolling stock and architecturally beautiful substations. To the busy street railway man the lines are a necessary adjunct to the business of transportation for the purpose of delivering motive power, but something often to be ignored until there is a service interruption due to a trolley break or similar cause.

The layman sometimes views the lines as a combination of poles and wires which he reluctantly admits must be tolerated. Said layman is prepared at all times, however, to advance unlimited arguments that a pole could be more advantageously located on his neighbor's frontage, rather than on his own, or that it is perfectly reasonable to request a 50-ft. move to clear an 8-ft. driveway to his new garage, when a few feet would suffice.

The Pittsburgh district, with its narrow streets, steep grades and sharp curves, presents the maximum difficulties for the successful operation of an electric street and interurban railway system. It is probably true that the line construction of the Pittsburgh Railways Company's system is not essentially different from that of other large systems, nor does the writer wish to convey the impression that radical departures have been made from existing practices.

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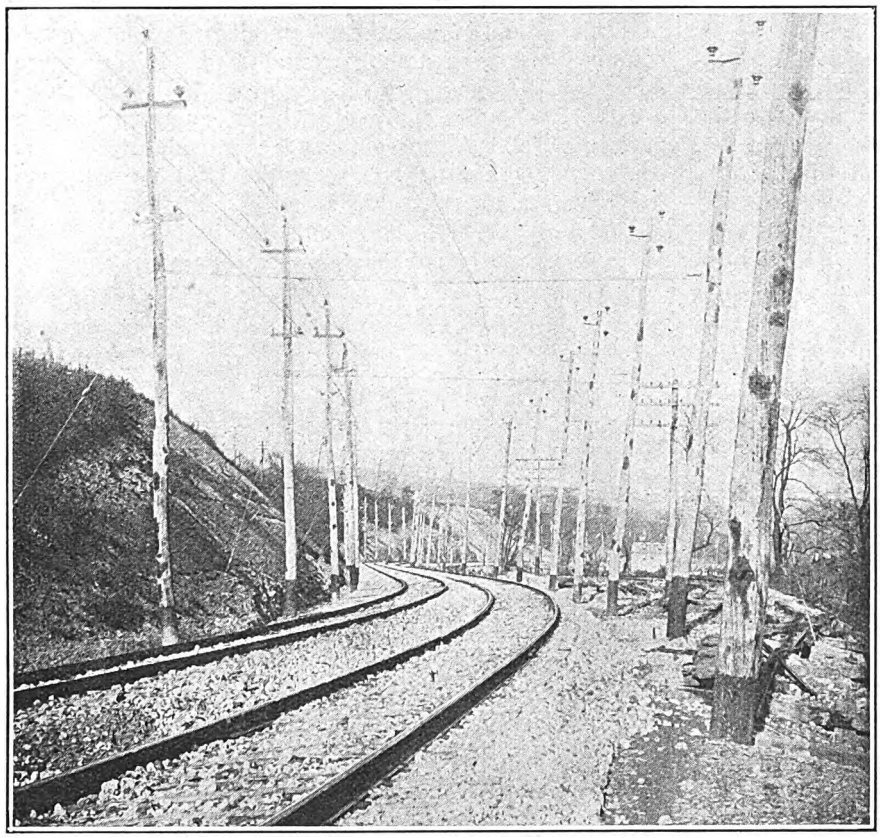
The department of lines has its problems due to the topography and atmospheric conditions of this district, and that some of them have been solved is evidenced by the record of February 19 and 20 this year. On that night the most severe sleet storm in local history visited the Pittsburgh district. With a total of 1,500 miles of trolley, feeder transmission, signal and other wires only eighteen breaks occurred. Six of these breaks were caused by sleet cutters and the balance by ice incrusted trees and foreign circuits, which by reason of their weighted condition were unable to withstand the violence of the high wind. There was not a pole broken nor disturbed, nor even a case of "hot" pole, and cars were kept in continuous operation on all routes in order to break the coating of ice on the trolley wires. Since all day runs were started out on schedule time in the morning the department of lines is naturally inclined to be proud of this record and considers that its efforts have not been in vain.



Typical Wood Pole Construction on Private Right-of-Way, Showing High-Tension, Feeder and Span Construction on the Same Pole Line

In maintaining the lines of the system it has been found that best results can only be obtained by constant inspection and repair. Every mile of line construction is inspected thoroughly and repaired or adjusted if necessary once each week. Where headways are close and wear is consequently greater, inspections are made at more frequent intervals. The old proverb that an "ounce of prevention is worth a pound of cure" applies admirably to the upkeep of lines. Minor repairs and adjustments made promptly when distress first appears save large expenditures which would later become necessary if the small faults were neglected.

Trolley inspection and repair are carried on by the familiar tower vehicle. Both tower trucks and horse drawn tower wagons are in use at the present time, but a complete motorizing program is well under way, and in a brief time trucks will be used exclusively.

A tower crew consists of lineman, helper and driver, and each crew is assigned a district for which it is responsible. By constant association daily, except Sundays and holidays, the lineman becomes intimately familiar with all the peculiarities of his district and is thus able to render more efficient service.

Pole and feeder inspection and repair are carried on by special crews on each division. This branch of work, classed as heavy, requires a force of men equal to the average requirements and the tool equipment corresponds to the nature of the work. Work of this class is carried on under the direction of the head lineman or assistant division foreman and line cars are generally used for transporting men and tools.

A total of twelve tower trucks and wagons and six line cars are required to care for the maintenance and construction of lines and other departmental activities.

The slogan of the Pittsburgh Railways Company is "Safety Always" and the safety movement pervades the entire organization of the lines department. Each truck, wagon and line car is equipped with only the best tools obtainable and in ample assortment, including rubber boots, coats, hats, gloves and safety blankets.

Emergency Crew Work and Equipment

Located within the area of heaviest traffic are six emergency stations of the line department, at each of which a crew, consisting of two men, is always on duty during the twenty-four hours. The duties of the emergency men are manifold as their title implies. They are prepared to handle troubles of any description which are causing traffic interruption, or may interfere with regular car movement. When the emergency service was first established wagons drawn by two horses were employed to transport men and tools. Later, light motor trucks were substituted. Recently all the light trucks have been replaced with a fleet of Autocar 3-ton trucks. In designing the bodies of the present trucks the experience of preceding years was the guide, with the idea of producing a vehicle that would meet all requirements as nearly as possible.

Mounted on each truck is a Trenton three-section tower, which enables all elevated work to be carried on with freedom and safety. Especial attention was given to the provision of space for tools and materials to meet every requirement. In the case of personal injury the emergency men are prepared to give first aid, and each truck carries a complement of stretchers, woolen blankets, rubber blankets and air pillows for the proper handling of cases requiring surgical attention.

The emergency men report to the foreman of the division where they are located, but their work is not confined to any particular area. The crew which is available nearest the source of the call is dispatched. In case of fires the load dispatcher, by means of a con-

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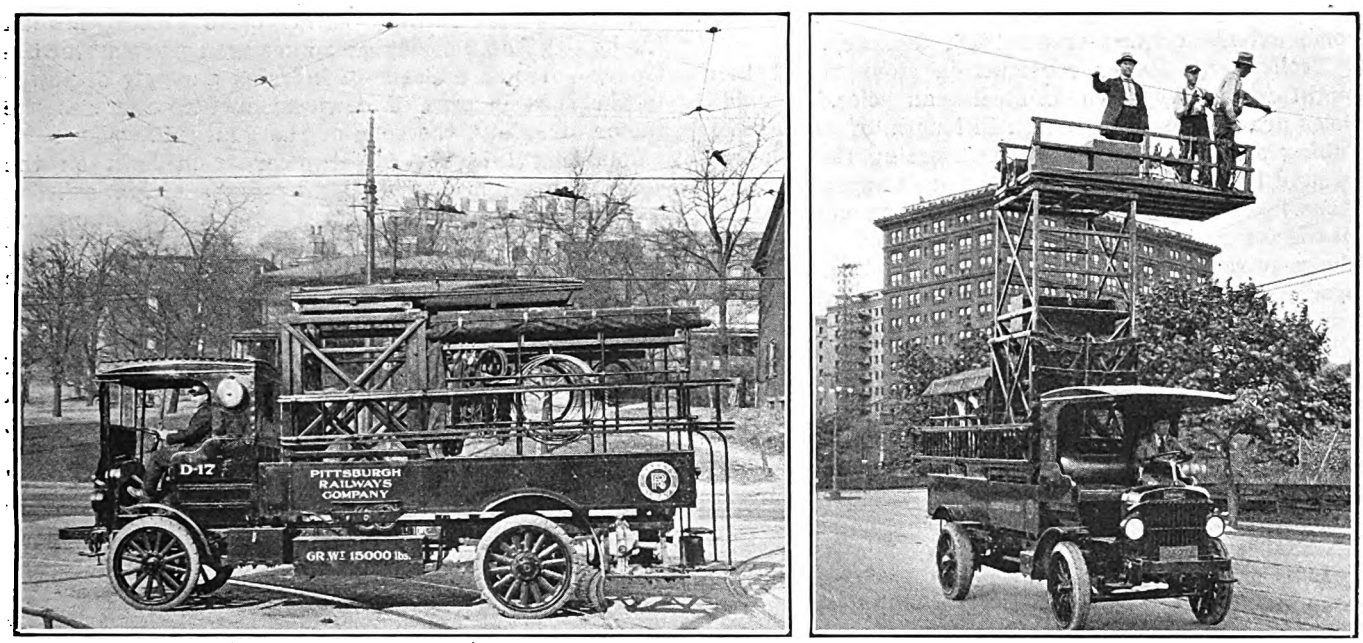


Latest Type Tower Truck Placed in Service by Pittsburgh Railways. Gross Weight of 15,000 Lb. Is Marked on the Truck to Comply with the State Law. The Actual Gross Weight, Including Two Men, Was Found to Be 11,325 Lb.

nection to the fire alarm system, learns the location and at once notifies an emergency crew to investigate. On arriving, the emergency men telephone the load dispatcher as to the probabilities of power or traffic interruption, and remain at the scene to furnish further information, assist in rerouting of traffic, or care for any lines which may be endangered or damaged.

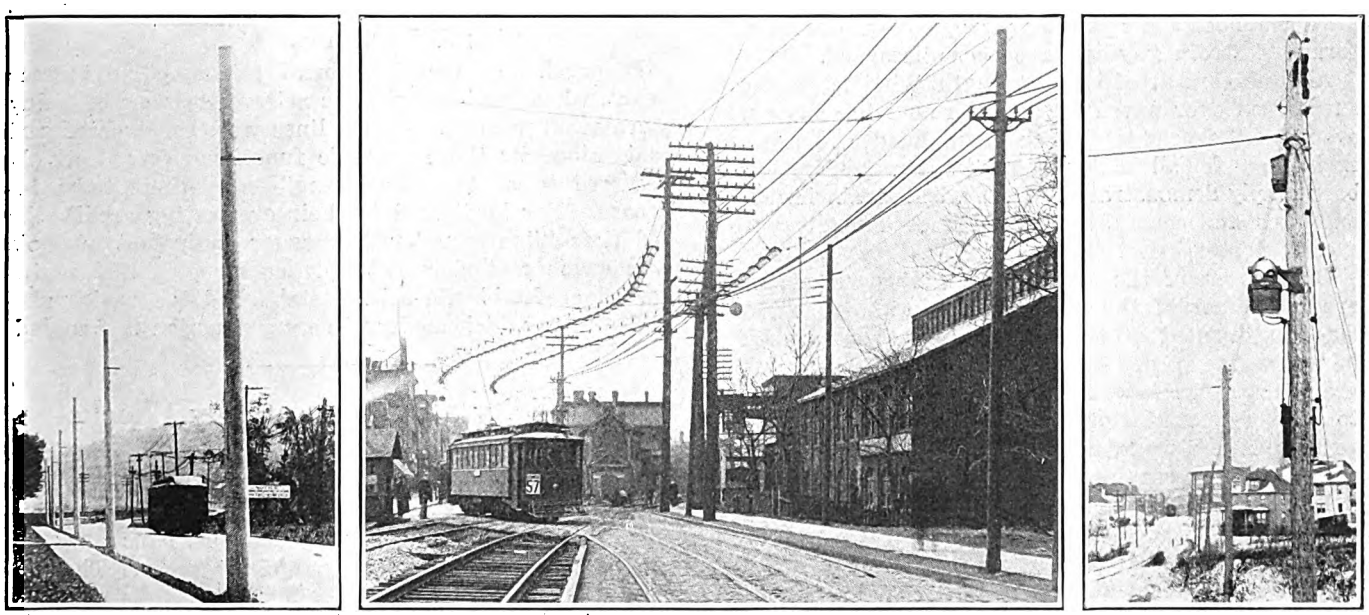
On holidays when traffic is heavy the regular emergency service is augumented by additional crews located at strategic points. These extra crews are composed of linemen, qualified by many years of street railway service. Line cars are usually the means of transportation for the extra service, since the regular equipment of tools will meet practically any demand.

Regular emergency service is not maintained on the interurban routes, but the residence of the men and the work schedule of these divisions is so arranged that men competent to handle high-tension lines, signals and other facilities peculiar to high speed routes are available on short notice.

The management of the Pittsburgh Railways Company has always been progressive and liberal to the extent of its resources. As a result the department of lines has been free to carry on experiments with various classes of materials and devices, and within reasonable limits to modify methods of construction in order to determine what is best adapted to the system as a whole.

Hard drawn trolley wire is standard, but on account of the increasing interest in high strength alloy wires, tests of such wires are being conducted on each division on routes where operating conditions are severe.

Rigid trolley construction prevails over the entire system, years of demonstration having shown this type to be best adapted to local conditions. Inasmuch as but few cases of crystallization are reported, it would



Left—Concrete Pole Installation at Charleroi, Pa., Pittsburgh Railways. Center—A Particularly Helpful Installation of National Trolley Guard on a Reverse Curve Crossing with the B. & O. R.R. on Second Avenue, Pittsburgh. Right—Typical Automatic Signal Installation of the Pittsburgh Railways. This Particular Installation Is on the Beachview Route

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seem that possibly rigid construction is a remedy to some extent for this troublesome tendency.

Trolley and feeder construction along paved thoroughfares is supported on steel span poles. Standard poles are three section, 30 ft. in length, of extra heavy tubing and provided with a reinforcing sleeve at the ground line. The section lengths are of special proportions in order to furnish a maximum amount of space in the top section. Several sizes are used according to the requirements of single line, double line, curves or special work. All steel span poles are set 6 ft. below curb grade, in concrete, and keyed with blockstone. The rake is uniformly at the ratio of 12 in. in 24 ft.

In passing, it is perhaps not amiss to cite the advantage of utilizing trolley span poles for street lighting. A notable program of "white way" lighting has already been carried out by the city of Pittsburgh and surrounding boroughs. The Duquesne Light Company has in all cases suspended its lights from ornamental brackets attached to the tops of span poles.

Long and irregular spacing of poles is avoided as far as possible. On straight line a spacing of 100 ft. is considered the limit, and by careful survey it is generally possible to confine the spacing to this distance with a tolerance of a few feet to reach a property line. For curve and special work construction, poles are spaced and located in relation to the requirements.

On private rights-of-way, wood poles are used exclusively for supporting trolley, feeder, transmission and other lines. All wood poles are head guyed to reduce stresses at the butts, thereby very materially increasing the life of the poles. Realizing the increasing scarcity of sound, symmetrical wood poles, the corresponding increase in price, and the necessity for a substitute, several important sections of line have been reconstructed on tubular, reinforced concrete poles, such as pictured herewith.

TROLLEY WIRE HEIGHT MAINTAINED AT 20 FT.

Trolley wires are maintained at a uniform height of 20 ft. above street grade as far as possible, except where passing under bridges and viaducts. Brailing is used on both the outside and inside of all curves, enabling trolley wires to be held in rigid alignment to the curvature of the track. All branch trolley wires are dead ended after passing through frogs but all other forms of strain guying have been discarded.

All line ears are 15 in. in length, with cap and cone suspension over paved track and round top suspension over T-rail trackage. Wood strain insulators are used exclusively for all trolley spans, their reliability having been amply demonstrated. Both wood strain insulators and caps and cones are painted once annually with a special preservative.

On account of the many short radius curves, which are a product of the narrow thoroughfares, a rather large assortment of trolley frogs of different degrees is necessary. Both malleable iron and bronze frogs are in use. Malleable iron, sherardized, has been found to be very satisfactory for frogs and for solid and adjustable crossings, both from the standpoint of first cost and from service.

Feeders throughout the system are supported aërially on the span poles. On steel poles, malleable iron crossarms, of a design originated by the line department to meet the requirements for supporting heavy feeders without being unsightly in appearance, are used. Feeder pins and insulators are of special design to meet local conditions.

Where street railway tracks cross steam railroad tracks at grade a trolley guard has been erected over the trolley wires as a means of insuring a supply of power to the cars in case of dewirement. To increase the factor of safety, the zone of the guarded trolley is of ample length to cover a two-car train both on the approaching and leaving sides of the steam railroad tracks. Special pole layouts were designed to support the increased weight of the crossing guards in order that the trolley wires could be easily maintained at the proper elevation.

The Pittsburgh Railways Company has always favored electric switch throwing devices and 115 of them are in operation at the present time. Like all other pieces of apparatus containing moving parts, electric switches must be properly maintained, preferably by men understanding both the electrical and mechanical features. The department of lines follows this practice, and on one particular division where many electric switches are involved one man confines his duties solely to this work, making rounds of inspection daily with a Ford roadster equipped with delivery body for transporting tools and repair parts.

Non-clearance curves, which cannot always be avoided where double tracks are laid on narrow streets, are equipped with automatic, trolley contact, block signals of Nachod design. These signals permit single train movements only and eliminate the delays and dangers due to backing should two trains reach the curve at the same time. Train movements over single track are governed by Nachod automatic block signals of the closed circuit type, permitting following movements.

Signal apparatus is under the direct supervision of the division foreman, assisted by certain linemen familiar with the circuits.

Since the track is the other side of the street railway power circuit the bonding of track has been given special attention. To obtain the best results certain men confine their activities to bonding and are competent to apply both compressed and arc weld bonds. Maximum conductivity of joints can only be secured by careful application of the bonds and the necessary tools have been carefully selected to achieve this result. Labor saving electric motor driven tools are used for drilling, reaming and grinding.

In conclusion, permit a brief retrospect to former years, when the large electric railway systems of today were small properties, when lines were constructed and maintained by those nomadic functionaries collectively referred to as the "line gang"—may their tribe increase. For be it said to their everlasting credit, the old time "line gang" with meager equipment of tools and crude materials not only constructed and maintained creditable lines but established the basic principles upon which modern line construction is founded.

Publicity Slips Accompany Checks

THE Olean, Bradford & Salamanca Railway pays all its employees, and other creditors, by check. To emphasize the fact that the money to make these payments comes from the railway patrons, slips have recently been attached to all outgoing checks. The slip reads:

"It is the people who ride on our cars who make advertisements that are being published in the local newspaper."

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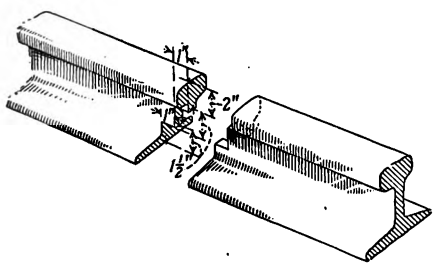
Equipment Maintenance Notes

Mitered Joint in T-Rail Has Great Strength

IN AN effort to devise a rail joint of the ordinary bolted type having greater strength than the ordinary joint, the Union Street Railway, New Bedford, some time ago constructed a mitered joint for use in open track. The rail used for the experiment was 5-in. T. It was cut vertically and horizontally as shown in the accompanying sketch. The end of another rail was cut to correspond.

After thus mitering the ends of two rails, the joint plates were left entirely loose to see what strength

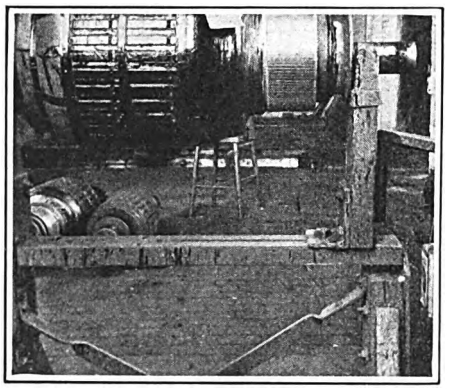


Special Joining of Rail Ends Gives High Strength

the joint would develop. This joint has now been under comparatively heavy traffic for two years and has stood up in excellent shape. During this entire time the joint plates have been left loose. It is felt by the railway that such joints possess much greater strength than the ordinary straight vertical joint, but that the cost of cutting is too great to make its use practicable except under unusual conditions.

Adjustable Winding Rack

THE winding of armatures is facilitated considerably in the Junction Park shops of the Beaver Valley Traction Company, New Brighton, Pa., by the use of the adjustable rack illustrated herewith. The base of the rack has four legs with cross braces of steel strap. Upon this is mounted a 4-in. steel channel with the groove fitting over the base. This channel has a groove slotted longitudinally for about half its length. On this is mounted the adjustable support for one end of the armature shaft, held by a follower and through bolt. The angle



This Rack Is Adjustable for Various Lengths of Armatures

on the upright is machined with an offset so that it fits into the slot and holds the bracket in line. A slight turn on the nut releases the bracket so that it may be shifted to another position. The opposite support is fixed.

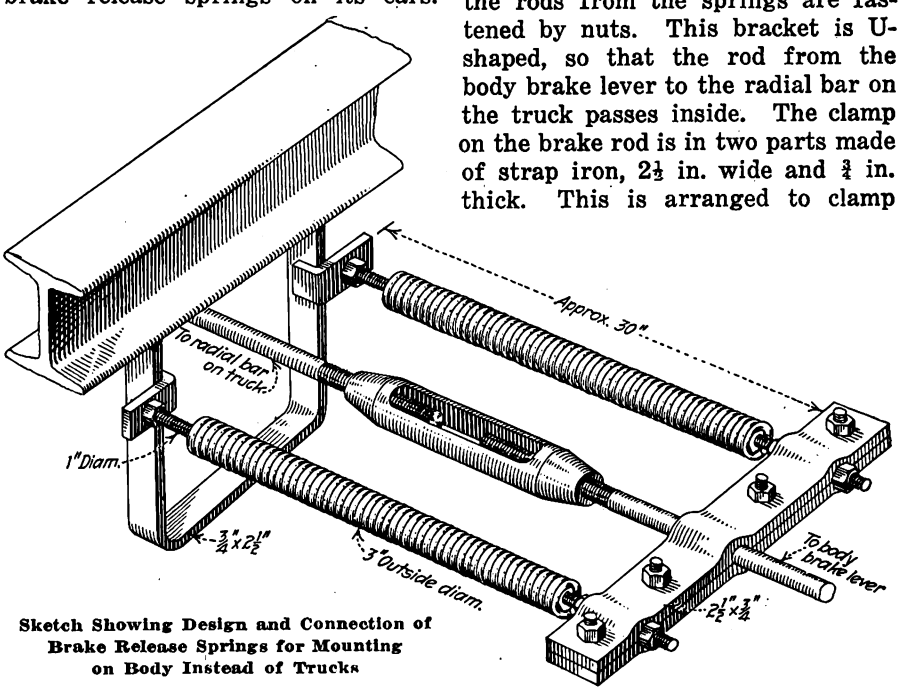
For winding compressor armatures which are too short to fit in the rack in the ordinary manner a sleeve bearing is attached to the upright and the armature shaft inserted in it.

Release Springs Connected in Body Brake Rigging

THE Philadelphia & Western Railway, Norristown, Pa., is using a special arrangement of the brake release springs on its cars. The springs are connected at one end to the rod running from the body brake lever to the radial bar on the truck. At the other end they are attached to a special support on the body underframe. The brake release springs on the trucks have been done away with, also various supporting parts, which lightens the truck considerably. At the same time the new arrangement of brake release springs insures that the shoes will remain free of the wheels and thus increase their life and reduce energy consumption.

The arrangement as shown in the accompanying illustration consists of two large tension springs. These are 3-in. outside diameter and have a nut screwed into either end, the thread on the nut being arranged so as to screw into the turns of the spring. Rods threading in these nuts at opposite ends of the springs are attached to a permanent bracket on the car body underframe and to a clamp on the rod running between the body brake lever and the radial bar of the truck. The rods used to connect the ends of the springs to their supports are 1 in. in diameter.

The bracket which forms the permanent attachment for the springs is made of ¾-in. x 2½-in. strap iron and has two supporting clamps to which the rods from the springs are fastened by nuts. This bracket is U-shaped, so that the rod from the body brake lever to the radial bar on the truck passes inside. The clamp on the brake rod is in two parts made of strap iron, 2½ in. wide and ¾ in. thick. This is arranged to clamp



Sketch Showing Design and Connection of Brake Release Springs for Mounting on Body Instead of Trucks

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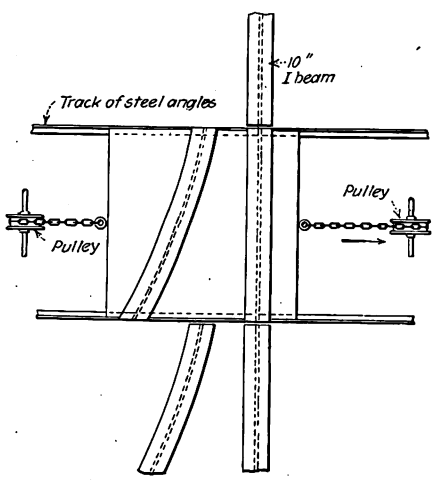
firmly on the brake rod and also has provisions for clamping the two rods which lead to the release springs. Further fastening is also provided by nuts on the end of the rods.

By this installation the release spring equipment is placed up away from wheel wash and mud, so that its operation is not so likely to be affected by weather conditions. Strong springs can also be used and efficient release of the brakes assured. This construction has been in successful use several years.

Overhead Monorail Switch

HEAVY material is moved from place to place in the shops of the Worcester Consolidated Street Railway, Worcester, Mass., by means of an overhead monorail system. The track is made of 10-in. I-beams from which are suspended rolling chain hoists. The main track runs



The Square Frame Moves on a Track Made of Angle Irons, When This Monorail Track Switch Is Thrown

through the entire shop and branch tracks lead off to various places, such as the welding rooms, where special operations are performed. To accomplish the switching from the main track to a branch, an unusual overhead track switch is used. A gap is cut in the overhead rail sufficient to allow the insertion of a rectangular frame that carries two short pieces of 10-in. I-beam, similar to that used for the main track. One of these is straight to bridge the gap in the straight track, and alongside of it the other which is curved with the correct radius to connect the straight track with the curved track. The frame rolls transversely on a track composed of steel angles. This track is slightly depressed to lock the switch into position. The switch may be thrown from the shop floor by chains fastened to the frame and running over a pair of pulleys.

Dick Prescott Delivers Material

And Sees an Opportunity

"DICK," said Steve White, the carpenter foreman, late in the morning of Dick Prescott's second day as a carpenter's helper in the Consolidated Railway & Light Company's shop, "run over and see if old man Johnson has those vestibule belt rails ready for us. We've got to get this car out, and our time is getting pretty short."

Accordingly, Dick immediately went over to the mill. On the previous day he had seen Steve White make a rough pencil sketch and heard him tell the shop clerk to have six pieces made up in the mill in accordance with the dimensions shown. He had not, however, heard the careless boy actually transmit a verbal order to make four pieces instead of the number required. Approaching old man Johnson, who was busily engaged at the shaper, Dick asked, "Have you finished the six belt rails that were ordered yesterday?"

"Sax rails, what you mean?" queried Johnson.

"Why, George ordered six rails made yesterday for this car that has to go out in a hurry."

"Sax nothing! Dat kid only say four pieces an' I doan' mak no sax! Der's four over on dat table an' you ken tak' 'em over. Let some'on else worry!"

Well, I'm sure I heard Mr. White tell George to get six pieces made, but I'll take these right over, as there has evidently been some error."

"Er'er yes—that's ever' day in dis shop. No order, no drawin', no system, nothing! Ever'thing last minute—hurry up! Hurry up! Half d' stuff ban wrong. Believe me, I lak t' have all good lumber we spoil! Tak' 'em on over, dis shop mak' me sick!"

After delivering himself of this tirade, Johnson turned on his heel and walked away, while Dick piled the four finished rails on his arm and started back for the carpenter shop.

Steve White was again busy at his little desk, this time listing in a requisition book a long string of parts which he had discovered were out of stock.

Dick looked in the door of the office and said, "Johnson only made up four of these rails, Mr. White; I thought I heard you say yesterday that you needed six."

"What!" exclaimed White. Then turning to the boy at the time window, "George, how many of these rails did you order yesterday?"

"Why, I'm not sure, Johnson seemed to know how many to make."

"Good Lord! What's the matter with your ears? Get over there and tell Johnson to make up two more pieces right away!"

As the boy slouched out the door, White turned to Dick as though thinking aloud. "We're sure out of luck now. Can't possibly get that car out today. Suppose old Johnson has his machines set up for something else by this time."

Dick, who had been thinking rapidly, hesitated a moment and then deciding to take advantage of the opportunity, spoke up.

"Mr. White, I've done drafting work in several shops during my summer vacations and I wonder if I couldn't be of help to you right here in the office. We could set up a drawing board over there in the corner, and I could do some of this detail work of making sketches, chasing up material and other things that would give you more time in the shop."

"Well, I don't know. I've talked to the old man about putting on a man for that kind of work, but he won't listen. Says this shop has got along all right for thirty years and he don't see no reason getting loaded up with a lot of red tape now. It would sure be a big help—"

Just then the telephone interrupted and White picked up the receiver.

"That you Steve?" said Thomas Mullaney's gruff voice. "How's that car coming along? The transportation department wants to know when to send for it."

(To be continued next month)

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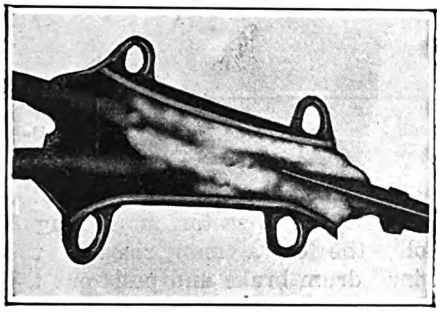
Overhead Frogs Reclaimed by Welding

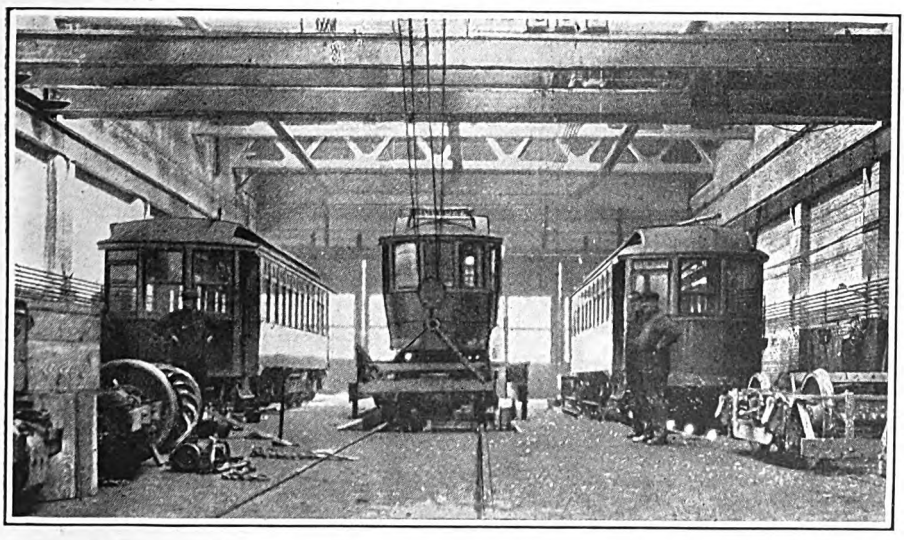
THE Springfield Street Railway has recently undertaken a program of reclaiming its overhead frogs. Investigation showed that these frogs were wearing out in the grooves rather than on the treads. Although the frogs are made of malleable iron, it was decided to try the experiment of building them up by welding. This was done with the ordinary arc-welding machine, after which the frog was ground smooth. A welded overhead frog is shown in the accompanying illustration. The process costs only 75 cents per frog, and experience has shown that a frog reclaimed in this way will wear as long as a new one. This cost figure includes labor and material for the shop work, but not the cost of taking down and replacing the frog on the line, as this would have to be done were a new frog used.



Worn Grooves in This Frog Were Built Up by Welding in Springfield, Mass.

Making Work Easier for the Mechanic

IT IS the theory of the Holyoke Street Railway that better work is done if the job is made as easy as possible for the workman. With this idea in mind, supports have been arranged to raise motors undergoing overhauling so that they can be got at more readily. Wooden horses also are used to raise the trucks to a convenient position. This plan is feasible at Holyoke because the shop is equipped with a 10-ton Niles traveling crane. With this crane it is easy to pick up motors or trucks and place them upon the supports.



All Heavy Equipment Is Handled by a 10-Ton Crane

New Equipment Available

Earth-Boring and Pole-Setting Machine

DUE to the heavy loads which the trolley and transmission lines of electric railways bear, poles must be well set in deep, clean holes. Poles for trolley lines are frequently set at an angle which makes the hole difficult to dig by hand and the pole difficult to set. Also many poles require setting in places where the working space is limited.

In order to meet these problems, the Four-Wheel Drive Auto Company of Clintonville, Wis., is marketing an earth-boring machine which not only digs the holes but also sets the poles. A special feature of this machine is equal distribution of load and power to the four wheels of the truck. This provides the large amount of traction that is necessary to negotiate bad roads, ditches, grades, etc. The turning radius of the truck is about 25 ft. 3 in., which permits the machine to go into tight places.

This special machine digs holes in any kind of soil except solid rock, raises the pole, drops it into place and then moves to the next location in considerably less time than the hole can be dug by hand. There is also a considerable saving in the number of laborers required, since three men can handle the machine conveniently. Of the three men, one drives the truck and controls the various gear shifts of the machine, one operates the earth-boring machine, and one ground man assists the machine operator.

At the front end, next to the clutch, is a set of gears known as the Debooster gears. Under ordinary operating conditions these gears are not used, the power going direct to the transmission. When the truck is required to operate under subnormal conditions, however, by engaging these gears the entire gear ratio is lowered, giving the truck a low gear ratio of 72.9 to 1. These gears are not used when the earth-boring machine is in operation, as the rotation of the auger would be too slow for satisfactory results. The only place they are used is in moving the truck over bad places.

Back of this gear assembly the transmission is located. This unit is of the sliding jaw clutch type, having gears in mesh at all times. Four sets of gears are provided in the transmission, giving three speeds forward and one reverse to both the truck and the earth-boring machine. When power is applied to the truck the power is transmitted to a subtransmission by means of a 5-in. silent chain. At this point the power is divided equally between the front and rear axles through the center differential.

In the rear of the transmission is located the power take-off, transmitting the power to the earth-boring machine. Within this power take-off is a double jaw clutch sliding which moves on the square of the transmission shaft. When the power take-off is disengaged or in neutral position, the front end of the jaw clutch is fully engaged with the silent chain upper sprocket, so that when any gear shift is made the transmission main shaft will turn the silent chain, thereby applying the power to front and rear axles. When the earth-boring machine power take-off is en-

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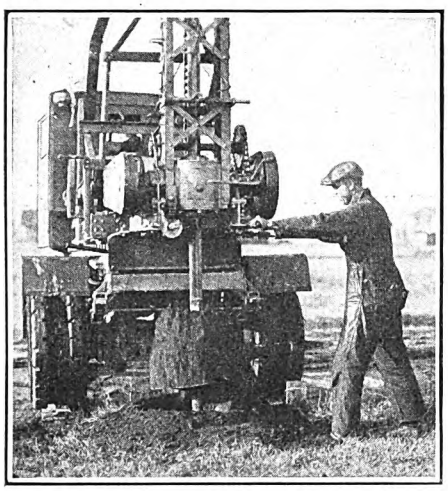
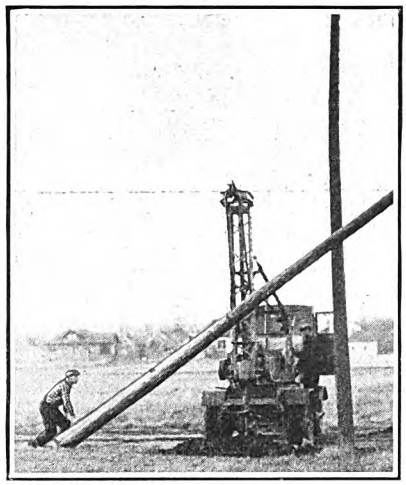
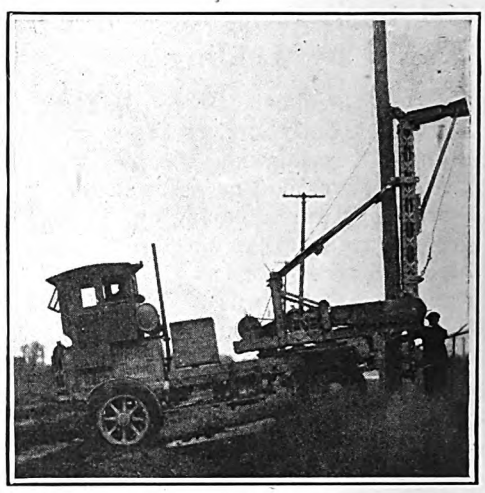




At Left, Digging a Hole. Each Load of Dirt Brought Up by the Auger Is Thrown to One Side. In Center, One Man Guides the Pole as It Is Raised. At Right, After the Pole Is Raised It Is Set in Position by the Machine

gaged, the sliding jaw clutch is pushed away from the silent chain sprocket and the other side is engaged to the shaft of the boring machine. The power is therefore transmitted from the square of the transmission shaft through the sliding clutch to the earth-boring machine. The silent chain sprocket remains stationary.

Just back of the tower brace bracket in the rear of the main shaft are two hand levers. One of these levers controls the operation of the winch drum. To engage the winch drum with the main shaft, this lever is pulled out and pushed in until the lever drops in place back of the locking block. The left-hand lever controls the operation of the sluing gear or the turning of the boring machine upon the large bull gear. This hand lever is connected with the main shaft, and the turntable can be swung to the side of the truck.

A ratchet hand lever located opposite the winch drum controls the brake on the winch drum. All levers, including the levers controlling the auger, are located on the right side of the truck within easy reach of the boring machine operator.

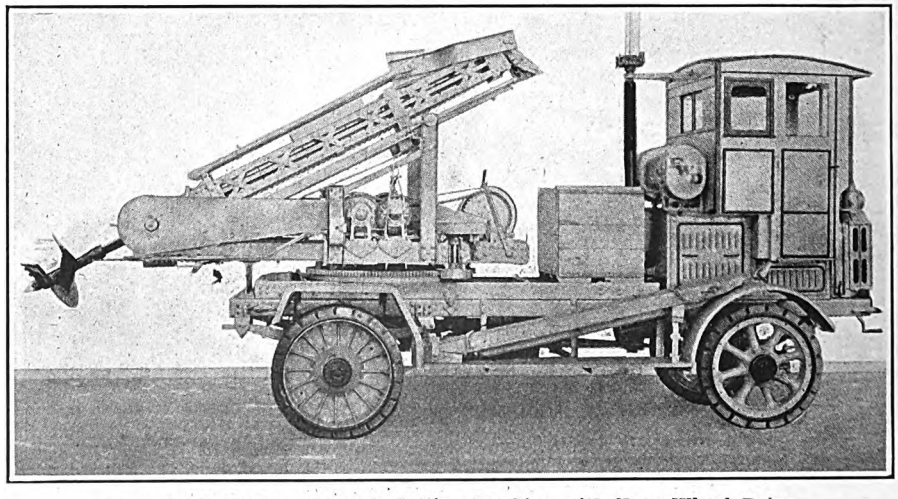
After the truck has been spotted, the emergency brake set and the wheels properly chucked, the power is applied to the earth-boring machine by shifting the central control lever out of neutral and into a position which engages the earth-boring machine power take-off with the transmission.

The signal for first speed is given, the clutch is disengaged and the speed control lever is put in the low-speed position and the clutch pedal is released. This engages the earth-boring machine power take-off with the first speed of the transmission. The engine is then accelerated to the speed called for. The speed of the earth-boring machine is controlled by the acceleration of the engine. By keeping one foot on the accelerator, the driver has full control of the engine at all times.

To dig a hole the driver is given the signal for second speed and the auger is raised from the ground by a slight jerk of the auger feed clutch lever, thereby starting the auger spinning. The driver is then given the signal for full acceleration of the engine. The auger is lowered and slowly fed into the ground by gradually lowering it with slight jerks on the feed clutch lever. When the auger is buried into the ground, the drive clutch lever is pushed in and the auger is raised above the ground by pushing the feed clutch lever. The driver is then given the signal for third or high speed with full acceleration of the engine. The dirt which has accumulated on the auger is thus discharged. This operation is continued until the auger shaft has traveled its limit or until the hole has been dug the required depth.

While the operator is digging a hole, the extra man releases the winch drum brake and pulls out the winch cable. The cable is fastened to the pole at as near a balancing point as possible. After the hole has been dug, the chuck blocks are removed from the rear wheels and the truck is driven forward until the winch boom is even with the side of the hole. The height of the boom allows raising of pole clear of the ground, with at least 1 ft. clearance between the boom sheave and the pole.

The pole is then slowly pulled toward the digger and up toward the boom. If there are wires above, the pole must be in a parallel line with the wires. The pole is pulled up slowly, with a man at the butt to guide it through the wires and bring it over the hole. When the bottom of the pole is clear a signal is given to stop, apply the brake, reverse speed and release the brake. Then, with slow acceleration of the engine, the pole is lowered into the hole.



New Earth-Boring and Pole-Setting Machine with Four-Wheel Drive

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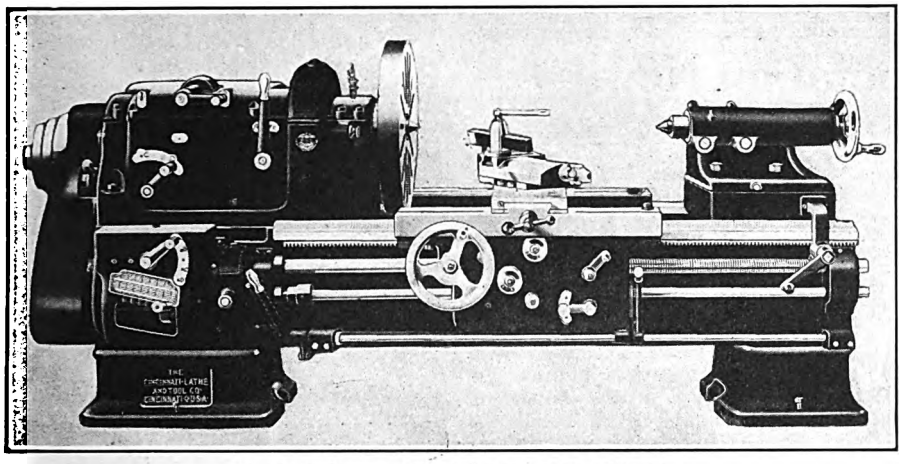


Single-Pulley, Belt-Drive-Geared Head Lathe

New Geared Head Lathe

A SINGLE-PULLEY, belt-driven lathe with twelve speeds and thirty-two changes of feeds has just been placed on the market by the Cincinnati Lathe & Tool Company, Cincinnati, Ohio. The advantages of the new machine as set forth by the manufacturer are as follows:

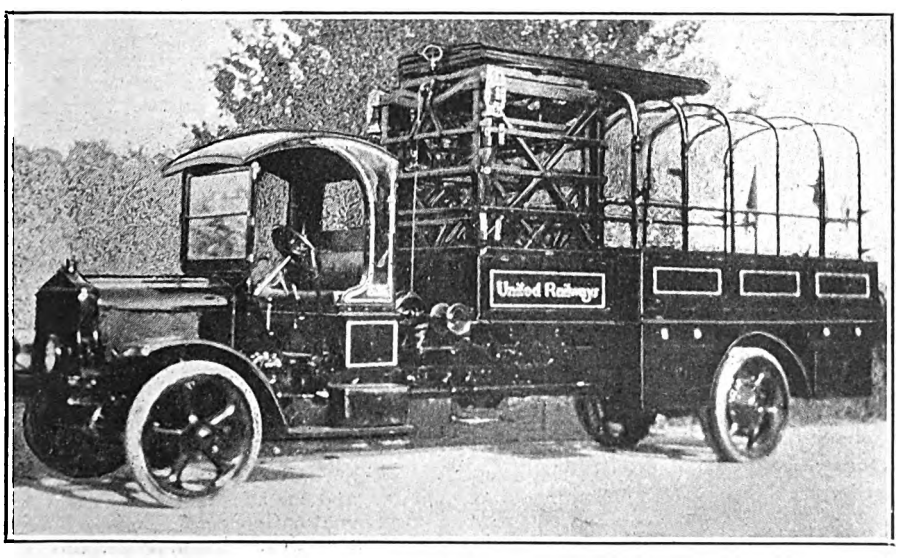
The twelve speeds can be made in an equal number of seconds and with but thirteen gears. Not more than one pair of gears are in mesh for any of the speeds, all of the gearing is contained in one solid housing. The gear velocity is low and as a result the lathe is very quiet running. Shifting levers are located so as to insure ample clearance and make it impossible to cramp or pinch the hand.

The interior of the headstocks can be inspected through an opening in the top of the cover without the necessity of removing the entire cover from the head. The splash system of lubrication in the head sends oil to all the bearings, and an indicator shows the amount of oil in the base of the head. A settling basin and a drain are provided for renewing the oil.

Provision is made for mounting the driving motor, either on the head or underneath the overhang of the head near the floor line. A low mounting of the motor brings the center of the motor near the center of gravitation of the lathe, and thus prevents vibration. Both of the drives are self-contained so that the lathe can be removed without inconvenience. These lathes can be supplied in sizes from 16 in. to 30 in.

New Tower Truck for Baltimore

THE accompanying illustration shows a tower truck which has been furnished recently to the United Railways of Baltimore, Md., by the Hampstead Mill & Body Works, Inc., Hampstead, Md. The body is mounted on a 3½-ton White truck with pole derrick, Trenton tower and winch. The sides are housed at the bottom and are divided into tool boxes of different sizes. Provision is made for carrying long tools by compartments which extend entirely through the truck body. The top has detachable bows with kahki top and curtains.

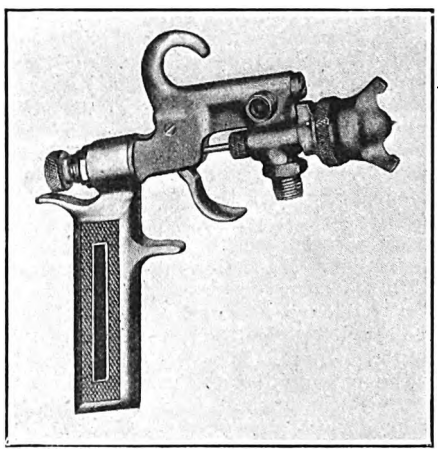


Tower Truck with New Features

Gun for Spray Painting

A GUN for spray painting that has many new features has been developed by the De Vilbiss Manufacturing Company, Toledo, Ohio. Special attention has been given to simplifying construction and reducing the number of parts and wearing points. The new gun is without yokes, links, pins, or push rods, and has only one pivot bearing. All moving parts are inclosed.

All nozzle parts are self-centering with the fluid tip and air cap positively held concentric. This makes it impossible for the nozzle to get out of alignment when parts are interchanged. The fluid tip is made of nickel alloy steel hardened, heat treated and ground. The body and other parts are made of special high strength, heat-treated aluminum alloy drop forgings. This reduces the weight of the complete unit to 10¼ oz.



New Gun for Spray Painting

A rotary air cap is provided which gives a wide fan spray when placed in a horizontal or vertical position and a round concentrated spray when placed in any intermediate position. The parts which require cleaning are all confined to a quick detachable spray head. This can be taken apart, cleaned and reassembled in less than two minutes. Special attention has been given toward providing accurate balance so that the gun will rest easily in the workman's hand, and the free finger action makes operation easy and non-tiring.

This new gun is designated as type A. Its wide range of work is claimed to result in improved spray painting.

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American Association News

Publicity Men Gather at St. Louis

IF THE directors of the state committees on public utility information entertained any doubt as to the American Electric Railway Association being in hearty accord with their efforts and willing to go to any limits to help them, they were removed at the publicity meeting on the day following the midyear gathering in St. Louis.

Directors representing more than twenty states were present. When James P. Barnes, chairman of the committee on co-operation on state and sectional associations, whose chief duty is to see that electric railway executives co-operate with the directors, and W. H. Sawyer, chairman of the committee on publicity, stood up and said that they would go the limit for the directors, they were cheered heartily.

Mr. Barnes explained that it did not seem feasible to send out questionnaires or circular letters to the industry generally, for the reason that such general ammunition seldom brought about good results and also that a very large majority of the executives are co-operating with the state committees.

"However, if you have a hard nut to crack, just let me know, and I will get on the job," Mr. Barnes said in closing.

The meeting was attended by about fifty publicity men, all of whom were given an opportunity to talk before the meeting closed. Mr. Sawyer presided.

The outstanding feature of the session was the urging of publicity men to make greater use of the radio. J. C. McQuiston of the Westinghouse Company, who organized the first radio program that company ever had and has been making up programs ever since, said that there was a vast undeveloped field for good publicity material over the radio. The hardest thing in the world, he said, is to get good copy for the program. Mr. Barnes spoke similarly regarding the use of the radio and said that it has been proving very helpful in Kentucky.

B. J. Mullaney of Chicago, who is known as one of the pioneers of the state committee movement, spoke enthusiastically regarding the plan of the association for reaching the individual member. He said he believed that this plan came nearer reaching the grass roots of the situation than that of any of the national utility associations.

Mr. Sawyer and E. F. Wickwire, chairman of the committee on co-operation of manufacturers, called especial attention to current work of the Advertising Section and told how in their opinion the directors could be of service in disseminating advertising material through encouraging electric railway executives to use it.

E. B. Atchley, Northern Ohio Traction & Light Company, made a rousing speech in which he pointed out that many executives were weakening their positions by not doing persistent advertising and publicity work. He said that many executives thought the proper way to do advertising was to begin taking full pages a week or so before they wanted to accomplish something. Failing to obtain the desired results, they blame it on the advertising.

These remarks by Mr. Atchley moved E. E. Soules, Illinois Traction System, to add a few words in a similar vein. He told specifically of one case that he had in mind where an executive who has done no advertising is planning a thirty-day campaign in the hopes of getting a new franchise.

One thing that was especially noticeable was that the directors of public utility information committees voiced their feeling that the railway men were now really appreciating the publicity and advertising end of their business, and were as a whole really doing good work. At previous meetings of this kind the railway man has always been criticised for lack of publicity interest.

Included among those present were State Directors Benjamin E. Ling of Ohio, John C. Mellett of Indiana, George McQuaid of Texas, Horace M. Davis of Nebraska, Joe Carmichael of Iowa, J. B. Sheridan of Missouri, George E. Lewis of Colorado, Earle W. Hodges of Little Rock, Ark., and Samuel T. MacQuarrie of Massachusetts.

Welding Committee's Request Was Approved

E. M. T. RYDER has checked up with President Budd as to the action taken by the executive committee in St. Louis on March 3 on the request of the welding committee for release of the funds originally appropriated for use in building a rotary test machine, to be used in making tests of another nature. There was some difference of opinion as to what action was taken. The JOURNAL printed on page 377 of the March 8 issue the statement that the executive committee did not approve the request of the welding committee. In its original report of the meeting the JOURNAL had recorded the action as approval, but this was changed by one of the officers of the association who understood the action to have been disapproval. This confusion undoubtedly came from the jocular manner in which the motion was finally put. Harry Reid said at the end of the discussion:

"Mr. President, I would like to move that your ideas be embodied in a motion which I would be glad to present."

This came about because two other motions had been made which did not seem to meet the situation, and yet it was evident that the committee desired to carry out the wishes of the president, who had previously said:

"I am perfectly willing that the committee should use the funds that it has for the other purpose, whatever it may want to do with them, but I would like to foreclose any demand for any further money from the association for construction of a machine, if we grant the request that these funds be used as the committee may see fit in its experiments." Later Mr. Budd expressed himself thus:

"I don't seek to minimize the importance of the committee's work, but I will not, as long as I am at the head of the association, acquiesce in the appropriation of any more money for building a machine. . . . I don't believe in an industry such as ours, if you cannot get from actual operating experience in our big companies, under the direction of this committee, sufficient funds to make the demonstrations in practical operation, under practical operating conditions, that you are going to get anywhere by designing a machine to duplicate operating conditions. . . ."

Hearing on Section 15-A

ON MARCH 19 some sixty representatives of interurban railways appeared before the Interstate Commerce Commission in Washington for a hearing to determine whether Section 15-A of the transportation act shall be interpreted to include electric interurban railways. A report of the principal features of the case made by the railway men will be published next week.

News of Other Associations

Illinois Utilities Joint Meeting

THE fourth joint convention of the Illinois Electric Railways Association, the Illinois Gas Association and the Illinois State Electric Association will be held at the Hotel Sherman, Chicago, on March 26 and 27. Joint sessions will be held in the mornings, the meeting on Wednesday being given over to reports of committees and district chairmen, while on Thursday there will be a symposium on "What the National Associations Are Doing" by Alexander Forward, M. H. Aylesworth, Britton I. Budd and A. C. Hall.

At the electric railway session on Wednesday afternoon papers will be presented on "Educating the Public," by Luke Grant; "Education of Employees," by C. B. Goodsell; and a report of the A.E.R.A. committee on co-operation with state and sectional associations by G. W. Welsh.

At the Thursday afternoon session papers will be presented on "Bus Transportation," by Garrett Seeley; "Light-Weight Double-Truck Cars," by H. H. Adams; "Some Problems Involved in the Construction and Maintenance of Electric Railway Tracks," by S. Clay Baker.

At the banquet to be held on Wednesday evening the principal speaker will be Floyd W. Parsons.

New England Club Program

THE twenty-fourth annual meeting and banquet of the New England Street Railway Club will be held at the Copley Plaza Hotel, Boston, on March 27. The annual meeting, with election of officers, will be at 3 o'clock. There will be a reception at 6 o'clock, followed by the dinner. The Hon. Robert M. Washburn will be toastmaster, and the speakers will be United States Senator George H. Moses of New Hampshire, Gov. Channing H. Cox of Massachusetts, Mayor James M. Curley of Boston and the Rev. William Porter Niles.

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The News of the Industry

Bus Talk in Cleveland

Two Sets of Interests Active—Cleveland Railway States Its Attitude —Hearing Set for April 10

Bus interests are threatening the Cleveland Railway with competition. A company, known as the Cleveland People's Motor Bus Corporation, has already requested the Ohio Public Utilities Commission to grant it a certificate of convenience and necessity for the operation of 175 double-deck buses paralleling fourteen of the main routes of the railway.

This company says it desires to operate its buses on a six to eight-minute headway between 6 a.m. and midnight, and that it will provide seats for each passenger, charging a 10-cent fare. It also insists that it will not really be in competition with the railway, but will give a parlor car service, something between that supplied by the taxicab and the street car. Most of its business, so the representatives of the company say, will come from people who now drive their own cars to business. A hearing on this company's application will take place on April 10 before the State Public Utilities Commission at Columbus.

Representatives of another company, backed by interests controlling the Red Top Taxicab Company, say they are prepared to provide bus service in Cleveland, if the Cleveland Railway is not disposed to give this sort of service.

Under the Tayler service-at-cost franchise in Cleveland, the railway and the car riders are partners. Because of this fact, the City Council takes the position that if there is any bus service in Cleveland the Cleveland Railway should give it. John J. Stanley, president of the Cleveland Railway, says his company is willing to operate buses providing Cleveland people desire this service and the City Council authorizes the company to give it.

At a hearing before the committees of the Council on public utilities and street railway Mr. Stanley asked the representatives of the Cleveland People's Motor Bus Company whether they would be willing to accept a bus franchise containing terms similar to the Tayler franchise, which limits the return to stockholders to 6 per cent a year. The representatives of the Motor Bus Company present said they were unable to answer this question in the absence of financial backers, and the hearing was adjourned for a fortnight.

Members of City Council and others versed in the law are of the opinion that the State Public Utilities Commission has no jurisdiction over Cleveland streets and cannot allow any bus company to operate in Cleveland without a franchise from the Cleveland City Council, because Cleveland is a charter city functioning under the home rule provision in the state constitution. If this view is upheld by the State Public Utilities Commission on April 10, or by the courts, as appears likely, it is believed that if buses are operated in Cleveland, they will be controlled and operated under the direction of the Cleveland Railway.

Nine-Cent Fare in Cincinnati

Fares in Cincinnati will be increased from 8½ to 9 cents beginning April 1. The Cincinnati Traction Company has posted notices in its cars that such increase will be put into effect under the terms of the service-at-cost franchise ordinance. W. Jerome Kuertz, Director of Street Railways, recently called attention to the fact that there was a large deficit for the current quarter in the company's receipts and that the city franchise tax would not be earned in full during the quarter. Under the ordinance the fare is to be raised ½ cent at the beginning of the next quarter when such conditions exist.

The increase of ½ cent in the rate of fare will affect only about 65 per cent of the riders, as 35 per cent now pay the 9-cent cash fare. Under the new rate no tickets will be sold at 8½ cents. Every one will pay 9 cents a ride, whether he tenders cash or buys tickets.

It will be necessary for the city and the street railway to agree upon a modified franchise and for the stockholders of the traction company and the street railway to approve the terms of the agreement between them before the new financial arrangements intended to be carried out by the Cincinnati Street Railway and the Cincinnati Traction Company can be put into force. This will take several weeks' time at the very least. For this reason the corporate changes could not be carried out in time to stay the fare advance.

Commission Against Five-Cent Fare for Trenton

The State Board of Public Utility Commissioners has informed Mayor Frederick W. Donnelly of Trenton, N. J., that the present 8-cent fare of the Trenton & Mercer County Traction Corporation is not excessive. The board disagrees with the Mayor in his stand that a 5-cent fare should be fixed. In reply to the suggestion of the Mayor that a lower fare would probably result in an increase in the number of car riders, the commissioners state that an attempt to force a reduction in rate without evidence of an excessive return should not be made unless it appeared clear at the present time that the company could bring about such reduction without creating a deficit which later might have to be made up by a higher fare.

Franchise in Columbus

Twenty-five-Year Grant for Ohio City Now Up for Discussion by City and Railway

Surrender of the perpetual franchises of the Columbus Railway, Power & Light Company, Columbus, Ohio, at the expiration of a ten-year period, immediate extension of two lines in the city and a yearly extension of 1 mile during a ten-year period, are the principal features of a proposed franchise ordinance introduced at the meeting of the City Council on March 17. A round table discussion between members of the City Council and officials of the company was set for March 21.

The franchise as proposed would be effective for a period of twenty-five years. It provides also that the company shall spend $200,000 this year for new equipment and that there shall be no change in the present fare, namely, 6 cents cash, or five tickets for 25 cents and free transfers.

The perpetual franchise clause says:

> The rights, privileges and grants herein made are so made with the express understanding and on the condition that the acceptance hereof by the Columbus Railway, Power & Light Company shall operate as a surrender by said company, its successors and assigns, of all claims or rights to any and all perpetual franchises in any street or streets in the City of Columbus, all such claims to terminate with the expiration of the franchise herein granted.

As to railway extensions, it is provided "that either the city or the company may propose extensions, and Council at its discretion may require reasonable extensions operated by the company under safeguards considered reasonable to the company and the city."

The immediate extension of two car lines, as provided in the franchise, does not apply to this 10-mile provision. One of the car lines, the Summit Street, will be extended 1 mile within the next six months, while the Mound Street line will go to the city corporation line. Provision is made that Indianola Avenue, on which the former line is to run, shall be widened to 50 ft. or more from curb to curb within six months.

In addition to these extensions it is also proposed that the company shall change the narrow gage tracks of part of the North High Street line to the corporation line to permit other cars to operate over the tracks. This improvement is to be made one year after the passage by the City Council of an ordinance directing it, the proposed franchise holds.

Arrangements have been made, if the franchise is adopted, whereby railway service to Clintonville, a suburb, will be extended for the distance of 1 mile. This, together with the West Broad Street extension, will make 2 miles of additional line available immediately, provided Council takes early action on the measure.

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Monorail Plan Rejected at Detroit

The Detroit Rapid Transit Commission has had under consideration the petition of the Michigan Elevated Railway relative to considering that company's equipment in connection with rapid transit for the city and reported that it does not feel warranted in considering for Detroit any type of transportation not fully developed and proven in operation. The observations of the commission as set forth by Sidney D. Waldon, chairman, include the statement that in considering the question of rapid transit for Detroit the commission has dealt with the subject from the viewpoint of the requirements of the city in 1950, with a probable population of 2,500,000, as well as with the needs of the present city with its present population. The capacity for mass transportation, practicability of operation, economy of construction and general desirability have been the governing considerations of the commission's study.

The commission arrived at this conclusion after a careful study of all types of elevated railways in operation here and in Europe. Among those types the monorail lines, existing and proposed, were included. There are two monorail lines in operation—one in Ireland, of a type where the weight for the car and passengers is balanced on either side of the rail, the car just clearing the ground, and one in Germany, connecting the industrial towns of Barmen and Elberfeld, of the free suspended type, the structure carrying the car being at a height sufficiently above the ground to clear the traffic. This system has been in operation since 1901 and repeated attempts have been made to secure its adoption in Berlin without success.

It is cited that there are no monorailways in operation in the United States.

The commission has made surface rapid transit the keynote of its plan. By so doing, it will effect a saving of millions of dollars in future construction and at the same time offer a means of handling and controlling the motor traffic expansion of the future at a reasonable cost, it is believed by the commission. It considers this feature too valuable in the interest of the community to justify abandoning it for any other type or for an undemonstrated possibility.

Both Trolley and Bus Needed in Newark

Rapid, safe, sanitary and comfortable mass transportation in the morning and the evening rush hours is necessary in Newark. In order to meet that need the city requires the full resources of both the trolley and the bus. These are among the main findings contained in the report just presented by a committee of the local Chamber of Commerce appointed to inquire into the matter.

The committee holds that the elimination of the independent bus owner from the transportation field is neither necessary nor expedient. The independent operator, according to the committee, has a distinct field, not only to fill certain present demands but also to develop new routes and territory.

The conclusion of the committee is that co-ordinated service should be committed to the Public Service Railway, but that co-ordinated service applies only to those routes on which the bus and the trolley are in competition. The committee says that "healthy competition along salutary lines should be fostered and encouraged." The committee expresses the belief that the adoption of the principles which it lays down will mean to Newark and its sister communities "a 5-cent fare, no monopoly and growing transportation as Newark grows."

Extension of Franchise Sought in Springfield, Ill.

A new franchise for the Springfield Consolidated Railway, Springfield, Ill., is up for consideration. Proposals and counter-proposals have been made. The present franchise does not expire for four years but the company had given notice to the city through A. D. Mackie, general manager, that it would be unable to go ahead with its share of the public improvement program unless the franchise was lengthened. The company is paying for its share of the improvements which run into thousands of dollars by the sale of bonds. Under the present franchise, soon to expire, the company has found it difficult to carry out necessary financing to the best advantage.

In its appeal the company requested that the sections of the old ordinance providing that the company pave between its tracks and that the company pay a franchise tax to the city, be done away with. These requests were supported by the contention that these costs, which run into high figures, are in the last analysis met by the passenger and not by the company.

A number of sections of the company's proposal refer to buses as well as street cars, and the ordinance provides that a blanket franchise shall be voted to the company covering all the streets within the present limits of the city of Springfield, or within the boundary lines as they may be extended from time to time during the twenty years, subject to the selection of specific streets from time to time by the Council and the company.

The counter-proposal of the city was drawn by City Attorney Sampson. It denies the plea of the company that the paying charges section be discarded and drops the special tax only in part.

Among the provisions of the ordinance suggested in behalf of the city are:

1. That the company shall pay for all paving between its tracks.

2. That the company shall pay a 4 per cent tax on its gross earnings for ten years and a 2 per cent tax for the next ten years. In the old ordinance under which the company is now operating it paid 2 per cent for ten years and 4 for the next ten.

3. That buses be used on certain streets to give additional service to thickly populated sections of the city.

4. That the city reserve to itself the right to purchase the street railway at any time during the life of the franchise at a price to be determined upon by arbitration.

Board Backs Mayor's Anti-jitney Ruling

A definite stand to support Mayor Edwin F. Leonard of Springfield, Mass., in his decision to rule independently operated buses from the streets of the city after May 1 was taken by the transportation board March 18 following a hearing before which a committee of the Springfield Bus Owners' Association appeared.

The decision was made on the ground that the street railway is a necessity and that it is unfair to allow any independent transportation group to take away any of the patronage from an essential service.

Richard J. Talbot, counsel for the Bus Owners' Association, was told by Alderman John D. Stuart, chairman of the transportation board, that if the bus owners secured signatures of half the voters in the city giving it as their opinion that the buses should be retained, the board will again consider the matter of continuing their licenses. Mr. Talbot says that an effort will be made to comply with that condition.

Upholds Fight Against Unionizing Pacific Electric Employees

The United States Supreme Court at Washington, D. C., in a decision on March 3 upheld the fight against unionizing the Pacific Electric Railway, Los Angeles, Cal. This ruling puts a final and permanent quietus on the efforts of professional organizers to unionize the employees of this system. M. E. Montgomery and J. A. Farquharson of the Brotherhood of Locomotive Engineers and Brotherhood of Railway Trainmen had petitioned for a writ of review to reconsider the decision of the Circuit Court of Appeals, rendered in Los Angeles on Nov. 13 last. That decision was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Dec. 1, 1923. This final decision enjoins the two brotherhoods and their officers and agents and all others acting with them from making any attempt to cause the Pacific Electric employees to join such brotherhoods and through them deal with the Pacific Electric Railway.

The numerous court actions grew out of the strike of Pacific Electric trainmen in 1918. At that time the company obtained a temporary injunction restraining the brotherhoods in their efforts to unionize the company's employees. This injunction was granted the United States District Court of Los Angeles. The next day the strike collapsed.

The brotherhoods later appealed to the United States District Court of Appeal at San Francisco and this court sustained the order of the lower court granting the temporary injunction. The case then came up for trial on the issues involved before United States Judge Radkin, who was sitting as a visiting judge in the Los Angeles Federal court in the early part of 1923. The case being decided in favor of the Pacific Electric Railway, the brotherhoods appealed to the District Court of Appeal, which sustained the lower court a second time. The brotherhoods then appealed to the United States Supreme Court for a writ of review.

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Franchise Agreement in Birmingham

At a conference between the City Commissioners of Birmingham, Ala., and the receivers of the Birmingham Railway, Light & Power Company, held on March 15, the receivers agreed to pay the city the sum of $35,000 for a thirty-year franchise over 140 blocks of city streets scattered over the city. Thy represent about 10 per cent of the trackage. The remaining 90 per cent was originally granted in perpetuity. In discussing the franchises City Commissioner Harrison indicated that with these franchises for short stretches of track expiring in periods of from four to six years it was in the interest of the city to accept any reasonable offer, particularly as the question was tied in with the lifting of the receivership and the franchises for the short stretches had no inherent value except in so far as they were joined with the perpetual grant so as to facilitate the operation of the system as a unit.

Seattle Employees Gain Support of Committee in Income Fight

In their fight against paying the federal income tax, the Seattle Municipal Railway employees have won the support of the city utilities committee of the City Council of Seattle, Wash. The committee recommended that the corporation counsel be asked to contest the ruling, which, in effect, declares that the railway workers are not exempt from the income tax, as are other city employees. The theory of the ruling is that the railway is not a branch of the city government, but a business venture of the city. A federal court injunction may be procured against the tax collector.

Traffic Experiments in Milwaukee

A co-ordinated effort is being made to solve the traffic problem in the downtown section of the city complicated by the addition of the city buses of the Milwaukee Electric Railway & Light Company to the present traffic. The safety commission with the co-operation and permission of the railway has proposed that two experiments be made to fix the best practice. One plan of the bus zoning experiment, to be given a two weeks' trial, will involve the marking off of spaces in each block of Grand Avenue sidewalks in the rear of the street car safety zones where the buses may drive up and stop flush with the walk and load and unload passengers. No other vehicles will be allowed to occupy these zones which will act as platforms. The other plan which will also be given a two weeks' trial will be to have the buses stop on the car tracks loading and unloading passengers from the same safety zones that cars now use.

Air Pressure Tank Order Expected in Indiana

An order is in preparation requiring interurban and street railways in Indiana to show on each car the date of safety inspection of air pressure tanks on cars and otherwise providing greater protection for passengers from possible explosions of such tanks, due to overpressure. The order will be promulgated by the Public Service Commission. It is understood that the commission will require that the tanks be equipped with safety "blow-offs" and be reguarly inspected. On March 4 the commission held a conference with representatives of railways looking toward such regulation. A committee was formed consisting of G. R. Green, master mechanic of the Chicago, South Bend & Northern Indiana Traction Company, and others. This body has drafted recommendations for the order. David E. Matthews, chief of the inspection division of the commission, is preparing the recommendations, together with suggestions of the division for presentation to the commission, which then will issue an order.

Bill Assessing Property for "L" Removal Signed

The two Burchill bills authorizing New York City to remove the elevated structure on Sixth Avenue were signed on March 18 by Governor Smith. Under the new law the railroad will be compensated by the city for the destruction of its property. An additional assessment against the property to be benefited by the improvement will be made by the city.

One of the bills provides for the removal of the spur from Fifty-third to Fifty-ninth Street and the other for the removal of the rest of the Sixth Avenue elevated line from Fifty-third Street to the Battery, and the construction of a subway to replace it, including, of course, the necessary connection with existing and projected subway lines.

Julius Miller, president of the Borough of Manhattan, who sponsored the removal, has announced that he will submit to the Board of Estimate plans for the demolition of the spur. No opposition is expected, as the members of the board are understood to be united on the desirability of its removal.

Bus Operation in Port Jervis Ready When Authorized

Plans for bus operation in connection with the railway lines of the Port Jervis Traction Company, Port Jervis, N. Y., were outlined at a hearing on the application of the Port Jervis Transit Company, Inc., subsidiary of the railway, for such operation before the Public Service Commission, March 17.

The company wants a permit to run two twenty-one-passenger Locomobile "Road King" buses on a one-hour headway over certain streets of Port Jervis. The desired route runs practically north and south through the city. The railway lines run approximately east and west. Transfer from bus to trolley and vice versa will be free. The fare will be 5 cents for each of two zones. A 10-cent through fare will be charged with ten tickets for 75 cents. The buses will serve a district heretofore without public transportation facilities. No action has as yet been taken by the commission.

Extensive Traffic Survey Planned for Los Angeles

Following appeals from the Los Angeles Traffic Commission to take early action in the matter of definite relief to traffic congestion in the downtown district of the city, the City Council proposes to approve an appropriation of $40,000 to carry out an extensive transportation survey of Los Angeles. The survey is to be conducted under the supervision of F. A. Lorentz, chief engineer of the Board of Public Utilities, and it is planned to engage Major R. F. Kelker of Chicago to direct the survey. It was urged that the appropriation be raised to $100,000, with the request that Los Angeles County contribute half of this amount, as the survey to accomplish the desired results must extend out into the county highways.

With the rapid automotive growth it is considered necessary that a comprehensive subway system be planned and constructed and street cars be removed from the street surface.

It is contended by the City Council that a bond issue of $125,000,000 would be required to finance the subway system, but the bonding capacity of the city, it is stated, will not allow such bond issue to be voted by the people. On the other hand, it has been suggested that private capital be induced to construct a rapid transit system.

The Pacific Electric Lines took the first step to relieve traffic congestion in Los Angeles when on Feb. 21, 1924, preliminary work was undertaken on its Hollywood-Glendale subway.

Bus Suggested for Shore Service

Philander Betts, chief inspector of the Board of Public Utility Commissioners of New Jersey, recently appear before the Chambers of Commerce of Cape May and Atlantic City and submitted a report on the electric railway situation on the shore in which he urged bus service on the shore road between Absecon and Pleasantville and the elimination of one-man cars on the suburban line. He urged the Atlantic City & Suburban Company to abandon duplicate service across the meadows and submit a report to the commission by April 1. The expert for the railway also advocated the elimination of the combination baggage and passenger cars now in use on the Atlantic City & Shore Fast Line.

Neutral Arbitrator Selected

Lewis C. Parker of Westfield, Mass., has been selected as neutral arbitrator in the dispute between the Worcester Consolidated and Springfield Street Railway Companies and the carmen's union. The carmen are asking for an eight-hour day, a six-day week and an increase in pay of about 20 cents an hour; also a reduction in the maximum spread for combination runs from fourteen to eleven hours. The company offers to continue the present maximum wage of 58 cents, but wants to eliminate certain bonuses, or if the bonuses be not eliminated, to decrease the hourly wage by 5 cents. Bentley W. Warren represents the companies and James H. Vahey the carmen in the proceedings.

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Higher Fare Increases Revenue by $40,000

Increase to an 8-cent fare with tickets selling at four for 30 cents brought in approximately $40,000 added revenue for the Community Traction Company, Toledo, Ohio, during February, according to the report of Commissioner W. E. Cann to the board of control at the monthly meeting.

Passenger traffic was scarcely affected at all by the fare increase. The average daily business was 182,092 revenue passengers in February, as compared with 178,574 in January and 182,305 a year ago. This was 8.67 passengers per car-mile, which is the highest since last March. Total revenue passengers numbered 5,280,660 for the month. As a result of operations there was added to the stabilizing fund in February $18,322, as compared with $2,757 for the same month last year. A credit of $15,000 for extraordinary maintenance was made in addition to the $40,000 usual allowance. Gross revenue amounted to $364,719, as compared with $312,946 last year. Operating expense of $179,000 represents an increase of 2.067 cents per car-mile, which is due almost entirely to the higher wage scale now in effect. Ratio of operating expense to gross income is 69.551 per cent. Operation of the bus feeder lines showed a loss of $860.65 for the month.

One Bid on Bus Lines.—Only one bid has been received by the City Commission of Astoria, Ore., on bus lines to supplant the Pacific Power & Light Company's system, which is to suspend operations. It was submitted by S. W. Lovell, Astoria, and W. E. Young, Portland, under the name of the Astoria Transit Company. The bidder asks for a twenty-year franchise, agrees to give a fifteen-minute service with not less than six Mack buses, charge a fare not to exceed 10 cents and pay 2 per cent of the gross receipts to the city. The bid is being examined by the city manager and attorney.

Appears to Contest Lower Fare.—William H. Maltbie, representing the United Railways & Electric Company, Baltimore, recently appeared before the Senate committee on corporations at Annapolis in opposition to the passage of a bill offered in the Maryland General Assembly to force the company to reduce fares in Baltimore from 7 to 5 cents. Interesting data were contained in a chart submitted to the committee by Mr. Maltbie showing how the 7-cent fare is expended.

Bus Service in Summer Months.—The Hartford & Springfield Street Railway has projected a limousine bus service between Springfield, Mass., and Hartford, Conn., in the summer months, in addition to the service now being maintained, which includes buses from Springfield to Windsor Locks and electric cars for the rest of the route. It is proposed to fix the fare for the round trip at $1.25. Occasional excursions from Hartford to more distant points, to include Greenfield and Brattleboro, are contemplated.

Bulletin Tells Everything.—The Pittsburgh Railways, Pittsburgh, Pa., has issued a time-table guide and general information bulletin for its patrons. The booklet contains a description of the various points of interest in the city and the routes to arrive at such places, a little account on parking regulations, something about what happens to your fare after you give it to the company and some things the company is actually doing to improve service. A map is included showing the territory served by the Pittsburgh Railways.

Electrification Planned.—The Reading Company (Philadelphia & Reading Railway) Philadelphia, Pa., has announced intentions of electrifying its line between St. Clair and Frackville, Pa., at an estimated cost of $1,500,000. Preliminary plans and surveys are now under way for this improvement, which will include automatic substations, line equipment, etc.

Wants to Discontinue Transfer Use.—The Puget Sound International Railway & Power Company, Everett, Wash., has asked permission from the State Department of Public Works to discontinue the issuance of transfers on its bus system, which superseded the company's railway system in Everett. The company has asked permission to try for ninety days, beginning April 1, operating without transfers, alleging that the present fare of 5 cents will no longer permit issuing transfers.

Two Arbiters Named.—Representative Peter F. Tague of Massachusetts has been named to represent the union trainmen of the Capital Traction Company, Washington, D. C., on the arbitration board to determine whether wages of motormen, conductors and shopmen should be increased at this time. The Capital Traction Company announced that its arbitrator will be Stanton C. Peelle, member of a law firm. These two men will select a third arbitrator to represent the public.

New Buses in Hartford.—The Connecticut Company has purchased two new buses to put in operation on the Maple Avenue route, Hartford. The new buses will seat twenty-nine people. Buses at present in use on Maple Avenue will be transfered to the High Street line.

Fares Lowered.—Reduced fares for school children between the ages of five and twelve went into effect on the cars of the Olean, Bradford and Salamanca Railway, in Salamanca, N. Y., on March 8. Tickets are now sold in sets of five for 25 cents, and these tickets are good in the city limits of Olean, Bradford and Salamanca, but not on interurban cars.

Franchises Advertised.—D. P. Abercrombie, receiver for the Connecticut Valley Street Railway properties, has advertised franchises, tracks and all buildings and equipment to be sold at private sale, and invites offers up to March 28. The sales are to be subject to approval by the Massachusetts Supreme Court.

Winter Hard on Railways.—The United Electric Railways, Providence, R. I., has estimated that the recent record March gale will cost between $20,000 and $30,000. Transportation is now entirely restored within the city limits and outside the limits. The Union Street Railway, New Bedford, Mass., has just recovered from the effect of a severe blizzard which crippled the interurban line to Fall River. Nearly one-quarter of the company's Much of the company's overhead work was blown down.

Trolley Likely to Go.—The Hornell Traction Company, Hornell, N. Y., has decided not to keep the line in operation more than two months longer. In the meantime, a plan is to be submitted to the stockholders to sell the equipment and put in operation a fleet of buses under a franchise from the city.

Railway Complains of Bus.—In letters signed by Col. Albert T. Perkins, manager for Receiver Rolla Wells of the United Railways, St. Louis, Mo., addressed to the St. Louis Board of Public Service protest is raised against the operations of the People's Motorbus Company in that city. The railway complains that the operation of buses on Lindell Boulevard interferes with cars and other traffic and that the buses are a menace to life and property, particularly east of Twelfth Boulevard, the congested section of the city.

Franchise Deal Confirmed.—The private bills committee of the Legislature on March 13 confirmed an agreement between Ottawa city and the Ottawa Electric Railway, Ottawa, Ont., renewing the franchise of the company for thirty years with a 5-cent fare for that time. There is a provision that at the end of each five years the city may take over the railway at its arbitrated value. One point debated was whether the railway should be exempt from taxation for school purposes. The bill, however, carried without amendment.

Radio Talks Reprinted.—The radio talks on "The Boston Elevated—As You Should Understand It" by Edward Dana, general manager of the property, have been reproduced in pamphlet form. This nineteen-page pamphlet is illustrated. Portions of Mr. Dana's talks were published in the ELECTRIC RAILWAY JOURNAL, issue of Jan. 12, 1924.

Upholds One-Man Car.—The use of one-man cars effecting lower operating costs in the Commonwealth has been commended by the commissioners in the annual report of the Massachusetts Department of Public Utilities. The statement is made that the use of these cars has been the deciding factor in enabling the companies to render service that otherwise could not have been furnished at all and to render more frequent service where the service formerly given was infrequent and inadequate.

Same Insignia on Buses.—The buses of the Los Angeles Railway will hereafter be inscribed with "Los Angeles Railway" spelled out in full length along the sides. They were formerly monogrammed "L. A. Ry. Co." It was decided that since the buses were a part of the railway they should be marked exactly like the street cars.

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Financial and Corporate

Youngstown Lost $198,678 in 1923

Gross Revenue Rises 14.5 per Cent, but Mileage Increases 18.8 per Cent—Deficit Reaches $1,039,794

The 1923 report of the Youngstown Municipal Railway, issued through Harry Engle, Street Railway Commissioner, indicates that the deficit in the fare stabilizing fund has increased to $1,039,794.

FINANCIAL AND SERVICE STATEMENT OF THE YOUNGSTOWN MUNICIPAL RAILWAY

Gross Earnings

1919	$1,418,217
1920	1,907,252
1921	1,463,352
1922	1,491,095
1923	1,707,530

Car-Miles of Service

Year	Trolleys	Bus	Total
1919	3,358,834	.....	3,358,834
1920	3,459,510	.....	3,459,510
1921	3,579,532	.....	3,579,532
1922	4,010,067	112,901	4,122,968
1923	3,979,806	919,557	4,899,364

Passengers Carried

1919	24,500,000
1920	28,493,713
1921	21,703,998
1922	26,337,168
1923	28,807,622

Capital Value

Jan. 16, 1919	$3,900,000
Dec. 31, 1919	4,384,484
Dec. 31, 1920	4,384,603
Dec. 31, 1921	4,406,071
Dec. 31, 1922	4,510,994
Dec. 31, 1923	4,640,298

Damages

1919	$79,359
1920	162,658
1921	142,169
1922	154,942
1923	135,440

Taxes

1919	$86,477.32 paid in 1920
1920	93,588.03 paid in 1921
1921	83,897.23 paid in 1922
1922	96,710.46 paid in 1923
1923	97,735.30 paid in 1924

Stabilizing Fund Deficit

Jan. 15, 1919, cash in bank	$100,000
Dec. 31, 1919, cash in bank	20,946
Dec. 31, 1920, deficit	19,837
Dec. 31, 1921, deficit	524,140
Dec. 31, 1922, deficit	841,115
Dec. 31, 1923, deficit	1,039,794

Losses in Operation

1919	$76,153
1920	40,684
1921	504,304
1922	316,974
1923	198,679
Total	$1,139,794

Recapitulation for Year

Gross revenue from all sources		$1,707,542
Operation	$1,144,858	
Maintenance	359,478	1,504,336
Revenue before taxes		203,205
Taxes		97,735
Revenue before payment of rent		105,470
Rent		304,149
Deficit after payment of rent		198,678

Gross increased from $1,491,095 to $1,707,530, or 14.5 per cent, but mileage increased from 4,122,968 to 4,899,364 vehicle-miles, or 18.8 per cent. Almost all of this increase was in bus-miles. The actual increase in motor-bus miles was 808,656, but the total increase (776,396 vehicle-miles) was somewhat less owing to the replacement of two car routes by bus routes.

The first buses were installed on Dec. 1, 1922, on two new routes. On March 18, 1923, the Indianola and South bus lines were added to cover more ground than the replaced Woodland and Williamson car routes. Later in the year more bus routes were added, making a total of seven. At present, the commissioner has ten new buses for installation as soon as the jitneys are finally ejected.

If allowance is made for the increase in vehicle-miles the earnings per mile in 1922 were on the order of 36 cents, whereas in 1923 the average was only 34.8 cents, against a cost of service of 39.1 cents.

During all of 1922 and up to April 1, 1923, inclusive, the fare was 9 cents cash, 8½ cents tickets, 1 cent transfer and $1.25 weekly pass. At the suggestion of Commissioner Engle the company installed a schedule of 7 cents cash, 6⅔ cents tickets and 1 cent transfer on April 2, 1923. Revenues decreased and after ten weeks the company went to a scale of 8 cents cash, 7 1/7 cents ticket and 1 cent transfer. This produced some improvement, but still left the revenue per vehicle-mile below the figure of 1922.

The figures for the past five years as presented in the report to City Council are contained in the accompanying table.

$2,436,238 Net Income for Atlanta Company

No separate statement of earnings of the railway department is contained in the report of the Georgia Railway & Power Company, Atlanta, for 1923. Operating revenue of the entire system was $16,006,928 in 1923, compared with $14,449,497 in 1922. The net income for 1923 before depreciation and dividends was $2,436,238, compared with $1,917,043 for 1922. On Dec. 31, 1923, the total mileage of street railway tracks (on a single-track basis) owned, or leased and controlled and operated by the company, exclusive of the street railway mileage in Gainesville, was 244 miles. During the year 1923 the company placed an order for twenty city type electric railway double-end prepayment passenger cars, with seating capacity of forty-eight passengers each, at an aggregate cost of $274,637. As of the date of the report, twelve of these cars had been delivered and it was expected that the other eight will probably be delivered within the next few weeks.

During 1923 the company transported on its city and suburban system 95,357,117 passengers as against 92,172,664 passengers in 1922. In addition, it transported 634,014 passengers on the Stone Mountain line in 1923 as compared to 557,274 in 1922. The Atlanta Northern Railway, which is the interurban line between Atlanta and Marietta, transported 1,218,697 passengers in 1923 as compared to 1,131,278 passengers in 1922.

$2,131,164 Net at Milwaukee

Operating revenues of the railway department of the Milwaukee Electric Railway & Light Company for the year ended Dec. 31, 1923, amounted to $10,559,581, an increase of 8.61 per cent over 1922. The percentages of operating revenues of the various utilities appropriated for maintenance and depreciation of physical property were:

	Per Cent
Railway	22.30
Electric light and power	12.75
Heating	16.64

Net income available for the payment of dividends was $2,131,164. Capital expenditures during the year amounted to $5,844,745, as follows:

Railway utility	$1,699,442
Electric power and heating utility	2,982,190
Common and miscellaneous	1,163,112

During the year $243,854 worth of property was withdrawn from service.

The company has successfully continued to obtain a good share of its capital requirements from the sale of preferred stock to investors in the com-

INCOME ACCOUNT OF THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY FOR THE YEAR 1923

Operating revenues		$22,206,800
Operating expenses:		
Ordinary operating expenses	$14,534,908	
Depreciation (reserve credit)	1,521,338	
Taxes	1,567,091	
Total operating expenses		17,623,337
Net operating revenues		$4,583,463
Non-operating revenues		274,141
Gross income		$4,857,604
Interest charges:		
Interest on funded and unfunded debt	$2,299,183	
Interest on depreciation reserve balances	383,932	
Interest on other reserve balances	43,325	
Total interest charges		2,726,440
Net income		$2,131,164

munities in which the company operates. It now has approximately 10,000 preferred shareholders.

The directors authorized the sale of $1,000,000 of 6½ per cent ten-year gold notes, Series D, dated Aug. 1, 1923, maturing on Aug. 1, 1933. The notes are being sold through the securities department of the company for cash at par. Up to Dec. 31, 1923, a total par amount of $122,500 had been issued and sold.

The revenue passengers carried increased from 144,238,122 in 1922 to 153,626,868 in 1923. The company very frankly says that a good share of this increase is due to the company's foresight in establishing up-to-date bus service.

STATISTICAL DATA OF THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY

	1923	1922
Miles of track owned	413.14	409.66
Miles of track leased	1.56	1.56
Miles of track operated	388.99	385.94
Revenue passengers carried	153,626,868	144,238,122
Transfer passengers carried	54,238,201	54,198,925
Per cent transfer to revenue passengers	35.31	37.58
Receipts per revenue passenger	$0.0664	$0.0652
Number of passenger cars owned	850	850
Number of passenger motor buses owned	93	76

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New Jersey Railway Will Benefit by Refinancing

Thomas N. McCarter, president of the Public Service Corporation of New Jersey, in referring to the plan for refinancing which was mentioned briefly in ELECTRIC RAILWAY JOURNAL for March 13, says that with the adoption of the plan the holders of the securities of the underlying companies will clearly benefit to a very marked degree since the development and upbuilding of their properties will thus be assured.

With respect to the Public Service Railway he says the position of that company and the holders of its securities will be greatly strengthened because the corporation itself, as the owner of all the capital stock of the railway, will be placed in a position, as the result of the adoption of the plan, to finance the railway's capital requirements until such time as the credit of the railway will enable that company to stand upon its own feet in this regard. He says that as a matter of fact the railway's capital requirements are comparatively small and should easily be provided for in the manner indicated. The officers of the company consider this feature of the plan of great importance as it promises to the public more dependable and adequate service and to the holders of railway securities sounder credit and enhancement of value.

In short, as has been indicated previously, the plan is designed to furnish the vast sums of new money required by the company for the adequate performance of its functions.

In connection with the plan the corporation has arranged to issue 200,000 more shares of no par value common stock, of which 100,000 is to be issued at once and the remainder later on. Stockholders of record of March 21, 1924, will have the privilege of subscribing to the new stock at $44 a share for each nine shares now held, either common or preferred. For each one share now subscribed for of the first 100,000 shares, the subscriber will have the option of subscribing for an additional one share of the second 100,000 shares on the same basis as the first 100,000 shares. There are now outstanding 600,000 shares of common stock, 215,086 shares of 8 per cent cumulative preferred stock and 87,200 shares of 7 per cent cumulative preferred stock.

Reported Kansas Power & Light Includes McKinley Interest

The Topeka Railway, Topeka Edison Company, Wichita Railway & Light Company and the Atchison Light & Power Company, all in Kansas, are to be taken over by the Kansas Power & Light Company. The new company has an estimated authorized capital of $11,250,000, divided as follows: 50,000 shares of preferred stock, par $100 a share; 75,000 shares of no-par stock with an estimated value of $50 a share; 25,000 shares of no-par stock with an estimated value of $100 a share. The directors of the new corporation include A. M. Patten, T. F. Doran, Clayton Kline, A. H. Purdy, W. D. Cole, A. W. Freeman, K. H. Losey, G. W. Thompson, and G. W. Miller. The company has applied to the Public Utilities Commission for permission to issue $5,413,000 in bonds for refunding and other purposes.

Denver Tramway Offers to Extend Bonds

The Denver Tramway, Denver, Col., has offered to extend further the bonds due on April 1, 1924, for three years with tax-free convenants and present existing liens, with interest at 6 per cent. The plan has the approval of the receiver and authority of the United States District Court for Colorado.

On the $2,000,000 Denver City Tramway first mortgage, extended 6s, the company reserves the right to redeem the whole issue at 101 and interest upon any interest date upon thirty days notice. On the $741,000 Denver Tramway Power Company first mortgage improvement extended 6s the receiver has been authorized to deposit $50,000 with the International Trust Company, Denver, to be used to redeem the extended bonds at 105, as drawn by lot. The extension is asked because the fare to be charged by the company is a matter for court consideration and the reorganization has been postponed. The company with the court approval reserves the right to withdraw this privilege on or before May 1, 1924.

$51,761,348 Value Accepted for St. Louis Property

Receiver Rolla Wells and the board of the United Railways, St. Louis, are said to have decided to accept the valuation of $51,761,348 placed upon the company's physical property by the Missouri Public Service Commission on June 4, last, and to drop the appeals against that decision now pending in the St. Louis and Cole County Circuit Courts. The decision is expected to aid materially the reorganization of the company.

The company had contended for a valuation of $70,000,000 while the city of St. Louis through special counsellor Henry S. Caulfield at one time contended for a valuation as low as $29,805,975. The last arguments on the valuation were made before the state commission in February.

While this valuation of $51,761,348 covers amply the present bonded debt of the company, it would appear to leave little for the $16,383,000 of 5 per cent cumulative preferred stock outstanding, though the additions to the property value since 1919 may make provision for several millions of this stock, it is stated.

On Saturday, March 15, arguments were heard before Former Supreme Judge Fred L. Williams, temporary special master, in St. Louis in the foreclosure suit of the St. Louis & Suburban Railway bondholders against the United Railways. The bondholders are seeking to have the St. Louis & Suburban property segregated from the remainder of the United Railways. The St. Louis & Suburban System was taken over by the United Railways in 1906.

The Suburban bondholders opposed the application of Receiver Rolla Wells for permission to spend $1,065,000 for new equipment and trackage extensions. Judge Williams finally took the matter under advisement after two hours of arguments by counsel for the St. Louis & Suburban Railway bondholders, Receiver Wells and the United Railways.

The receiver desires to spend $1,050,000 in constructing 100 new side-door-exit cars and $15,000 for double-tracking the St. Charles line from St. John's station to Woodson Road.

Conspectus of Indexes for March, 1924

Compiled for Publication in this Paper by

Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Street Railway Fares* 1913 = 4.84	Mar. 1924 **6.93**	Feb. 1924 **6.93**	Mar. 1923 **6.89**	May 1921 **7.24**	May 1923 **6.88**
Street Railway Materials* 1913 = 100	Feb. 1924 **163**	Jan. 1924 **159**	Feb. 1923 **174**	Sept. 1920 **247**	Sept. 1921 **156**
Street Railway Wages* 1913 = 100	Mar. 1924 **219**	Feb. 1924 **219**	Mar. 1923 **207**	Sept. 1920 **232**	Apr. 1923 **207**
Steel—Unfilled Orders (Million Tons) 1913 = 5.91	Feb. 29 1924 **4.91**	Jan. 31 1924 **4.80**	Feb. 28 1923 **7.28**	July 31 1920 **11.12**	Feb. 28 1922 **4.14**
U.S. Bank Clearings Outside N. Y. City (Billions)	Feb. 1924 **14.71**	Jan. 1924 **16.14**	Feb. 1923 **13.71**	Mar. 1920 **18.54**	Feb. 1922 **10.65**
Business Failures Number	Feb. 1924 **1,578**	Jan. 1924 **2,258**	Feb. 1923 **1,563**	Jan. 1924 **2,258**	Sept. 1923 **1,280**
Liabilities (millions)	**73.75**	**103.1**	**38.15**	**109.1**	**27.50**

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Eng. News-Record Construction costs 1913 = 100	Mar. 1924 **224.7**	Feb 1924 **220.3**	Mar. 1923 **205.2**	June 1920 **273.8**	Mar. 1922 **162.0**
U.S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Feb. 1924 **152**	Jan. 1924 **151**	Feb. 1923 **157**	May 1920 **247**	Jan. 1922 **138**
Bradstreet's Wholesale Commodities 1913=9.21	Mar. 1 1924 **12.90**	Feb. 1 1924 **13.20**	Mar. 1 1923 **13.93**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
Dun's Wholesale Commodities 1913 = 120.9	Mar. 1 1924 **190.7**	Feb. 1 1924 **191.1**	Mar. 1 1923 **191.2**	May 1 1920 **263.3**	July 1 1921 **159.8**
U.S. Bur. Lab. Stat. Retail food 1913 = 100	Feb. 1924 **147**	Jan. 1924 **149**	Feb. 1923 **142**	June 1920 **219**	Mar. 1922 **139**
Nat. Ind. Conf. Bd. Cost of living 1914 = 100	Feb. 1924 **163.9**	Jan. 1924 **164.6**	Feb. 1923 **157.5**	July 1920 **204.5**	Aug. 1922 **154.5**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen and conductors on 105 street and interurban railways in the United States, operating more than 100 passenger cars each, and weighted according to number of cars.

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Indiana Interurban Has Net Income of $73,336

The net income of the Union Traction Company of Indiana for 1923 shows a surplus of $73,336 compared with a surplus of $210,163 in 1922, a decrease of $136,827. Differences in the treatment of depreciation charges for 1923 and 1922 account partly for this decrease. Computation of 1923 depreciation on the 1922 basis would increase the 1923 net income to $129,453. Financial conditions compelled the passing of sinking fund payments during the year. The deduction of 1923 sinking fund charges would make the balance for the year $4,936.

STATEMENT OF EARNINGS OF THE UNION TRACTION COMPANY OF INDIANA

	1923	1922
Revenue from transportation.	$3,745,715	
Revenue other than from operation	144,974	
Total operating revenue.	$3,890,689	$3,835,747
Total operating expenses	2,647,123	2,459,744
Net operating revenue	$1,243,566	$1,376,003
Taxes	257,409	264,000
Net revenue less taxes	$986,156	$1,112,003
Other income	30,998	15,337
Gross income	$1,017,155	$1,127,340
Bond and other interest, etc.	943,819	917,176
Net income	$73,336	$210,164

In the operating expenses for the year are included $534,896 for maintenance of way and structures and $320,058 for maintenance of car equipment, making the total sum charged in these directions for maintenance of the property $854,954. This sum equals 21.98 per cent of the gross operating revenue for the year, equivalent to $2,056 per mile of single main track operated, exclusive of city tracks of other companies at Indianapolis, Logansport and Wabash. The 1922 figures for the same purposes were $787,709, equal to 20.54 per cent of gross operating revenue, or $1,893 per mile of single main track operated.

During the year $323,158 was expended for additions and betterments to the company's property and $66,199 was expended for extensions and betterments to the property of the Traction Light & Power Company, owned by the company. The 1922 figures for like purposes were $257,055 and $25,295. There was also included in the expenditures of 1923 the net sum of $32,330 representing additions to property of the Traction Land Company, owned by the Union Traction Company and used to help finance the purchase of real estate required for company purposes.

One of the principal expenditures for additions was for the purchase of twenty-three safety cars, financed in part by an issue of $63,720 car trust notes payable serially during a three-year period, of which $17,700 was paid in 1923. The system comprises 453 miles of track.

Discontinuance Asked. — The Public Service Railway has asked permission of the Board of Public Utility Commissioners to discontinue railway service from Gloucester to Fairview, N. J. If the application is granted the company will remove the tracks and increase bus service between the two towns.

Auction Sales in New York.—At the public auction rooms of A. H. Muller & Sons there were no sales of electric railway securities this week.

$2,500,000 Issue Offered.—E. H. Rollins & Sons, New York, are members of a syndicate which is offering for subscription at 99½ and interest to yield 6.05 per cent $2,500,000 of Key System Transit Company 6 per cent first mortgage gold bonds, Series A. The proceeds from the sale of the bonds will be used to reimburse the treasury of the company for capital expenditures already made and to pay for the cost of additions and betterments to its plant and equipment.

Directors Chosen. — Directors were chosen at the recent meeting of the stockholders of the New York State Railways in Rochester for the Rochester Railways Co-ordinated Bus Lines., Inc., as follows: Daniel M. Beach, Albert H. Harris, Willis A. Matson, Alfred H. Smith, and James F. Hamilton. This subsidiary operates the trackless trolley line and Greece bus route in Rochester.

Prior Preferred Dividend Passed.—Directors of the Market Street Railway, San Francisco, voted on March 14 to omit the 1½ per cent, quarterly dividends on the prior preference stock. It is understood that the decision was based on the opinion that the payment would be unwise in view of the recent large refunding operations and the retirement of more than $500,000 of funded debt.

New Data for Sale.—The receiver for the defunct Pennsylvania & Ohio Traction Company, Ashtabula, Ohio, recently announced that another effort would be made to dispose of the property at public auction on April 7, at the courthouse in Jefferson. A sale was advertised for Jan. 28, but no bids were made. If no bids are made at the coming sale it is reported the receiver will ask for a reappraisal.

Interurban Line Sold. — Representatives of the security holders bought the Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, at foreclosure sale on March 14 for $4,605,000. The property includes 202 miles of track. The company has outstanding $4,236,000 of common stock and $2,413,000 of 5 per cent cumulative preferred stock. The property was put into receivership on Jan. 20, 1922, on petition of the General Electric Company.

Canadian Road Floats Issue in London.—The British Columbia Electric Railway, Vancouver, B. C., is reported to be floating an issue of £750,000 of 5 per cent debentures in the London market. They are redeemable in 1934 at 95.

Wants Company to Operate.—Just as soon as the Colorado Springs & Interurban Railway, Colorado Springs, Col., announced the plan proposing the discontinuance of its service from the Springs to Roswell, a suburb, the suburbanites drew up a petition asking the Public Utilities Commission to force the company to operate its electric cars.

Applies for Abandonment.—Competition of buses was blamed for the decision of the DeKalb-Sycamore & Interurban Traction Company of Illinois to cease operations. An application for permission to quit business was filed with the Illinois Commerce Commission at Springfield on March 14. The interurban operates between DeKalb and Sycamore.

Appraisers Named.—G. E. Scott and M. G. Irvin, Norwalk, and A. V. Brown, Sandusky, have been named appraisers of the Norwalk-Shelby Railway, now in the hands of receivers and about to be ordered sold to satisfy mortgages.

Reorganization Effective.—Following the retirement of Ives & Davidson, New York City, as operating managers of the Mauch Chunk & Lehighton Transit Company, Mauch Chunk, Pa., a reorganization took place on March 10. A new board of directors was elected by the stockholders. The officers chosen are: President, V. M. Walff; vice-president and general manager, H. T. Ely; treasurer, G. H. Myers, and secretary, H. O. Probst. The company owns and operates the electric railway in Mauch Chunk, East Mauch Chunk and Upper Mauch Chunk also an interurban line to Lehighton.

Seeks Partial Abandonment.—The Union Traction Company, Santa Cruz, Cal., has applied to the Railroad Commission for authority to abandon operations upon Soquel, formerly Minnesota Avenue, from Front Street to Pacific Avenue, and those portions of its system extending respectively to La Veaga Park, Seabright and Capitola.

Gold Bonds Offered.—A syndicate including A. C. Allyn & Company, Inc., New York, is offering at 96¾ and accrued interest to yield about 6.80 per cent $880,000 of the North Carolina Public Service Company, Inc., first lien and refunding mortgage 6½ per cent gold bonds. The bonds, known as Series "A," are dated Feb. 1, 1924, and are due Feb. 1, 1944. This company is a consolidation of properties as noted in the ELECTRIC RAILWAY JOURNAL for March 8.

Gold Bonds Offered.—Howe, Snow & Bertles, New York, are offering at 95 and interest to yield 6.90 per cent, $800,000 of first lien and refunding 6½ per cent gold bonds of the Central Power & Light Company, known as the "1952" Series. The bonds are dated Sept. 1, 1922, and are due Sept. 1, 1952. The company operates directly or through its subsidiaries thirty-four central electric power stations as well as doing a gas, water, railway or ice business in fifty cities and towns in eleven different groups. The proceeds from this additional offering will be used to cover part of the expenditure for improvements on the Texas Central Power group and other properties located in Texas.

Separate Company for Railway at Ottumwa. — The Ottumwa Traction Company, Ottumwa, Iowa, incorporated in Delaware in January, has taken over the railway properties formerly included in the system of the Ottumwa Railway & Light Company. This is a change in the interest of simplification of intercorporate relations and does not involve any change with respect to the control of the properties by the Byllesby interests and the Northern States Power Company.

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Personal Items

Fred C. Marston Appointed B.-M. T. Secretary

Fred C. Marston, who recently resigned as a vice-president of the Irving Bank-Columbia Trust Company, has been elected secretary and treasurer of the Brooklyn-Manhattan Transit Corporation. Mr. Marston is the first man to hold this post since the company was reorganized from the old Brooklyn Rapid Transit, the new corporation having up to this time had no secretary and treasurer.

Mr. Marston joined the original Columbia Trust Company before its amalgamation with the Irving Bank, in 1905. He became assistant secretary in 1908 and rose from then on until he became vice president, a post which he held until his resignation.

S. E. Boney Made Director of Carolina Information Bureau

S. E. Boney, Philadelphia, has been named by the executive committee of the newly organized North and South Carolina Public Utility Information Bureau as the director of the bureau. He has had an experience of eighteen years in the newspaper field. Mr. Boney has served with the Union (S. C.) *Times*, the Laurens (S. C.) *Advertiser* and the *News and Courier* of Charleston, S. C. For the past ten years he has been with the *Public Ledger*, Philadelphia. His most recent position was city editor of both the *Public Ledger* and the *Evening Public Ledger*. Mr. Boney is a native of South Carolina, in which state he is widely acquainted.

Ben S. Allen Appointed to Key System Transit Company

Ben S. Allen has been made manager of the recently created public relations department of the Key System Transit Company, Oakland, Cal. Mr. Allen took his degree in history at Stanford in 1907. He served on several San Francisco newspapers as reporter until 1908, when he joined the San Francisco bureau of the Associated Press. He was transferred East, and after serving for a short time in New York and Washington offices of the Associated Press he was sent to the London bureau, where he acted as outside man for seven years. During the first three years of the World War Mr. Allen covered many of the big stories coming under the jurisdiction of the London office. He was one of the seven men invited to Herbert Hoover's office for the purpose of forming the Commission for Relief of Belgium, and thereafter, as a volunteer, directed the publicity of that great relief organization. When the United States entered the war Mr. Allen returned to this country with Mr. Hoover and, with the creation of the Food Administration, he became director of its educational division. He was also publicity advisor of the Fuel Administration and the War Trade Board. Returning to California at the close of the war, he became the publisher of the Sacramento *Union*, a position he held for two years. He then started a national educational campaign designed to inform consumers about the operations of the California farmers' co-operative marketing associations. Later he reentered the newspaper field as publisher of the *California Farmer*, one of the leading farm journals of the Pacific Coast.

C. C. Coates Promoted

C. C. Coates was recently promoted from assistant railway superintendent to the position of railway superintendent of the Pacific Northwest Traction Company and Puget Sound International Railway & Power Company, in Everett, Wash. He entered the employ of Stone & Webster in 1907, in the sales department of the Whatcom County Railway & Light Company at Bellingham. He was later transferred to the accounting department, continuing in that work until July, 1917, when he was appointed to the position of assistant railway superintendent in Everett.

C. C. Coates

A. A. Wilson, formerly general agent of the Chicago, Milwaukee & St. Paul Railroad at Denver, has been appointed traffic manager of the Salt Lake & Utah Railroad, with headquarters at Salt Lake City, Utah. Mr. Wilson succeeds A. V. Kipp, who resigned last October to become assistant general freight agent of the Oregon Short Line Railroad. Mr. Wilson has been identified with the Chicago, Milwaukee & St. Paul Railroad for the past twenty-seven years and has worked in various capacities in the traffic department. He began his railroad career as a telegraph operator and worked up to division freight and passenger agent in Iowa. He was later promoted to assistant general freight agent at Chicago and then to general agent of the line at Denver.

H. E. Blain Political Organizer

H. E. Blain, assistant managing director of London Underground Railways and the London General Omnibus Company, has been appointed chief agent of the British Conservative (or Unionist as it is sometimes still called) Organization, in succession to Admiral Sir W. Hall, retired. Mr. Blain, though a conservative, has never actively concerned himself in political affairs, but he has a great reputation as an organizer, and it is as an organizer that he is expected to prove of greatest value to the Conservative party. Years ago he was principal traffic assistant on the Liverpool Corporation Tramways. In 1903 he became tramway manager to West Ham Corporation. Ten years later he left West Ham and joined the London Underground Railway and bus combine as purchasing agent. In 1914 he became operating manager, and in 1921 assistant managing director. Mr. Blain was president of the Municipal Tramways Association in 1910-11. He achieved independent note as the founder and first chairman of the London Safety First Council and founder and vice-president of the British Industrial Safety First Association. To this movement for the prevention of accidents he has devoted his energies with great success. In fact, he may be said to have called it into being in England, and now it is an elaborate organization. The Conservative party evidently considers that in him it has found the man it wants. He is not tied up with a political past, and is free to devote his organizing abilities to the improvement of the party electoral machine.

New Appointments at Pittsburgh

Several new appointments in the newly reorganized Pittsburgh Railways, Pittsburgh, Pa., have been announced, as follows:

C. C. Gillette has been appointed traffic agent.

J. E. Davis has been appointed special investigator.

F. R. Cogswell has been appointed director of traffic promotion.

J. B. Donley has been appointed director of public relations.

All these officers have their headquarters in the Central Office Building, in Pittsburgh. The appointment became effective March 1.

A. W. Leonard, president of the Puget Sound Power & Light Company, Seattle, Wash., has been elected president of three of the subsidiary companies of the corporation: The Puget Sound Electric Railway, operating the Seattle-Tacoma electric interurban; the Tacoma Railway & Power Company, operating the Tacoma street railway system, and the Pacific Northwest Traction Company, operating the Mount Vernon-Bellingham interurban. Mr. Leonard succeeds Frederick D. Pratt in the presidency of the three companies, while Mr. Pratt becomes chairman of the board of directors in each instance. The company does most of the commercial electric lighting and power business in the Puget Sound District and Western Washington and substantially all the electric street and interurban business there except in Seattle.

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P.R.T. Official Changes

Changes have recently been announced in the designation of the personnel of the Philadelphia Rapid Transit Company as follows: R. F. Tyson has been advanced from operating manager of the elevated railway to vice-president in charge of operation. G. C. Haney succeeds Mr. Tyson as manager of the elevated. H. C. Heaton has replaced George B. Taylor as engineer of way. B. J. Yungbluth will continue as supervisor of materials and supplies but will take on new duties as assistant vice-president of finance and accounting.

Fred P. Snyder, for several years in charge of the shops of the Oakwood Street Railway, Dayton, Ohio, has been appointed superintendent of transportation and equipment.

William A. Jackson, who has been at the head of the legal department and legislative counsel of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., for the last nine years, has been elected a vice-president of the company, according to S. B. Way, vice-president and general manager of the company. Before going to the Milwaukee company, Mr. Jackson was associated with the North American Company.

Frederick L. Farr, formerly specialist in public utility securities for Moody's Investors Service, has joined the staff of Stevens & Wood, Inc., who finance and manage utility and industrial properties.

Obituary

R. K. Willman, formerly president of the Citizens' State bank and a director of the Union Traction Company of Indiana, Anderson, died recently at Hartford City, Ind.

E. F. J. Gaynor, auditor of the Interborough Rapid Transit Company, New York, N. Y., is dead. He had been connected with the company and its predecessors more than forty-six years. In 1903 when the Manhattan Railway lines were leased by the Interborough Rapid Transit Company Mr. Gaynor was appointed auditor of the latter company. Prior to that he had been auditor of the Manhattan Railway.

Five Cents in Kenmore

Under an agreement between officials of the Northern Ohio Traction & Light Company, Akron, and the city of Kenmore a 5-cent fare with penny transfers will become effective in Kenmore. Formerly Kenmore had a 5-cent rate with free transfers, as did Akron under the terms of the old Akron franchise, which expired Feb. 1. Since that time the fare between Kenmore and Akron has been 7 cents.

Though under a separate city government, N. O. T. Officials desired to give the community the same fare rate as prevails in Akron.

The new rate will be effective as soon as permission to put it in effect is received from the State Public Utilities Commission.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Railways Buy Many Fageols

During the first sixty days of 1924 the Fageol Motors Company received orders from electric railways in the United States equal to more than half of the entire purchases of Fageols by railways in 1923. Most of these orders were placed by companies already operating this type of motor vehicles. Among the recent orders are the following:

Pacific Electric Railway, Los Angeles, Cal.	20
Los Angeles Railway, Los Angeles, Cal.	20
San Diego Electric Railway, San Diego, Cal.	10
Public Service Company, San Antonio, Tex.	6
Milwaukee Electric Railway & Light Company Milwaukee, Wis.	5
Trenton & Mercer County Traction Company, Trenton, N. J.	10
Public Service Railway, Newark, N. J.	25
United Electric Railways, Providence, R. I.	3
Connecticut Company, New Haven, Conn.	2
Day & Zimmermann, Public Utility Engineers, Philadelphia, Pa. (for operation in Ohio)	6

The question of delivery is becoming a serious one and orders for new coaches are now being accepted for June and July delivery. Plans for factory production in the East, however, are maturing rapidly.

It is the belief of the Fageol Motors Company that transportation is a natural monopoly subject to regulation. For that reason the company desires to encourage the purchase of Fageol coaches by the existing transportation agencies before endeavoring to develop other fields. Under no circumstances is it contemplated by the Fageol Motors Company that it should engage in the actual operation of coaches. A staff of engineers has been organized and their services are at the disposal of electric railways operating or contemplating the operation of buses. Coordinated service has been successfully worked out by several railways working in conjunction with these engineers.

Use of Variable Load Brake Is Being Extended

The recent receipt by the Westinghouse Air Brake Company of an order for the installation of variable load brakes or single-truck cars indicates a probable further extension of the use of this device. During the past two years the variable load brake has been used by street railways to an increasing extent. This attachment has the same purpose as a similar attachment added to the automatic brakes on the cars first placed in service in the Brooklyn subway in 1915. Inasmuch as surface cars do not have automatic brakes, however, the variable load attachment has been somewhat modified.

The extensive introduction of lightweight cars in city service emphasizes the need for such a device. The first property to make a large installation was the Boston Elevated, which now has more than 300 surface cars equipped in this way. The Eastern Massachusetts Street Railway, Brooklyn City Railroad, Connecticut Company, Massachusetts Northeastern Street Railway, United Railways & Electric Company of Baltimore, Union Street Railway, New Bedford, Mass. and others have equipment in service or on order. To date orders have been received for nearly 710 equipments for surface cars and about 1,000 attachments for automatic subway brakes.

Good Demand for Differential Dump Cars

Six different electric railways have recently placed orders with the Differential Car Company for dump cars and dump car trains. Of the cars ordered eight will be equipped with motors and two will be trail cars. The companies placing these orders and the type of car desired follow:

DETAILS OF RECENT DUMP CAR PURCHASES

Name of Company	No. of Cars	Type	Capacity	Motors
Tri City Railway, Davenport, Iowa	2	Motor	20 cu.yd.	GE 80-A
Memphis Street Railway, Memphis, Tenn.	1	Motor	20 cu.yd.	GE 201-I
Memphis Street Railway, Memphis, Tenn.	1	Trailer	20 cu.yd.	
Market Street Railway, San Francisco, Cal.	2	Motor	18 cu.yd.	Bodies only
Omaha & Council Bluffs Street Railway, Omaha, Neb.	1	Motor	18 cu.yd.	4 GE 80-A
New York State Railways, Syracuse, N. Y.	1	Motor	.....	4 GE 90
New York State Railways, Syracuse, N. Y.	1	Trailer	.....	.....
Cincinnati Traction Co., Cincinnati, Ohio	1	Motor	.....	4 Westinghouse 93

A majority of these dump cars are of the recently developed door-chute design.

Metal, Coal and Material Prices

Metals—New York	March 18, 1924
Copper, electrolytic, cents per lb.	13.625
Copper wire base, cents per lb.	16.375
Lead, cents per lb.	9.00
Zinc, cents per lb.	6.74
Tin, Straits, cents per lb.	53.50
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.675
Somerset mine run, Boston, net tons	2.375
Pittsburgh mine run, Pittsburgh, net tons	2.125
Franklin, Ill., screenings, Chicago, net tons	2.00
Central, Ill., screenings, Chicago, net tons	1.70
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.75
Weatherproof wire base, N.Y., cents per lb	18.00
Cement, Chicago net prices, without bags.	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal.	$0.95
White lead, in oil (100-lb. keg), N.Y., cents per lb., carload lots	12.25
Turpentine, (bbl. lots), N. Y., per gal.	$1.02

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Officers of Johns-Manville Company Advanced

At a recent meeting of the board of directors of Johns-Manville, Inc., New York, the following officers were elected:

T. F. Manville, chairman of the board; H. E. Manville, president; L. R. Hoff, vice-president and general manager; W. R. Seigle, vice-president and general manager of the factory and mines; J. E. Meek, vice-president; J. W. Perry, vice-president; J. S. Carroll, vice-president; A. C. Hoyt, secretary and treasurer, and T. F. Manville, Jr., assistant secretary and treasurer.

The position of chairman of the board is a new office, to which T. F. Manville, formerly president and treasurer, has succeeded, while H. E. Manville, formerly vice-president and secretary, has been elected president.

James W. Perry, who was elected a vice-president of the company, is general manager of the electrical, automotive and public utilities departments. He has been connected with Johns-Manville since 1889. Mr. Perry is treasurer and a director of the Electrical Manufacturers' Council, a director of the Electrical Manufacturers' Club and has always been active in the work of the N.E.L.A., in which for five years he served as chairman of the exhibit committee. He is also a member of the American Electric Railway Association.

Foreign Trade Convention in Boston in June

The National Foreign Trade Convention will be held at Boston, June 4, 5 and 6, next. This is the first time the convention has been held in New England. The central theme of the convention will be "Our Need for Wider Markets."

This is also the first time that a session specially devoted to the interests of importers has been included in the program. It will be held in cooperation with the National Council of American Importers and Traders.

In sending the call for the convention James A. Farrell, president of the United States Steel Corporation and chairman of the National Foreign Trade Council, has cordially invited all chambers of commerce, boards of trade, national and state associations and other industrial and commercial organizations to be represented. He says that the present foreign trade situation of the United States offers an inspiration and encouragement to American foreign traders.

Rolling Stock

Binghamton Railway, Binghamton, N. Y., has decided as a result of a six months' test begun in July, 1923, to equip thirty-seven one-man cars with the Simplex Safety system.

Indiana Service Corporation, Fort Wayne, Ind., has recently ordered from the St. Louis Car Company fifteen double truck one-man cars for city operation. These cars are of the same design and construction as the fifteen cars received in October of last year. They will have double doors at the front for entrance and exit and an exit door at the rear.

Hartford & Springfield Street Railway, Warehouse Point, Conn., is negotiating for two buses.

New Orleans Public Service, Inc., New Orleans, La., recently ordered six new car bodies from the Perley A. Thomas Car Works, High Point, N. C. Delivery is to be made in ninety days. The type of body is the same as previously ordered by the Public Service Company.

United Railways, St. Louis, Mo., through its receiver is desirous of spending $1,050,000 in the construction of 100 new side-door-exit cars.

Des Moines City Railway, Des Moines, Iowa, plans the purchase of new equipment at a cost of $169,000. Three new cars are included in the purchase.

Michigan Railroad, Jackson, Mich., has placed an order for fifteen new steel frame freight trail cars and two freight motor cars.

Track and Line

Montreal Tramways, Montreal, Que., is preparing a program of extensions and improvements which will involve an expenditure of $1,500,000. A considerable part of the program consists of replacements and repairs. A new line to be constructed this year is that to give access to the top of Mount Royal. The line will be ready for operation this summer. The Iberville Street line will also be extended this season.

Community Traction Company, Toledo, Ohio, it is expected will undertake considerable track construction this summer.

Des Moines City Railway, Des Moines, Iowa, expects to submit to the city administration an improvement and extension plan which will involve the expenditure of more than $500,000. The plan includes the extension of the Sixth Avenue and Oak Park line, extension of the Sixth Avenue and Highland Park line and the extension of the Clark Street line. In addition to these improvements, the company proposals call for new tracks and paving on University Avenue at a cost of $13,622, new tracks and paving on Clark Street at a cost of $19,818 and other new tracks and paving work at a cost of $76 577. The company also plans to construct a new wye at a cost of $5,280, a new passing track and new crossovers where residents have complained of noise from the present equipment, at a cost of $3,600. The total cost of the company's proposed plan in 1924 is $717,505.

Trade Notes

Morton Manufacturing Company, Chicago, Ill., announces the appointment of the Consolidated Equipment Company, with offices at 260 St. James Street, Montreal, as its exclusive and direct representative covering the sale of its Acme line of railway appliances throughout Canada.

Mica Insulator Company, New York, N. Y., recently elected new officers. L. W. Kingsley became chairman of the board; Edward T. Wood, president, and Edward Nelson secretary and treasurer. These men have for a long time been identified with the Mica Insulator Company. The company has factories in both America and England, securing its mica direct from the mines.

New Advertising Literature

Yale & Towne Manufacturing Company, Stamford, Conn., has issued a 100-page catalog-handbook of hoisting and truck equipment. This catalog, "21-M," contains much engineering information, including a signed article by Henry R. Towne on chain block efficiency. A brief outline of the new line of Yale trucks is incorporated. The book is not for quantity distribution, but will be sent to all ELECTRIC RAILWAY JOURNAL readers making written request for a copy on their letterheads.

General Electric Company, Schenectady, N. Y., has recently issued the General Electric Review, containing a reprint from the issue of February, 1924, of an article by W. D. Bearce entitled "Epoch-Making Tests on New Passenger and Freight Locomotives." The pamphlet is illustrated.

Bethlehem Steel Company, Bethlehem, Pa., has issued an illustrated thirty-page pamphlet on Bethlehem twin-span turntables. The development of the turntables to meet the requirements of present day railroad terminal facilities is reviewed in this pamphlet.

The Electric Power Club, Cleveland, Ohio, gives important new rules on preferred ratings and system voltages for distribution transformers, standards for single-phase and three-phase step-up power transformers, the adoption of outdoor construction as standard, in the third edition of "Transformer Standards," just issued by the transformer section of the club. The new edition also contains lead markings and vector diagrams, polarity connections, standard ratings, performance specifications, tests, methods of measuring losses and temperature and all other material which appeared in the previous edition. This is a publication of forty pages and it may be obtained from manufacturers of power and distribution transformers or from the Electric Power Club, B. F. Keith Building, Cleveland.

The Field and Future of the Motor Bus has been reprinted in pamphlet form. It was the subject of a paper presented by J. A. Emery, vice-president, Ford Bacon & Davis, Inc., before the Society of Automotive Engineers at Detroit, Mich., on Jan. 24. The speech was printed in the Feb. 24 issue of *Bus Transportation*.

Triumph Electric Company, Cincinnati, Ohio, announces the issuance of a complete revision of prices, covering its entire line of motors, both a.c. and d.c., 1 to 250 hp. This price book will be issued to any user of motors who has not yet received a copy.

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New York, March 29, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 63
Number 13

Good Records Make for Better Transportation Employees

A COMPLETE system of records of individual employees, such as that used by the Chicago Surface Lines in its transportation department, and described in this issue, requires considerable effort and co-operation on the part of the various other departments to make it efficient and valuable. But with this co-operation, the value of such records is indeed great, as is evidenced in part by the marked improvement in conditions in the transportation department of this company.

Up-to-date records filed in such a manner as to be readily available at any time serve as a guide to the supervisory force when employing, disciplining or dismissing a man. With details of the employee's service record before him, unprejudiced judgment may be given by the one rendering a decision. From the employee's point of view, the knowledge that complete records are kept of every detail of his service life prompts the conscientious man to do better and offers a means of bringing to light his qualifications for advancement.

Elimination of undesirables from among the applicants is greatly facilitated by records of all men who have ever served the company. Nearly always the "ringer" will return for employment, often under an assumed name, and it is only through a complete system of records which includes photographs that he is detected.

It is with a view toward employing and keeping desirable men in the train service that the records of the Chicago Surface Lines are maintained. Their effectiveness is apparent to one who takes note of the quality of platform men now seen on the surface cars in Chicago.

Sincerity Should Be the Keynote of Relations with Employees

THE problem of good relations between management and men is no less important today than it has been in the past, but the development of a friendly spirit is being more and more left to natural growth instead of being forced. This is a good thing in every way.

As a matter of fact the whole plan of improving employee relationship by a kind of beneficient paternalism was based on a false theory. It never had much chance of being successful with men of average intelligence. What the employees want is plain, straightforward and fair dealings. If that is the attitude of the management the slap-on-the-back and the too hearty appearance of friendliness are unnecessary. The spirit is recognized by the action. If that is not the attitude of the management no amount of soft words will secure real co-operation from the men.

It is desirable, when opportunity offers, for the railways to provide reasonable comforts for the men and opportunities for recreation at the carhouses and repair shops. Such things the employees cannot well provide for themselves and they serve to make working conditions more attractive. They have, therefore, genuine value and usually are appreciated.

But to think that good will can be bought by a comparatively small expenditure of this sort without real mutual confidence and understanding betrays ignorance of human nature. That more and more railway executives are conducting their relations with the men on the basis of outspoken frankness—saying what they mean and meaning what they say—is an encouraging indication for the future.

St. Louis Planning to Start Anew

RECENT news indicates the prospect of an early removal of the United Railways of St. Louis from the direction of the federal courts. As one step toward straightening out the local railway situation, the receiver of the company, subject to the instructions of the court, has indicated that as promptness in reorganizing the company is desirable he is prepared to accept the $53,620,059 valuation of the company's property fixed by the State public utilities commission and drop the litigation seeking an increase in that figure. The valuation thus set was fixed on June 4, 1923, and was for the property as of Jan. 1, 1919. Since then capital expenditures amounting to $4,039,054 have been made.

The commission had overruled requests of both the company and the city for a rehearing of the valuation finding. Both the city and the company then sought court intervention. The company claimed a valuation of approximately $70,000,000. The city sought to have the valuation figure fixed at $29,805,975. The commission very distinctly said at the time its decision was rendered that no reduction in fares would be justified until operating conditions had improved by increased revenue or decreased operating expenses. As the net income for 1923, under the present 7-cent fare, was only $809,745, there would appear to be little prospect for a change in the fare in the near future.

The $53,620,059 valuation on which agreement was reached covers amply the present bonded indebtedness of $50,690,000, but following the bonds are $16,383,000 of 5 per cent cumulative preferred stock, on which no dividends have been paid since 1910, and $24,918,000 of common stock, a total of $41,296,000 of junior securities. Theoretically the stockholders would appear to be entitled to share in the future of the company only to the extent of the difference between $53,620,059 and $50,690,000 of indebtedness, plus $4,039,054 put back into the property since the date of the valuation, or

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$6,969,113. On the other hand an 8 per cent permissible return on $57,659,113 of capital value would provide, if earned, $4,612,729, as compared with interest requirements last year of only $2,913,614. These figures are of course hypothetical. Many other things remain to be settled in which the city is equally interested with the company, among them the mill tax and the working out of an arrangement which will provide a plan for the co-ordination of transportation facilities in the future.

As for the former owners of the property, the extent to which they will be permitted to participate in the terms of the reorganization remains to be seen, but the case for them, while it does appear bad, is not so hopeless as it might appear from the bald valuation figures. The hope of the stockholders lies principally in the spread between the interest rate and the permissible return, and on the prospect for economies resulting from the money already put back into the property and that may in the future be put back.

So the St. Louis news is good news, even to the stockholders. It may be followed by the announcement of an Irishman's dividend, but for the stockholders almost any arrangement would seem to be preferable to the present one, under which there is neither profit for them nor participation in the management of the company.

Detroit Finds Its Railway Purchase Plan Unworkable at Low Fare

DETROIT is finding it difficult to pay for the system of the Detroit United Railway out of earnings and at the same time function as a going concern. Of the total purchase price there remains an indebtedness of $15,000,000 to be taken up during the next nine years. As one of the local papers puts it, there is no doubt in the minds of practically all city officials that a new financing scheme is essential to the success of the Detroit municipal railway. At present the city must meet, out of current earnings of the railway, all expenses, pay semi-annually $500,000 on the purchase price in addition to interest, and accumulate a reserve with which to make the final payment of $7,580,000 in 1933. On the unpaid balance of the purchase debt the city is required to pay 6 per cent interest.

With the need for expansion ever present the city is apparently finding it increasingly difficult to carry on successfully and keep pace with current needs. Fares have already been boosted once. The hope is expressed that the city may be able to arrange a loan, possibly through Henry Ford, covering the unpaid balance of the purchase price of the private undertaking which it took over, this new bond to run for twenty years at a rate of interest considerably less than is called for under the present terms. It would seem that sooner or later resort must be had to some such plan if fares are not to go still higher.

The measure of success which may attend the city's attempt thus to solve its problem remains to be seen. The optimists who conceived and put across the purchase at Detroit had of course hoped to amortize the cost of the purchase out of earnings in fifteen years, but it appears there were a number of practical considerations that did not enter into their calculations. To say that this is usually the case does not make it any the easier for those who are being called upon now to grapple with the problem.

Regulation for the Bus Is Inescapable

MANAGERS of steam and electric railways in Oklahoma view with alarm the failure of the recent session of the Legislature there to impose any measure of regulation on buses and trucks similar to that under which they are compelled to operate. And well they may. But the advocates of the policy of a free field for the buses have won only a temporary victory. Everywhere the tendency is toward regulation, for it is obviously unreasonable to restrict and tax the railway while letting its competitor continue operating free of virtually all obligation.

The very things that the bus operators of Oklahoma hope to enjoy brought about regulation of transportation in the first place. Already some twenty-five states exercise supervision over bus operation. That supervision extends from control over routes, through the establishment of rates and fares to the examination of accounts and records, to mention just a few things. Unless the operator intending to engage in the bus business is prepared eventually to accept regulation similar to that imposed on other common carriers he had better not enter the field. It is only as a temporary respite that he is free from road-use fees and other obligations which other carriers must meet. Regulation is inescapable. It is bound to come. The iniquities that will grow up under the present system in Oklahoma will eventually drive the state to regulation as a matter of self-defense. In thus standing out at this time against the tendency of the day Oklahoma by its lethargy or indifference will be called upon in the future to pay the price that unfair discrimination always imposes on the users of a service.

Need More Publicity Men as Managers

FEW men have a "nose for news." This holds true for men of all professions, and surely it applies to most general managers of traction companies. Nowadays, in view of the great importance placed on publicity work, perhaps we need more publicity men in the position of manager; that is, we need managers who also have a good sense of what makes readable and worth-while publicity.

If a good newspaper man were sitting in on all the things that pass over the general manager's desk, he would find all kinds of "great stuff" there for publication in the newspapers. Yet few executives see the public interest in the things they pass upon. Particularly do they miss the publicity value of the routine reports of operation. These contain much that would make newspaper copy.

For example, why not tell of the quick work of the wrecking crew in removing a broken-down truck? Why not tell of the skill and quick thinking of the motorman which averted a bad accident—rather than to tell only of the accidents? Why not, in short, tell of the good things the company has accomplished that are evident on every hand to those familiar with it?

A good way to get more of such matter before the public would be to route more routine company business over the publicity man's desk. Or give the publicity man a desk in the G. M.'s office. One of the most successful executives in the country, in point of public relations, has his secretary as his publicity man.

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Records Facilitate Transportation Department Management

Co-operation of All Branches of Transportation Department, Together with Adequate Forms and Filing System, Gives the Chicago Surface Lines Accurate, Available Employee Records—Forms Are Result of Twenty Years' Development

CAREFUL development by the Chicago Surface Lines over a period of twenty years has resulted in a system of collecting, compiling and filing the "live" records of more than 12,000 trainmen and the "dead" records of all men who have left the service since 1914, which greatly expedites the management of the transportation department. These records are designed for a threefold purpose: First, to record promptly all infractions of rules and to call the man's attention to such infractions promptly, so as to enable the supervisory force to offer constructive criticism and advice before the infraction is repeated; second, to build up a running history of the character and efficiency of each employee, as a guide for promotion; third, to give the heads of the department accurate and quickly available records to aid in judging the man when disciplinary action seems necessary.

The Forms Are Designed for Simplicity

The printed forms are designed with a view toward avoiding red tape. A portion of the time of nine clerks and two stenographers in the transportation department is used to maintain these records so that they are always up to date and quickly available when required. This is possible since each has a definite part of the work to perform.

The system used may be termed a "one-file" system; that is, all of the records pertaining to the employee's service life, together with manuscripts substantiating these records, are filed together in a large manila envelope known as a "jacket." After an application for employment has been accepted, it is sent to the transportation department office, together with all forms which the applicant may fill out during the employment and instruction period, where these records are filed in the "jacket." Termination of his service by no means terminates the record of the man. It is kept on indefinitely as an aid to this company or to any other company desiring information on the man's ability or character. To insure the accuracy of the record, the complete co-operation of all branches of the department, both at the main office and at the twelve outlying division offices, is essential.

When the application blank is filled out at the employment office the applicant begins his relationship with the company. A careful investigation of his former record is made by the employment division of the transportation department. Many interesting irregularities and discrepancies are thus divulged, and in case of doubt as to the validity of replies to reference questionnaires, letters are sent to prominent citizens such as the postmaster or president of a bank in the town which the applicant refers to as his home. This procedure has frequently eliminated "ringers" who make a practice of "floating" from one property to another.

If the applicant's record is found favorable he is notified by a call letter to report back to the employment office and is sent to the doctor, who makes an examination and fills out the form designed for the examining physician. From the doctor to the transportation department office, and then back to the employment manager, is the route taken by the successful applicant before he finally signs his contract and is furnished with a badge and other credentials. A deposit is taken from the applicant for his badge and uniform. Orders signed by the employment manager give him the right to be measured for his uniform, to have his photograph taken, and to enter the school of instruction.

At this school he is given preliminary instruction for one day, after which an assignment is made for a "student run" on a division as near his residence as possible. Under the instructions of able employees the student takes up a fourteen-day run, for which he receives no pay. Following the successful passage of an examination at the school of instruction after his student period the new employee is sent back to the employment manager for final instructions. The superintendent of transportation makes it a point to interview all new employees personally, either singly or in groups, at this stage in their training. Permanent assignment to a carhouse is then made and the man's name is placed on the "extra" list.

Up to the point of signing the contract, all forms and records which have been made out are kept at the employment office. When the applicant becomes an employee, which is marked by his signing the contract with the company, and which establishes his seniority, these records are transferred to the transportation department, where they are placed in the "jacket" and filed numerically by badge number in the company's "live record file." This includes the application blank, reference replies, medical examination, and contract with the company. At the same time a notice is sent by the employment department to all department heads containing information relative to the men who have signed contracts on that day.

All Forms Filed in Individual "Jackets"

The "jacket," previously referred to, which holds the forms while they are in the possession of the transportation department, is of ample size to accommodate all letters or other data. On the outside are rulings for notations of badge number changes, or transfers from one depot to another. It is also in this space that notation is made of the reason for leaving the service, such as discharge, decease, or resignation. At the time the "jackets" are filed, two cards are made out on which are recorded the man's name, conductor or motorman, depot, date of employment, date of final instructions, and badge number or badge number change. These are filed, one numerically by badge num-

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ber and the other alphabetically, in the "live card index." A yellow card is used for motormen and a white one for conductors, and odd badge numbers are assigned to the former, while the latter are given even badge numbers. Although the "jackets" are filed numerically without reference to the man's work, the cards are segregated into a conductors' and a motormen's file. These cards serve as a cross index on the "jacket" file and also aid in locating the new badge number of a man whose badge has been changed at any time. Given the employee's badge or name, it is possible to establish definitely his identity and to procure quickly all records pertaining to his service.

To systematize the recording of incidents in the employee's service life and the disciplinary action taken by the division superintendents, a record sheet of such size as to fit conveniently into the "jacket" is made out for each current year by the clerk at the division superintendent's office. This, and an inspection record card, are the only two pieces of current manuscript pertaining to the employee which are not at all times kept in the vault of the transportation department.

At the end of each year, however, these records are sent to the transportation department office for filing in the "jacket" of the man. In the case of dismissal, the current record sheets are immediately sent to the transportation department and are promptly placed with the rest of his record, so as to be available at the time he is interviewed by the superintendent. Upon the employee terminating his relationship with the company, the "jacket" is filed alphabetically by years under the year in which he left the service, and cards are filed both alphabetically and by badge number in the dead file.

The outside of the jacket carries a notation of the man's settlement with the company. The customary procedure requires the man to turn in his badge and paraphernalia and receive his deposit, or that portion to which he is entitled. Some men prefer to retain their badges in lieu of receiving their pay and deposit. Where such is the case the auditing department attempts to force a settlement so as to have the badge returned. A daily notice similar to the employment notice is sent around to all division offices, indicating the number of men who have left the service by their badge numbers, names, and reasons for leaving.

Careful attention is given to all complaints received from patrons. A great majority of these are received through the mails, but some are transmitted by telephone or personal call. When a complaint is received from any one outside the company, no matter in what form it may have been delivered, a complaint form or blank is made out by the transportation department clerk who receives the information. This gives the location of the car, badge number of conductor and motorman, and details pertaining to the incident. The regular supervisors also transmit complaints relative to infractions of the rules. The form, together with the letter, if the information is received by mail, is sent to the executive department, where a reply is written thanking the writer for his co-operation. The complaint form is then forwarded, for disciplinary action, to the superintendent of the division in which the accused man operates. After the incident has been investigated, the form is returned to the transportation department office with the action noted thereon and is filed with the man's record. When a supervisor or inspector makes a report of a breach of rules, a similar complaint form is filled out and is sent directly to the division superintendent's office for action, after which it is returned to the transportation department to be filed in the "jacket."

The field supervisory forces of the department con-

C.S.L. 8089

CHICAGO SURFACE LINES

DELAYS TO SERVICE FOR 24 HOURS AT _____ DIVISION

BEGINNING _____ 7 P. M. _____ 19__. ENDING _____ 7 P. M. _____ 19__

TIME OF DELAY	LINE	PLACE OF DELAY TO SERVICE	RUN No.	CAR NO.	DIRECTION	CAUSE OF DELAY TO SERVICE	TIME CARS WERE DELAYED MIN.	TIME CARS WERE DELAYED HR.	SUPERVISION BY (GIVE NAME)	ACTION TAKEN TO MAINTAIN OR RESTORE SERVICE

CHICAGO SURFACE LINES

TRANSPORTATION DEPARTMENT

DELAYS OF FIVE MINUTES OR MORE DURING 24 HR. PERIOD ENDING 7:00 P.M. MONDAY, DECEMBER 17, 1923.

Time of Delay	Line	Place of delay to service	Run No.	Car No.	Direction	Cause of delay to service	Time cars were delayed Hr.	Time cars were delayed Min.	Action taken to maintain or restore service
7:12PM	Blue Island Ave.	26th & Crawford Ave.	666	397	E	Collision auto		5	
7:19	59th St.	61 st & Blackstone Ave.	189	5028	W	Auto down		8	
7:30	Halsted St.	18th St.	445	5438	N	Defective car		10	
9:48	Cott. Gr. Ave.	94th St.	53	6181	N-S	Railroad Crossing		7	1 car switched
11:15	Western Ave.	River Bridge	223	854	N-S	Trolley wire down		14	Cars switched
12:08AM	Cott. Gr. Ave.	60th St.	49	5850	N	Collision of autos		13	
			300	5586	W	Collision of autos		5	

C.S.L. 3281 PHONE DEARBORN 8800

CHICAGO SURFACE LINES

DELAY TO SERVICE

DATE _____

LINE _____

DIRECTION _____

RUN NO. _____ CAR NO. _____

PLACE OF DELAY _____

TIME OF ARRIVAL AT DELAY _____ {A.M. P.M.}

TIME CALLED WRECK WAGON _____ {A.M. P.M.}

TIME WRECK WAGON ARRIVED _____ {A.M. P.M.}

TIME DELAY WAS CLEARED _____ {A.M. P.M.}

TOTAL TIME OF DELAY ____ HRS. ____ MIN.

CAUSE OF DELAY TO SERVICE _____

CONDUCTOR _____

BADGE _____

MOTORMAN _____

BADGE _____

Forms Used in Compiling Delay Report. Delay Card Is Filled In by Conductor on Lead Car at Point of Delay

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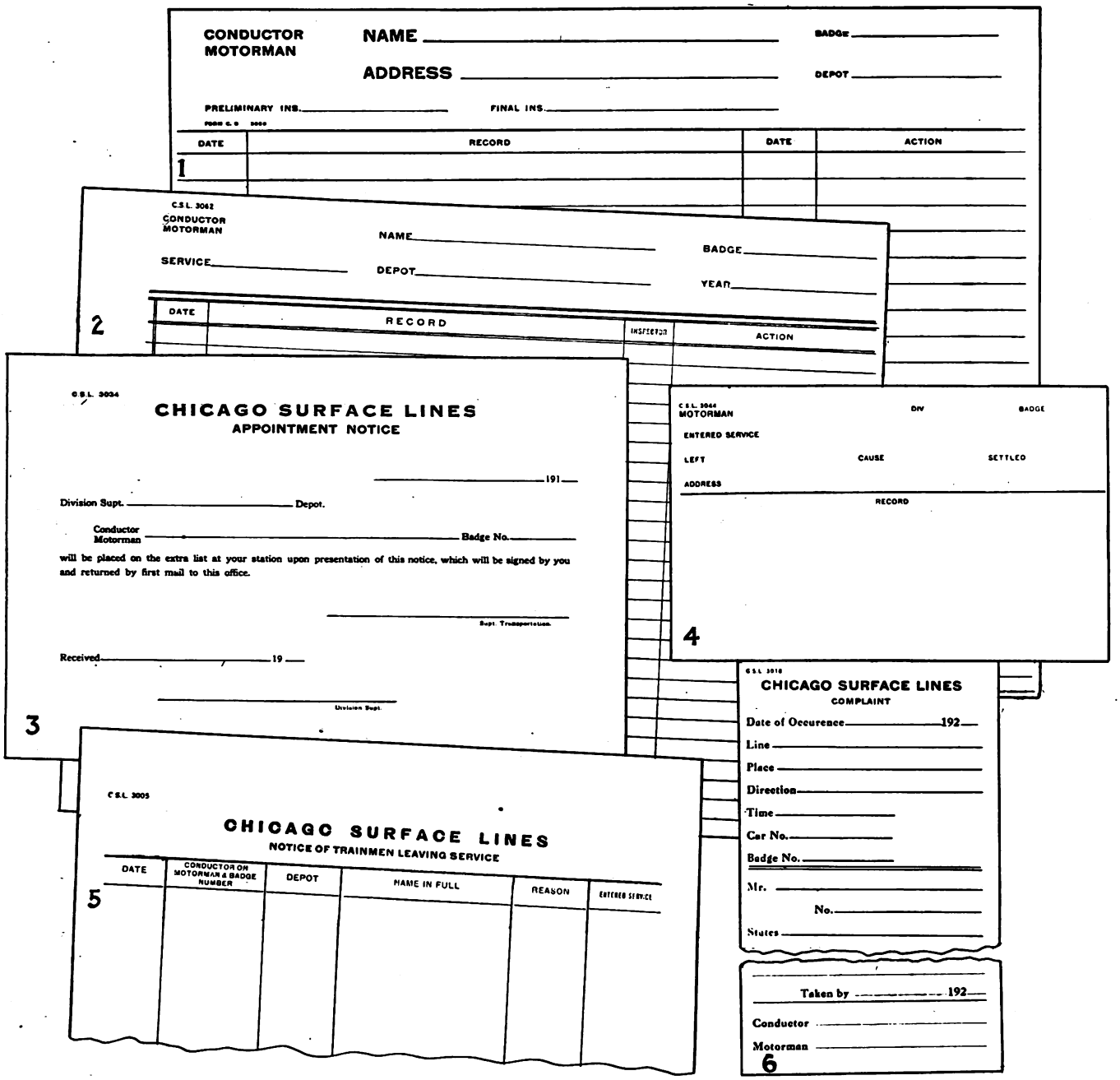
sist of supervisors, traveling conductors and traveling motormen, operating out of each carhouse. Their duty is to foresee and correct defects in service on the street. In cases of trouble such as an interruption of service or difficulty between a patron and trainman, they act as the direct representative of the division superintendent and make every effort to handle the case on the job so that the situation may be cleared up correct errors in trainmen while on duty. It is part of the duty of these men to instill in the new motorman or conductor that confidence which is so often lacking in the new man who has recently completed a course of instruction. When necessary the new man is shown how to feed the power, apply the brakes, and in case of a conductor, to handle fares rapidly and to be courteous to passengers. There are a total of ninety-



Group of Forms Used by Transportation Department for Keeping Records of Trainmen

No. 1. Manila "jacket" which holds manuscript in file.

No. 2. Record sheet kept at division headquarters for current year, then filed in main office jacket.

No. 3. Appointment notice sent to all division superintendents at the time assignment is made.

No. 4. Card record form used in cross index on jacket file. The one for motorman is shown, that for conductor being exactly similar.

No. 5. Departmental notice of trainmen leaving service.

No. 6. Complaint form.

with promptness and to the satisfaction of the passengers.

The supervisor is a street man, and his primary duty is to keep traffic moving. The traveling motormen and traveling conductors, while they wear the badges of supervisors, are really traveling instructors and are selected for their personality and ability to six supervisors, of which number twenty-four, or two out of each division, are classed as traveling motormen and conductors.

A man's ability as an operator is largely judged on the basis of accidents in which he figures as a responsible party. A form covering the usual data on the car, location, and time of day, together with the con-

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ductor or motorman's statement and the names of witnesses, is made out by the conductor when reporting any unusual incident in the trip. The men are encouraged to do this work carefully and are paid for time taken to fill out these blanks at the division superintendent's office after their day's work is over. The report is sent directly to the claim department, where a number of copies, known as accident briefs, are made. Two of these are sent to the transportation department office the following morning. Passing through the transportation department, one copy goes to the depot out of which the man is working, and the other remains in the department office for reference.

The division superintendent takes whatever disciplinary action is necessary, notes action taken on accident brief, enters report and action on man's yearly record sheet and sends the brief back to the main office, where it is filed in the man's "jacket." As in the case of other infractions of rules, if the matter is serious enough to warrant dismissal, the general superintendent has the final ruling.

Seniority Rights Maintained

An interesting and important function of the transportation department is the compiling and maintaining of the seniority record of all trainmen. A new man's name is placed on the seniority book the morning after his contract notice is sent out by the employment office. A section in the book is devoted to the names of men working out of each depot, and is further subdivided for motormen and conductors. The names of new men are added to the list for the station to which they are assigned, in the same order as they appear on the employment notices. Although a man's name may appear fifth on the employment notice for a given day, he will rank first for that day in the seniority book for that depot, if no one of the preceding four was assigned to the same depot. As men leave the service for one reason or another a line is drawn through their names. A new book is made up each year so that the book for the current year does not contain the names of men leaving service during the previous year.

Seniority rights determine the order of the man's choice of run. A general "pick" is conducted every three months and after the trainmen have made their selection of runs, a list showing the runs picked is sent to the main office, where the validity of a man's claim of rating is checked against the seniority book. As this list also contains the man's badge number, it serves as a quarterly check on the information recorded in the book. A similar list is made up of extra men, with the newest man at the depot occupying the bottom position on the list.

Handling Delays

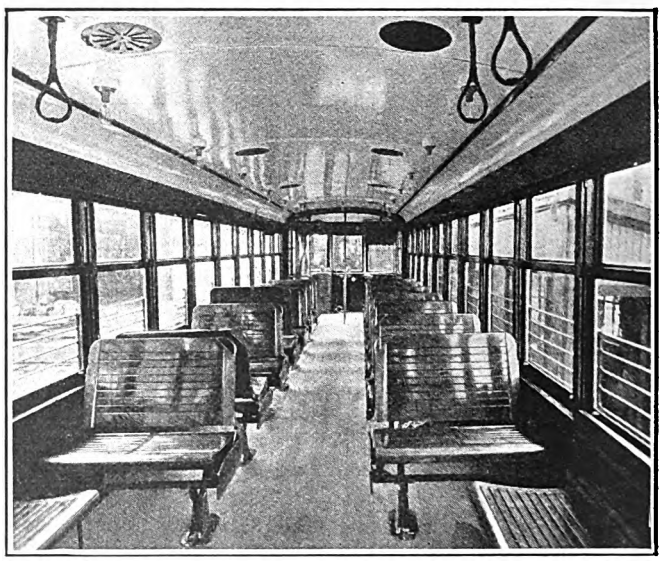
A daily delay sheet is run off on a duplicator each morning by the transportation department, listing the time, place, duration, and cause of every specific delay of five minutes or more occurring between 7 p.m. of the second day preceding and 7 p.m. of the day preceding the day of issue. Copies are sent to heads of departments and executive officers of the company. There are two sources of information from which this general delay sheet is compiled. The first is a smaller sheet which is made up by the clerks at the various division headquarters from information recorded on delay cards made out during the day by trainmen. These sheets are forwarded to the main office for tabulation.

The other source of delay information comes from the dispatcher on duty at the main switchboard. He makes out a report of each delay which requires a wreck wagon. A check on the service rendered by the various departments in time of trouble is made from the time noted on the trainman's delay card. The following blank headings to be filled in by the conductor of the lead car indicate the efficiency of the co-operating departments: Time of arrival at delay, time called wreck wagon, time wreck wagon arrived, time delay was cleared, and total time of delay. An unusually long time elapsing between any two of the above calls for an explanation from the man or department responsible.

Chicago & Joliet One-Man Cars

Double-Truck, 44-Passenger Cars for Suburban Service in Joliet—Low Floor, Maximum Traction Truck, Safety Devices Are Features

TEN new cars recently built for the Chicago & Joliet Electric Railway, Joliet, Ill., by the G. C. Kuhlman Car Company have been placed in suburban service on the Lockport to Rockdale run, a distance of 6½ miles, the greater part of which is made



The Interior Has White Maple Floor, Mahogany Finished Seats and Trim and White Enamel Headlining

through the city streets of Joliet. The car is more comfortable than would be a strictly city type car, due to the generous spacing of the seats and the wide windows. The cars are arranged for operation by one man.

In the design considerable thought was given to the fact that these cars would be used during heavy rush-hour periods when the workers in the wire and steel mills of Rockdale are transported to and from their homes in Lockport and Joliet. Ample provision has been made both in the width of aisle and in the length of platform to accommodate a large standing load.

The car is of the straight side type, with a low arched roof, and drop platforms, mounted on maximum traction trucks. Double folding doors are provided at the right-hand front corners of the car, while a single folding door opposite provides means of egress from the car where an island platform stop makes this arrangement necessary. The side sills are 3-in. x 3-in. x ⅜-in. angles, securely gusseted with 4-in. x 4-in. x ⅜-in. angles to

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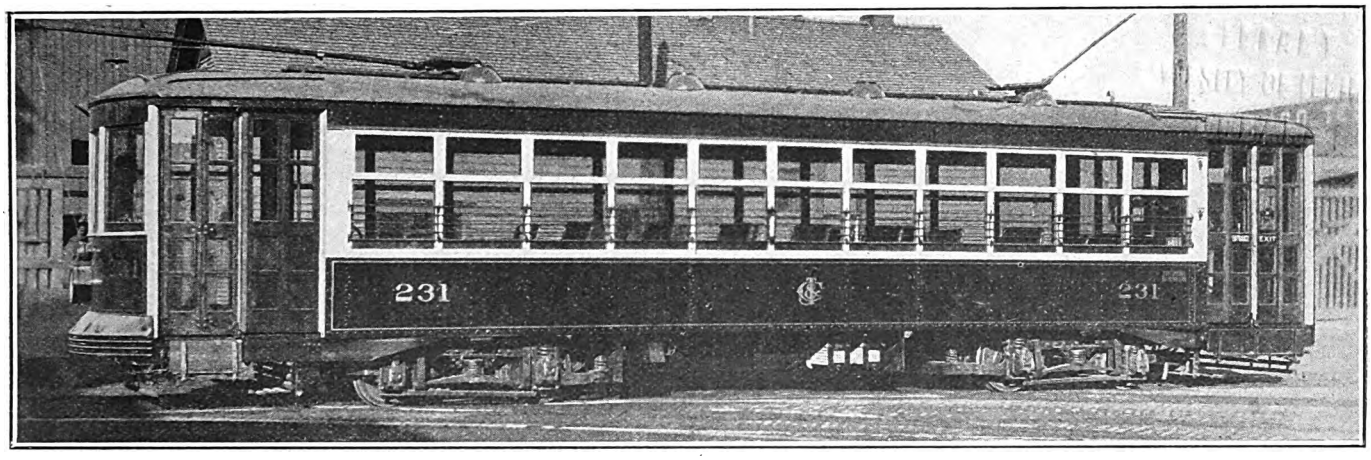


The Wide Windows and Extended Platforms of the Chicago & Joliet Cars Give a Pleasing Appearance

3-in., 4-lb. channel cross sills which extend the full width of the car body. The outside platform knees consist of 8-in., 15.5-lb. channels extending to the inside of the bumpers. Additional support is given to the platform by means of center knees of 3-in., 4.1-lb. channels. The bolsters are of the built-up type, made with an 8-in. x $\frac{5}{8}$-in. top plate and an 8-in. x $\frac{3}{4}$-in. bottom plate. The body, corner and side posts are of 1½-in. x 1½-in. x $\frac{3}{16}$-in. tees. The same material is used for carlines, poplar strips being bolted on each side of the tee for nailing strips for the roof boards and for the Agasote headlining.

The side sheathing of the car consists of $\frac{3}{32}$-in. steel, riveted to the side sill and to the side posts. It is secured to the wood body corner post by means of screws and bolts. The belt rail is a flat steel bar, 2½ in. x $\frac{3}{8}$ in. It extends the full length of the car body between body corner posts, with a formed sheet steel cover. The seat rest angles are of 1¼-in. x 1¼-in. x $\frac{1}{8}$-in. steel, riveted to the side sheathing. A steel letter board riveted to the side posts extends over the top sash frame.

There are eleven side windows. The top sash is stationary and is framed in one continuous piece the length of the car body, while the lower sash is arranged to raise. The side posts are placed on 33-in. centers, allowing a somewhat wider window than that usually found in city cars. Window guards in two sections are provided for each side of the car. The length over bumpers is 44 ft. 10 in. and the width over corner posts is 8 ft. 4 in. The truck centers are 22 ft. apart, and the truck wheelbase is 4 ft. 10 in.

The interior of the car is finished in cherry, with white enamel ceiling. No bulkhead or step separates the platform from the car body. The Agasote headlining is continued into the vestibule and a slight ramp drops the platform level approximately 2 in. Seven Brill reversible cross seats of wood slat construction are spaced opposite the seven middle windows on each side, while a longitudinal seat occupies the space in front of the remaining two windows at each end. There is also a single folding seat on the left side of each platform between the body corner post and the door, making a total of forty-four seats.

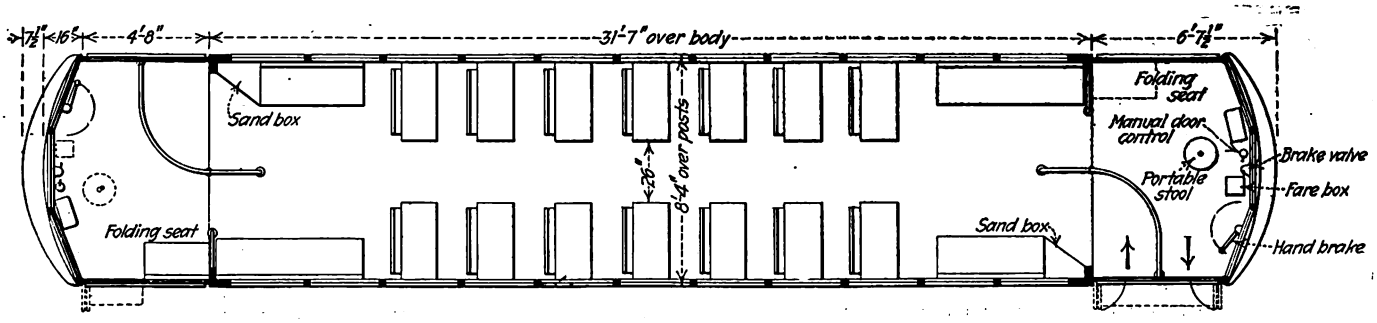
To insure warmth and comfort to the passengers a double flooring has been provided, made up of $\frac{13}{16}$-in. hard maple laid upon $\frac{13}{16}$-in. pine flooring, with a layer of building felt placed between. The inside sheathing from the floor up to the window rests is of ¼-in. Agasote.

Thermostatically controlled electric heat is provided with twenty single coil truss-plank heaters under the seats. A cab heater is located in each vestibule close to the operator's position. Eight Brill exhaust type ventilators, spaced four on each side of the roof, may be regulated by means of ceiling registers with movable shutters.

Passengers Enter and Leave by Separate Doors at the Front End

The two-leaf folding doors on the right side swing outward against the body corner post and vestibule post. They are equipped with National Pneumatic door and folding step mechanism. The single folding door on the left side of the vestibule is hand operated. The cars are operated "Pay-As-You-Leave"; passengers enter through the door adjacent to the car body and leave through the other one. A Johnson fare box is used for fare collection. The car has the standard safety features of the Safety Car Devices Company.

One Westinghouse 535-A, 60-hp. motor is mounted on each of the Brill 39 E-1 maximum traction trucks. The driving wheels are of 28 in. diameter and the pony wheels 22 in. The control is K-35 double end. The Westinghouse air brake equipment is used, including DH-16 compressor.



The Platforms of the Chicago & Joliet Car Is Flush with the Body, Facilitating Passenger Movement

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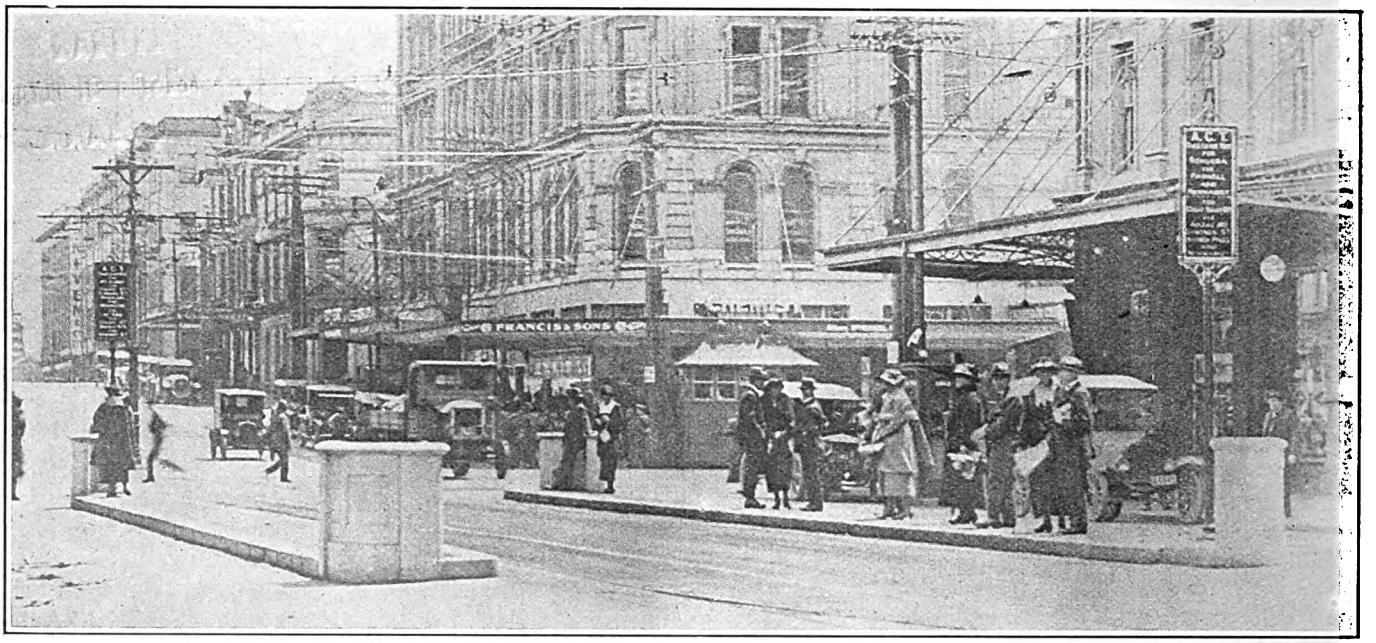


Substantial Waiting Platforms of Concrete Are a Feature of Some of the Downtown Streets in Auckland

Auckland Will Make Extensive Improvements

New Zealand Tramway Carried About 52,000,000 Passengers in 1923 and Has Decided Upon a Development Program to Cover Four Years

DURING the next four years the city of Auckland, New Zealand, will spend £280,000 (approximately $1,260,000) on improvements to its tramway system. This is in addition to £250,000 invested under recent appropriations and to the £1,277,201 paid by the city for the property in July, 1919, when it was taken over from its private owners, the Auckland Electric Tramways Company, Ltd. The new improvements contemplated include extensions of the line, new repair shops, a number of additional cars and ten up-to-date motor buses.

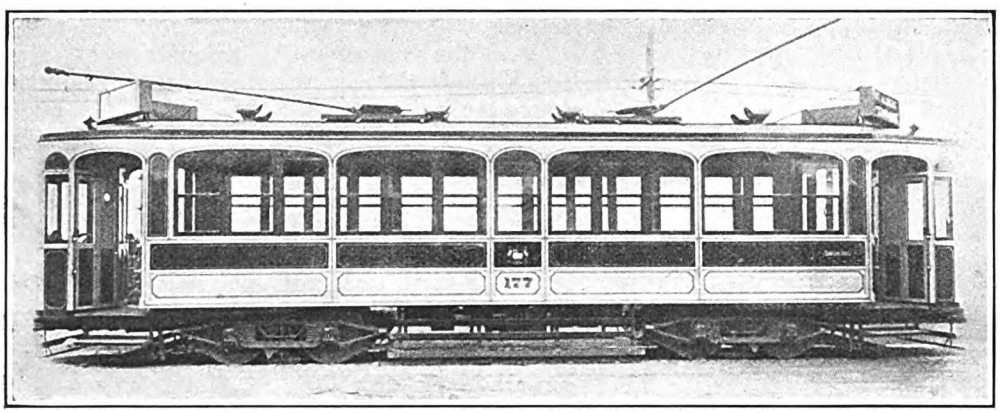
Auckland has a population of about 140,000, and on Jan. 1, 1924, the trolley system comprised 51½ miles of single track, 170 passenger cars and eleven service cars. About 4,300,000 car-miles were run and about 52,000,000 passengers were carried during 1923. This makes the system the largest electric railway property in New Zealand, the total number of passengers carried in Wellington in 1923 being about 37,000,000, in Christ Church 25,000,000 and in Dunedin 20,000,000.

The zone system of fares is used, the zones being about 1 mile in length. Weekly tickets, available over six sections, are issued for 3s. 9d., and in some cases return tickets are used, as, for instance, an ordinary fare for six sections is 7d. each way, but a return ticket is issued for 11d.

Accompanying illustrations show the standard car used as well as a typical view downtown, with a concrete waiting platform, of which there are a number on the Auckland system.

One striking feature of the car is the window arrangement, made up in what might be called in this country an exaggerated empire style. A close inspection of the photograph will show that each of the two openings at each end of the car actually is divided into three upper and three lower sash. Other features of the car are a completely inclosed motorman's cab, the elaborate lining of the panels, the side safety guard between the trucks, the anti-climber and the very conspicuous route sign at each end of the car.

A. E. Ford, general manager Auckland Municipal Tramways, was formerly traffic superintendent of the Adelaide Municipal Tramway Trust, and began his tramway career in the service of the Sydney tramways.



The Auckland Standard Car Has a Peculiar Arrangement of Sash, Inclosed Motorman's Compartment and Conspicuous Route Signs on Roof

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Making Tests to Save $15,000,000 a Year

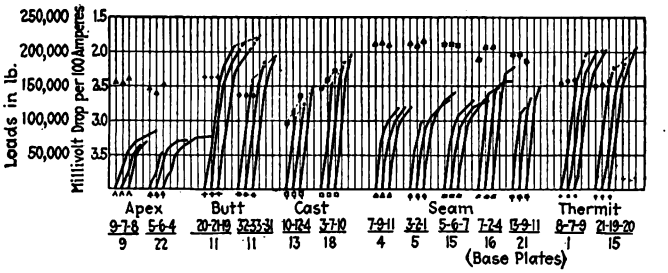
A Joint Capable of Developing the Full Life of the Rail Would Greatly Reduce Track Reconstruction Expenditures—Results of Numerous Tensile, Bending and Drop Tests Are Given

THERE are something over 25,000 miles of urban electric railway track in this country. At $60,000 a mile this represents an investment of $1,500,000,000, and on the assumption that this track has to be reconstructed on an average once in 20 years, there is an expenditure of $75,000,000 per year. If it be assumed that track built with welded rail joints capable of developing the full life of the rails would have an average life of 25 years, the corresponding annual expenditure for track reconstruction would be $60,000,000 per year. The difference would constitute a saving of $15,000,000 per annum.

In order to discover a way in which such a saving can be accomplished a committee representing the American Electric Railway Association and the American Bureau of Welding has conducted an extensive series of tensile, bending and drop tests. It is planned to make also a series of repeated impact tests and some sort of service test, but the method of making the latter has not yet been definitely decided upon.

The Emery tensile machine of the United States Bureau of Standards is being moved from one building to another and it will not be possible to complete the series of tensile tests for two or three months. The impact testing machine designed and built especially for the committee has been constructed and is now being erected in Washington. As soon as these two machines are available all the tests can be completed which are contemplated in the preliminary program of determining the state of the art. It was thought undesirable to attempt to pass judgment on the relative service value of the different joints tested until after service tests have been made. However, the results given by the conductivity, tensile, drop and bending tests are so clearly shown that the engineers of electric railway companies will find in them valuable information for their guidance.

A standard method was followed by engineers of various railways in making test joints on special rail in order to have the work done under conditions approximating normal track methods as closely as possible. Two 33-ft. 6-in. rails furnished by steel companies for the purpose of making test welds were laid end to end in existing track after removal of existing rail and 15 in. of pavement each side of the rail down to the top of the ties. This was to insure that conditions for the workmen making welds were normal and that the temperature conditions were normal, including the ability of the adjoining rail to conduct heat and electric current.

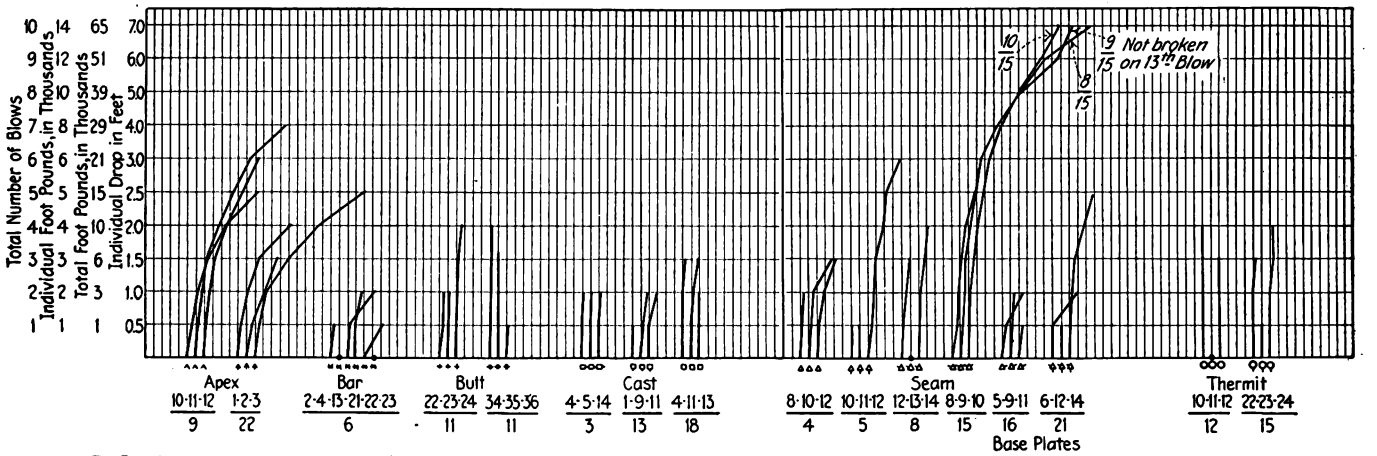


Results of Bending and Conductivity Tests. On the Horizontal Scale (Deflections) Ten Divisions Equal One Inch

Test rails were spiked to the ties and the outside ends welded to the adjacent rails. The joint between the test rails was fastened with standard bolted plates with ½-in. open joint to permit wedging the test rails together at the individual joints as each was cut and welded.

An identification number was assigned to each company making test welds. Each weld bore this identification number and also was numbered individually. Conductivity, tensile and repeated impact tests are being made by the Bureau of Standards. Bending and conductivity tests are being made at Purdue University, and the University of Illinois is making drop tests.

As a result of the tensile tests of three cast-welded rail joints it was found that they first showed separation of the rail ends and finally failed by breaking the cast material. Slag inclusions were found under the rail flange and head. These joints all failed between 200,000 lb. and 300,000 lb.



Deflections of Welded Rail Joints During Drop Tests Made at the University of Illinois, October, 1923-January, 1924
Horizontal scale (deflections) is four divisions equal one inch. Each specimen broke under the blow following the last shown on the chart

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Three of the butt-welded rail joints tested were found to be perfectly clean and welded over the entire rail section, the fractures having a crystalline structure. Another specimen developed the yield point of the rail material. Failures occurred at somewhat more than 700,000 lb. in one case and in the other two at a little below and a little above 900,000 lb.

In the case of three seam-welded specimens the failures occurred by the shearing of the weld at contact of fish plates and rail. One specimen had four bolts through fish plates and web; the remaining joints were without bolts. The seam welded joints having Abbott plate reinforcements failed by breaking in the rail section at or near the end of the fish plate. All failures occurred at figures varying from about 300,000 lb. to about 400,000 lb. except one specimen which failed at 800,000 lb.

Failures of Apex type joints in three instances occurred by shearing of bolts and welds, at about 200,000 lb. Lengths of 2 to 4 in. of weld were found to show no fusion with the rail section.

A number of the thermit welds showed blow holes and slag inclusions. Failures occurred at approximately 600,000 lb. Attention is called to the fact that the inserts in the welds tested were not all fused. Slag was found to be trapped under the inserts. The failure began by separation of the rail heads at the unwelded insert.

Results of Bend Tests

In making the bend tests two Riehle testing machines, one of 300,000 lb. capacity and the other of 200,000 lb. capacity, were used. The test specimen was placed on two supporting knife edges, so that the joint was midway between the supports, which were spaced to give a span length of 42 in. Load was applied by a knife edge resting midway on the saddle block. The number of load increments was such as to give from 10 to 20 points on the chart for each joint.

In three of the cast welds flaws and air holes appeared in the cast iron at the web and flange. In another a sudden tension failure occurred through the sides of the casting even with the bottom of the flange, while in two cases failure took place through the sides at one end of the casting even with the bottom of the flange.

The butt welded joints all fractured suddenly at the weld. In the Apex joints the seams opened up and failures occurred by bolts shearing. In the tests of the electric seam welded joints, failures occurred both by opening of the seams and by fracture of the rail flange.

In the thermit welded joints one specimen failed suddenly through the rail ⅞ in. from the joint; another failed suddenly through the rail ½ in. from the joint and a third ⅞ in. from the joint for the lower half and ½ in. from the joint in the opposite rail for the upper half of the joint. Three other specimens failed through the rail at the edge of the weld and ⅞ in. from the joint; all failures of these three specimens were sudden.

KEY TO TEST SPECIMENS

Type of Joint	Made by	Steel from	Joint Numbers
Cast Iron	Cram	Bethlehem	3- 1 to 3-12
Cast Iron	Pinckley	Bethlehem	13- 1 to 13-12
Cast Iron	Wilson	Lorain	18- 1 to 18-12
Bar Weld	George	Lorain	6- 1 to 6-12
Bar Weld	Lorain	Lorain	11- 1 to 11-12
Butt Weld	Lorain	Bethlehem	11-25 to 11-36
Butt Weld	Lorain	Lorain	11-13 to 11-24
Seam Welds			
Carbon Electrode	Clark	Bethlehem	2- 1 to 2-12
Carbon Electrode	Dalzle'sh	Bethlehem	4- 1 to 4-12
Carbon Electrode	Estill	Bethlehem	5- 1 to 5-12
Carbon Electrode	Graves	Lorain	8- 1 to 8-12
Carbon Electrode	R. W. & B. Co.	Lorain	14- 1 to 14-12
Carbon Electrode	Ryder	Lorain	15- 1 to 15-12
Carbon Electrode	Steward	Bethlehem	16- 1 to 16-12
Carbon Electrode	Wysor	Bethlehem	21- 1 to 21-12
Metallic Electrode	Gould	Bethlehem	7- 1 to 7-12
Metallic Electrode	Walker	Lorain	17- 1 to 17-12
Metallic Electrode	W. W. & M. Co.	Lorain	19- 1 to 19-12
Apex Type Electrode	Way	Bethlehem	22- 1 to 22-12
Apex Type Electrode	Ind. S. & F. Co.	Bethlehem	9- 1 to 9-12
Thermit Weld	Larned	Bethlehem	10- 1 to 10-12
Thermit Weld	M. & T. Corp.	Lorain	12- 1 to 12-12
Thermit Weld	Ryder	Lorain	15-13 to 15-24
Thermit Weld	Candy	Lorain	24- 1 to 24-12
Thermit Weld	Lincoln	Lorain	25- 1 to 25-12

Method of Making Drop Tests

The drop test machine used in making the tests by the University of Illinois conforms to the specifications of the A.R.E.A. The machine is arranged to allow a 2,000 lb. tup or hammer to fall freely from various heights up to 50 ft. The rail supports were bolted to the anvil of the machine and had a cylindrical upper bearing surface with a radius of 5 in. The distance between centers of the supports was 3½ ft.

Rail joints to be tested were placed on the supports with the head of the rail up and with the center of the joint directly under the center of the striking face of the tup. The tup was slowly raised and automatically tripped at a height of 6 in. above the joints. The tup was then raised a short distance above the joint and the test specimens inspected so that the effect of the drop could be noted and recorded. If the joint was bent or developed a crack the extent of the deflection was measured and recorded and the joint removed and photographed. It was then placed back in the machine and subjected to the next blow. After the blow that finally destroyed the joint both ends of the specimen were photographed to show the nature of the fracture. For successive drops the height from which the hammer fell was increased by 6 in. until the height of 3 ft. was reached, after which the increment in height was 1 ft.

The cast weld specimens in general showed no deflections until several blows had been struck. Failures occurred in some instances by fracture of the rail and in other cases the weld failed. The butt welds in most cases showed some deflection after the first blow. Breaking of the weld was the prevailing reason of failure with these joints. In the tests of the bar welds, failures were accompanied by breaking of the side plates.

No outstanding tendency was noted in the experiments with seam welded specimens. In some cases the rail broke without disturbing the weld and in other cases failures occurred along the seams. Among the Apex joints the majority of failures resulted from cracking of the seams. Thermit welded joints failed in most cases by fracture of the rail outside the weld.

Early in 1923 the Bureau of Standards issued specifications for making conductivity tests on the rail joint specimens submitted. Owing to the fact that few tensile tests were made before the dismantling of the Emery testing machine, definite conclusions cannot be drawn as to the relations between tensile strength and conductivity. The relation between conductivity and bending is shown on an accompanying chart.

Detailed results of the tests so far made, and exact descriptions of the methods followed in making the joints, are given in the report of the committee. This was published in full in the *Journal of the American Welding Society* for February, 1924.

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Eliminating Poles in El Paso

European Method of Attaching Span Wires Directly to the Buildings Is Being Employed with Marked Success

THE American electric railway visitor to Europe is nearly always impressed with the way in which the span wires of the trolley line are attached in a great many instances to adjoining buildings instead of to span-wire poles. This not only removes an obstruction from the sidewalk, but it lightens the aërial structure and decreases the total expense of pole maintenance. Such a form of construction, of course, is especially adapted to the narrow streets found in many cities on the continent of Europe, but its advantages are by no means confined to streets of this kind. They apply almost as strongly to broad thoroughfares, and it is interesting to note that the El Paso Electric Railway has been employing this method of overhead construction with success in a number of instances. The accompanying views "Before" and "After" at a typical corner show how it was possible to get rid of an unsightly wooden pole on the corner by attaching the span wires to abutting buildings.

Owing to the variety of local conditions a standard type of fastener has been found impracticable in El Paso. Those used were made from a ½-in. x 2-in. bar iron, shaped to fit the particular location where it is to be used.

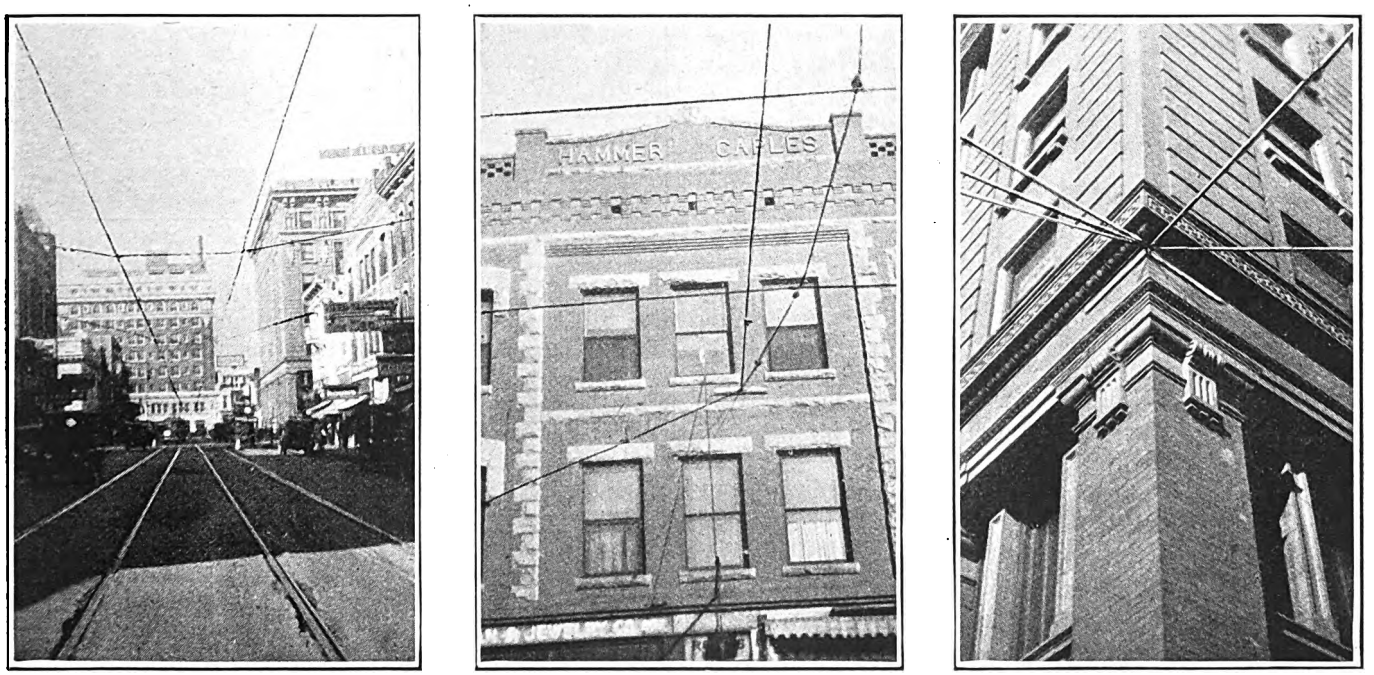
If it is at all possible to place the fastener at a corner where it can be attached to both sides of a building, this method is followed. The iron bar is then simply bent at a right angle and an offset is made to form an "eye" at the vortex of the angle. From this "eye" the supporting spans are attached. Where the pull is straightaway, a flat iron bar of the same size is attached to only one face of the building, and an eyebolt is screwed into a hole near the end of the supporting bar.

All these various types of fastenings are attached to the building, if of stone or brick, by means of ½-in. x 4½-in. expansion bolts, and up to the present time no trouble has been experienced with any of these bolts pulling out.

It so happens that no supports of this kind have been attached to wooden buildings, but no difficulty is anticipated by the company in making the attachment by screws, light bolts, or bolts with washer and nut. Where the attachment is made to both faces of a stone or brick building, two bolts in each face have proved sufficient. Where the attachment is made to a single face of the building, three or four bolts are used. Other than the fastening, there is no change from standard

Before After

The Same Corner with the Overhead Wires Supported by Wooden Span Pole and Attached to a Building



Some of the Buildings in El Paso to Which the Span Wires Are Attached Are of the Most Substantial Character

The view at left shows San Antonio Street, an important business thoroughfare, after the poles were removed. The second view shows a face pull-off. The third view shows a corner attachment.

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in the overhead construction or in the type of strain insulator used.

At first the company had some difficulty in securing permission to make these attachments, but after explanations were made to the owners of the building as to the benefits in civic beauty, permanence, removal of poles from the sidewalks, etc., the disinclination was overcome. The advantages of this construction from a public standpoint are particularly evident on a handsome business thoroughfare, like San Antonio Street. On this street all the poles that could be spared were removed. As will be seen from the illustrations of individual attachments, the buildings to which the wires are attached are of very substantial construction, including several handsome structures.

Children Aid Safety Campaign

Posters Prepared by 3,000 Pupils in Beaver Valley Schools Emphasize Accident Prevention—The Co-operation of Newspapers and a Local Photographer Obtain Wide Publicity

A NOVEL plan for enlisting a large part of the entire community in safety work is in effect in New Brighton, Pa. This consists of a contest in which some 3,000 school children prepared posters. The best of these are being published serially in the local papers along with photographs of the children preparing them. While not definitely identified with the Beaver Valley Traction Company, the campaign has been planned and conducted by H. O. Allison, safety engineer of the company. As vice-president of the Western Pennsylvania Division of the National Safety Council, he addressed each of the schools of the valley, making as many as seventeen talks in one day. Following the talks a special poster blank, 11 x 14 in., containing on the reverse side suggestions for preparing the posters and a list of 100 suitable topics, was distributed and the pupils requested to make accident prevention posters. No prizes were offered and each poster made was the voluntary act of the student. More than 3,000 posters were received.

Day by day, hour by hour, moment by moment; let this thought grow in your mind, and be the main-spring of all your efforts: Safety First.

JOHN L. STEWART,
President, The Beaver Falls Tribune

Accident Prevention Poster

GOOD BYE

It MAY HAVE BEEN GOOD BYE FOR EVER IF THE MACHINE HAd NOT HAVE STOPPEd JUST AT THAt MOMENt.

NEVER STANd IN THE MIDDLE OF THE STREET "SAFETY FIRST"

Made by
Charles N. Boyde
529 Corporation St., Beaver, Pa.

Selected as one of the best posters made by the pupils of the public schools, Beaver county Pennsylvania.

Here is a child wandered away from the sidewalk and its mother into the street between crossings. An auto driver approaching, startled into action by the sudden appearance of the child, has done what, was apparently the only thing possible to prevent a fatality. He risked injury himself and the occupants of the automobile to save the child.—Written, arranged and published for the Prevention of Accidents by H. O. Allison.

Photo by Brown Studio

Your action may prevent a serious accident tomorrow by the exercising of ordinary care today.
—Contributed.

The posters were displayed at a special safety rally held at the Junction Park pavilion. Some time later judges selected 100 of the best. With the posters on hand the news value and publicity possibility of the posters for the newspapers were quickly seen. A conference with the representatives of the six papers in the territory confirmed this, and each paper agreed to publish a poster daily until the entire hundred had been printed. These are now appearing in the local newspapers.

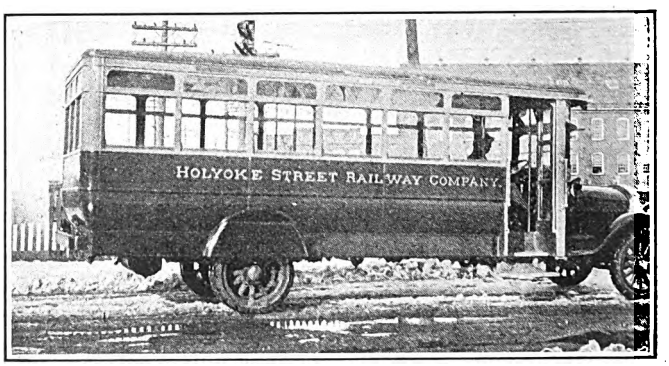
A local photographer was approached and it was suggested to him that to have 100 children call at his studio to be photographed would be of sales value to him. He saw the point and agreed to photograph the children and furnish two prints of each without charge. The picture of each child is reproduced along with the poster. Several people interested in safety and children agreed to take care of the cost of the engravings so that no one was particularly burdened.

With each poster is a brief statement of the safety precautions indicated through a study of the poster. In addition there appear with each poster two safety cautions written and signed by prominent men and women of the district. A typical poster is reproduced. In order that the list of best posters made may be preserved by those who made them, a book containing them has been prepared and is being distributed by Mr. Allison.

Railway Bus Sets Standard

THE Holyoke Street Railway is in the business of supplying transportation to the people of Holyoke, Mass., and it is the belief of the company that it should supply facilities of such high quality that complaints will be forestalled and possible competitors will be discouraged. The railway has been operating buses for about two years and has recently purchased two new Macks.

These buses are painted exactly the same color as the street cars and carry the name "Holyoke Street Railway Company" on the sides. This is done so that the public may thoroughly understand that the street railway is in the transportation business in every way.



Color Scheme and Name Identify Bus with Railway

The buses operate on a 2-mile route with a twenty-minute headway and a twenty-minute round trip time. One bus is in regular operation and the other is kept as a spare. The route runs from the center of the city up a street along which there are no car tracks and through a residential district. The fare is 6 cents, the same as on the cars, and no transfers are issued. By operating buses on this route the company has saved the expense of new track and it has also obviated the necessity of operating a car line which could not be conveniently tied in with any other existing line. Up to the present time the bus line has paid its operating cost but has made no great profit.

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Detroit Answers Motorbus Proposal

Rapid Transit Commission and Department of Street Railways Present a Brief to the Common Council of the City in Reply to a Proposition to Substitute Buses of a New Type Carrying 250 Passengers for the Surface Cars and Proposed Rapid Transit System

RECENTLY a petition was presented to the Common Council of the City of Detroit for the substitution of a new type of autobus to supplant the present surface cars operated by the city and to forestall the construction of a rapid transit system for which plans are now being prepared by the Rapid Transit Commission. The most revolutionary feature of the plan is the use of a vehicle with a capacity of 250 passengers.

A joint answer has been filed with the Common Council, signed jointly by William B. Mayo, Commissioner and general manager, and Ross Schram, assistant general manager, for the Department of Street Railways, and by Sidney D. Waldon, chairman, and Daniel L. Turner, consulting engineer for the Rapid Transit Commission. This answer, which cites the main arguments against the proposition, is particularly interesting to electric railway men since it expresses the opinion of the city's transportation executives regarding transportation methods where all the facilities are owned by the city, or are being planned as municipal projects. An abstract of the reply, as addressed to the Common Council, follows:

THE CITY'S STATEMENT

The petitioner claims among other things "that the proposed new type of autobus has been proved to be superior to the street car in every conceivable manner." He then recommends that the city "build and prove the bus," and "effect complete substitution of buses for street cars as quickly as possible." The petitioner further claims that "the bus will provide rapid transit on present streets for an indefinite period," and then states that, "assuming the bus will not provide rapid transit in the present streets, it is still worth while as a substitute for street cars, but more particularly it is still the most valuable rapid transit conveyance because it will do everything that a train will do and do it better." The petitioner admits that: "Some may say that this is all premature and should not be thought of until the bus is built and proved."

In this latter conclusion, the commissioners and engineers of both the Department of Street Railways and of the Rapid Transit Commission state that they are in entire agreement with the petitioner. Considering only the major issues involved, they may be stated about as follows:

1. Shall the city decide now that its street railway system is obsolete and proceed to adopt the proposed new type of autobus with which to replace it?

2. Shall the city decide now that the proposed new type of autobus will be able to carry such loads of passengers at such speeds through the streets as to make it unnecessary for Detroit further to consider the use of trains upon exclusive rights of way, below or above ground, as a necessary rapid transit requirement?

These two questions seem to sum up the main points contained in the petition, states the reply.

The street car and the present or future motorbus are held to be essentially surface vehicles, each with its proper place in the scheme of surface transportation of great cities. However, neither the street car nor the motorbus operating upon the street surface will meet the requirements of urban rapid transit, but that safety, capacity, economy in operation, and speed will demand the exclusive right of way, underground in the thickly built-up sections of the city and on the surface, with suitable grade separations wherever possible, in the outlying districts, and with six, eight or ten car train units, as now used in New York City.

At the present time in Detroit the motorbus and the street car are, to a large extent, serving two different purposes and are each aiding the other, even though in some places their routes occupy the same street. The motorbus is a smaller vehicle, giving a seat to every passenger, making fewer stops to take on and discharge a full load, and consequently, giving a faster service between points. For this limited, or special service, the rider pays a special and higher rate of fare.

The street car does not guarantee a seat, but it does stand in the position of giving to Detroit its mass transportation until construction is authorized and completed upon a real rapid transit system. It is, and must continue to be, the backbone of the city's mass transportation until such time as it can be gradually relieved by underground train operation. For the absence of a guaranteed seat the street car gives a ride at a lower rate of fare.

IMPORTANCE OF THE MOTORBUS RECOGNIZED

Following a sketch of the development of the bus as a factor in urban transportation, which has taken place in the last 20 years, the answer states that the importance of the motorbus as an element of urban transportatioin upon the surface is being recognized more and more every day, and it is destined to play an increasingly important part in circulating and distributing the population of our cities in the future. But admitting this fact, the conclusion that the motorbus is now ready to supersede all other means of urban transportation is wholly unjustifiable. The motorbus must still pass through many stages of development before any city can afford to consider seriously substituting the motorbus for the street car for its first step in mass transportation.

While it is not important in comparison with the main issue under consideration, the practical engineering and operating side of the proposed new type of 250-passenger motorbus proposal should be mentioned, states the answer. It is suggested that the city, with an experience covering the use of 48 and 60-passenger vehicles jump to the construction of buses capable of carrying 250 passengers. It is proposed to incorporate into this proposed new type of bus a number of elements not now in regular use in motorbus operation, and with a very limited amount of experience after one is built to launch into manufacturing and operating commitments upon an extensive scale.

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To jump from a 60-passenger vehicle, steered and controlled by one man, with fare collection attended to by another man, to a 250-passenger vehicle, also steered and controlled by one man, and with fares collected by another man, with all of the unsolved problems such a jump presents, would not normally be undertaken by any private company with its own money, and with its own future staked upon the result. The evolution would be gradual. Is it wise to recommend doing with public funds what no one has attempted to do, or would seriously consider doing, with private capital?

The city of Detroit has invested in its street railways aproximately $40,000,000. With this system it serves 93 per cent of the total revenue passengers at a 6-cent fare, the remaining 7 per cent being carried by the bus lines and by jitneys at a 10-cent fare. The service offered compares favorably with that offered in any other city.

It is now proposed that this self-supporting transportation system be discarded as rapidly as possible as obsolete and be replaced with a new type of vehicle yet to be built and proved out at city expense. The writers state that they fear that numerous taxpayers might consider such action imprudent.

They are quite in accord with the idea that there should be more buses, as this would avoid the cost of the less important extensions to street railway lines that would otherwise be necessary, pending the construction of a rapid transit system, but they do not advise an increase in buses for the purpose of displacing the surface car system.

Streets are Inadequate for Rapid Transit Service

Considering the second half of the proposal, that the motorbus be utilized for rapid transit instead of trains on rails, there are inherent and controlling reasons against it. The city's street system is wholly inadequate for any such use, according to the writers. The existing streets were originally planned for a two or three-story town and for man and horse traffic. On the one hand the automobile has been substituted for the horse, and on the other hand people are being piled up layer upon layer in multi-storied buildings. Already the 23-story building has been reached in Detroit, the 32-story building is in prospect, and the end is not in sight. In other words, in some places, we are superimposing ten cities on one, and yet the same circulating and distributing street system that was designed to serve a two-story village is expected to continue to serve a 25 or 30-story city.

The capacity of the land is flexible. The sky is the only limit. But the street capacity is inflexible and made so by the very bulk and cost of the enormous structures that impose the greatest traffic burden upon the streets they hem in so tightly.

What is needed is new street space, not an increased use of the existing streets. Only when rapid transit subway or elevated lines are constructed through the developed and congested sections of the city will this new street space be really provided by building under or over the existing street.

Rapid transit presupposes mass transportation at high speed. High speed is impossible on the surface of the street congested with all other kinds of surface traffic. Again, high speed cannot be attained when the transit vehicles are interfered with by cross traffic at every street intersection. High speed in congested streets is impossible with safety. The essential feature of rapid transit lines is that they must be located where they will not be subjected to interferences from any kind of traffic either along the line or at intersections with it. In the outlying and undeveloped sections of the city the streets can be made wide enough to permit a rapid transit line to operate on the surface over an exclusive right of way in the center of the street, with cross streets carried over or under the line, thereby eliminating all surface interferences. But in the developed sections of the city such a thing is not possible because the streets cannot be widened sufficiently. These are the conditions under which subways or elevated lines must be constructed, thereby permitting a high speed to be attained through the congested districts, at least three to four times what is possible on the surface.

The petition so far as it relates to the substitution of the proposed new type of motorbus for the present street car system is considered to be unwise, uneconomical and contrary to the best interests of the city. As to the claims that the proposed new type of motorbus will provide rapid transit upon the existing streets and make unnecessary real rapid transit on rails upon exclusive rights of way, this is regarded as impracticable and the claims are not borne out by fact. Subway rapid transit will serve the public with the maximum of safety, economy and speed. The motorbus is still in an evolutionary stage, both mechanically and as a surface transportation medium. It has a service to render as an aid to the street car system, but not as substitute for it.

Medical Department in Milwaukee

THE medical department of the Milwaukee Electric Railway & Light Company was begun in a limited way in 1912 and has expanded now so that it includes the complete medical, surgical and obstetrical care of employees and their families. It is under the direction and part of the work of the Employees' Mutual Benefit Association.

In an article on the department by Dr. E. W. Miller, medical director, in the January issue of *Nation's Health*, stress is laid upon the need for the physicians in such a department to continue some private practice as it gives them a wider experience and broader vision than would be likely with full time medical men. In Milwaukee the medical service is available not only to the employees but their families, and this, in the opinion of Dr. Miller, is an important influence in improving the capacity of the employee for business. If he knows the best of medical and surgical care for the members of his family is at his immediate disposal, without worry as to the expense incurred, he can carry on his work in a proper and normal frame of mind. The department also includes two visiting nurses.

Besides direct medical care of employees the department has done much in preventive medicine on the Milwaukee system, including the drafting of specifications for employment in the different branches together with medical examination of all applicants. The article points out that this does not mean that a person with some minor physical defect cannot obtain employment, but the various positions are classified medically to determine what defects are serious for each. At times this plan really favors an applicant who on strict physical examination might otherwise be rejected.

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Measuring Electrolytic Currents in Soil

Two New Methods of Measurement Are Proposed, One Based on Substitution of Known Resistance and the Other on Balancing the Current to Give Zero Galvanometer Reading—Latter Method Eliminates Calculation of Earth Resistance—Method Useful in Quantitative Electrolysis Tests

By B. A. Williamson
Electrolysis Engineer Los Angeles Gas & Electric Corporation

THE measurement in direction and quantity of the electricity flowing between the soil and a pipe for unit area of surface or length of pipe at any desired location is the basic index by which the intensity of electrolysis may be estimated and the efficiency of the mitigative measure determined. Unfortunately the problem of finding an accurate method of detecting and measuring current in the soil adjacent to a metallic conductor has been attended with great difficulties. In the writer's opinion these have been only partially met. A number of methods have been described, but it would seem that they have certain limitations either in basic principle, accuracy or scope in the matter of practical application. It is believed that this research work has marked a slow but steady progress that will lead ultimately to a standard of electrolysis engineering practice comparable with other present-day measurements.

It is desired to present herein two methods, believed to possess value and certain new features, to describe how the required physical apparatus may be constructed and assembled at low cost and to discuss frankly their utility and limitations.

The problem of determining current flow in the earth does not permit of an ordinary solution based on Ohm's law, as the area of the cross-section of the path of the current increases in direct proportion to the distance from the center of the pipe. The current density and the effective soil resistance decrease as the first power of this distance and the potential or IR drop decreases as the second power. In the equation $E = IR$ it would be possible to determine the potential E between two points, m and n, within the soil, but no direct way exists for measuring either I or R for substitution in the equation for the solution of the other. In fact, there exists no straight line relationship.

If the pipe P in Fig. 1 is discharging current through the earth to the rail R by reason of a potential difference between them that is proportional to the vertical distance of P'-R', the earth adjacent to the pipe will have a potential gradient of a form represented by the curved line p-r. A potential P'-p' will be spent at the surface of the anode P and a potential r'-R' will be expended at the surface of the cathode R in a chemical action known as electrolysis. This will leave an unexpended potential of p'-r' that is effective in causing the vagrant current to flow against the resistance of the earth. It is evident that if the current leakage from the pipe is to be calculated from data involving the potential drop within the soil and its resistance, three factors must be considered, namely: (1) The variation of the current density in the soil; (2) the potential drop within the soil; (3) the resistance of the soil.

Having indicated that Ohm's law is not practically applicable to a solution of the problem, a method will now be offered which is based on this law, but which in practice requires neither the measurement of the fall of potential in the soil nor of its specific resistance. Before proceeding with the development of the solution, it will be necessary to describe briefly a non-polarizable electrode which is an element in the physical equipment. This electrode was designed by Professor Haber to provide a means of determining the potential

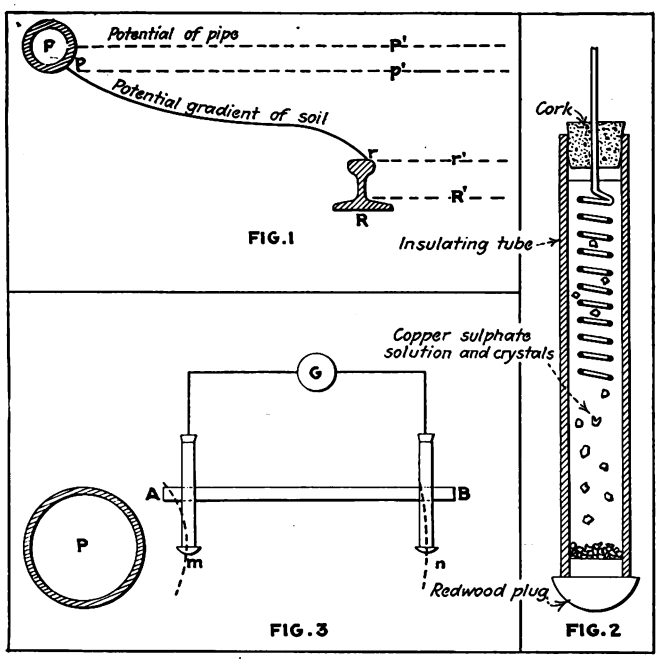

Fig. 1—Drop of potential at surfaces of the electrodes and within electrolyte earth.
$P'p'$ = potential spent at anode.
$p'r'$ = potential effective for overcoming the resistance of the soil.
$r'R'$ = potential spent at cathode.
Fig. 2—Details of a non-polarizable electrode.
Fig. 3—How two non-polarizable electrodes may be definitely spaced in the earth adjacent to a pipe and used with the galvanometer G to measure electrolytic current.

gradient of the earth by furnishing non-metallic contact between the earth and the voltmeter terminals, thereby avoiding the galvanic potential occasioned by ordinary metallic electrodes.

One form of construction, shown in Fig. 2, consists of a tube of rubber or other insulating material, filled with a saturated solution of copper sulphate, stoppered at the end in contact with the soil with a thin porous wooden plug and closed at the other end by an ordinary cork through which is passed a copper voltmeter wire that makes intimate contact with the solution by being wound in a spiral.

If the pipe P, Fig. 3, is discharging current to the soil, the potential will be higher at the point m than at the point n. Let two non-polarizable electrodes that are definitely spaced with respect to each other and the pipe P by the insulating bar A-B be placed at these points. Assuming uniform soil resistance and equal distribution of current in all radial directions, the

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potential difference between the points m and n, located on imaginary circles concentric with the pipe, will be the same for all radial positions.

If I represents the current leakage in amperes per unit length of pipe, and R is the resistance of the soil between concentric circles per unit length of pipe, then E, the potential drop in the soil between m and n, is equal to IR.

Since it is impossible to measure the resistance R, it is necessary to resort to the expedient of measuring the resistance between the electrodes located at m and n. This resistance, R_s, is proportional to the resistance R, and

$$E = CIR_s \qquad (1)$$

where C is a geometric constant depending on the size of the electrodes, their spacing and the diameter of the pipe.

This potential difference E between the electrodes at the points m and n will cause a current, I_g, to flow through the shunted circuit formed by the galvanometer of resistance R_g and by the electrodes, whose combined resistance is R_e. That is,

$$E = I_g (R_g + R_e) \qquad (2)$$

This current I_g in the shunted circuit will produce a deflection of the galvanometer of θ divisions. If c is a constant expressing the ratio between the current I_g through the galvanometer and its deflection θ, the last equation may be rewritten thus:

$$E = c\,\theta\,(R_g + R_e) \qquad (3)$$

The quantity E may be eliminated by evaluating equations 1 and 3. Equating them and solving for I,

$$I = K\,\theta\,\frac{R_g + R_e}{R_s} \qquad (4)$$

where the constant K replaces the ratio of constant c/C.

Measuring the Soil Resistance

The resistance of the soil between the electrodes may be determined by means of a battery and voltmeter by a slight modification of the well-known direct-deflection method of measuring a high resistance. Two readings are taken, one with the voltmeter directly across the battery and the other with the earth resistance in series with the voltmeter. The Standard Handbook* gives the value of the high resistance as "$R = R_v\,(d - d_1)/d_1$, where R_v = the resistance of the voltmeter (the greater the resistance per volt, the higher the precision), d = deflection of the voltmeter in first reading, d_1 = deflection in second reading." In this particular case it is evident that the resistance of the electrodes R_e may be considered a part of the voltmeter resistance, thus:

$$R_s = (R_v + R_e)\,(d - d_1)/d_1 \qquad (5)$$

This value of the soil resistance, R_s, should be substituted in the working equation 4, and with the deflection θ of the galvanometer determined the value of the leakage current I per unit length of pipe.

This method is subject to a certain degree of error due to the factor of the contact resistance being neglected in the development of both the equations 4 and 5. If it were possible to make a separate measurement of the contact resistance R_c, equations 4 and 5 would be written thus:

$$I = K\,\theta\,\frac{R_g + R_c + R_c}{R_s} \qquad (4a)$$

$$R_s = (R_v + R_e + R_c)\,(d - d_1)/d_1 \qquad (5a)$$

It will be noted that when the value of R_s as determined by equation 5a is substituted in equation 4a, the indeterminate quantity R_c tends to elimination by appearing in both the numerator and the denominator. In order that this error may be kept to the lowest possible limit the contact plugs of the electrodes should be plastered lightly with thin mud in taking the galvanometer reading θ and the two voltmeter deflections d and d_1.

*Standard Handbook for Electrical Engineers, Fifth Edition, page 148.

Calibration of the Set

The set is calibrated by a single and separate measurement in the laboratory of the resistance of the voltmeter R_v and of the non-polarizable electrode R_e. The value of the constant K may then be determined experimentally by impressing a definite leakage current of I amperes on an isolated pipe line to permit the substitution of numerical values in all quantities in equation 4, except K, for which solution is made.

On account of the uncertainty due to the contact resistance, it is believed a more accurate measurement may be taken by a method now to be proposed, or by an ingenious method and instrument that were developed by Burton McCollum, electrical engineer United States Bureau of Standards, in the ELECTRIC RAILWAY JOURNAL, Nov. 5, 1921. Credit belongs to him for having successfully perfected a method of measuring soil currents through the application of the basic principle of using non-polarizable electrodes.

The Zero Deflection Method

This method is somewhat similar to the preceding in that it is based upon the general principle of determining the current discharge from a pipe by the fall of potential in the soil. Use is made of two non-polarizable electrodes, and the value of a geometric constant is obtained by a process of calibration. Its accuracy lies in its simplicity and in the avoidance of the necessity of measuring the soil resistance in any way.

The pipe P, Fig. 4, is represented as discharging current to the soil along the dotted lines extending in radial directions. A certain small portion of the vagrant current will tend to take the shunted circuit formed by the non-polarizable electrodes m and n and the galvanometer G. By means of two metallic electrodes, M and N, a battery, B, ammeter A and a variable resistance, C, a measured current is passed through the soil in a general direction opposite to that taken by the vagrant current, and whose intensity is just sufficient to neutralize that of the vagrant current along the radial direction m-n. When this condition has been realized, it will be indicated by a zero deflection of the galvanometer.

If I denotes the value of the vagrant current being discharged or received per unit area of surface or length of pipe, and i represents the current in ammeter A for neutralization for a definite diameter of pipe and spacing of electrodes, it is evident that there will be a definite geometric factor of proportion between these currents for all homogeneous soils regardless of their specific resistances.

$$I = K\,i. \qquad (6)$$

After the value of K has been determined experimentally, a field measurement for electrolysis is taken by manipulating the applied battery voltage and the resistance to obtain a zero deflection of the galvanometer by a current, i, which is read and substituted in equation 6.

While this method is simpler and more accurate than the preceding, the test set requires instruments that are less likely to be found in the ordinary laboratory. The ammeter must be of high sensitivity, of the degree of about 1 milli-amp. for full scale deflection. The

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resistance should have considerable range and flexibility to meet the extreme variation in the soil resistance and the intensity of the vagrant current.

A portable, direct-reading type of D'Arsonval galvanometer should be selected, having a current sensitivity such that an impressed potential of 1 volt through an external resistance of about 1.25 megohms will give a deflection of one division. Its sensitivity may be reduced, where desirable, by adding an external resistance.

UTILITY

The value of a method for testing for electrolysis should be appraised on the basis of comparative merit rather than by the standard of absolute worth. It is perhaps sufficient to state that while there are a number of ways for testing which may be described as indicative or qualitative, such as voltage readings between the rails and pipes, there is practically no recognized method of making a quantitative measurement of the current leakage unless it is the one by Mr. McCollum to which reference has been made. Though the assumption of the ideal conditions of homogeneous soil and an equal distribution of current in the soil in all radial directions from the pipe for the purpose of the development of the theory of the solution lead to somewhat erroneous conclusions in practice on account of these conditions not being realized, yet the best solution of today must be accepted, subject to its known limitations, with an idea to present needs and future development.

LIMITATIONS OF THE METHODS

The limitations of these methods of testing electrolysis by the use of non-polarizable electrodes may be included and discussed under four general classifications as follows:

Time.—These tests are confined to that class known as instantaneous, since galvanometers are not usually built in the recording chart type. Electrolytic conditions are of such a variable quality that no accurate estimate of them can be made unless the tests show the average conditions for a twenty-four-hour period.

Location.—This system of testing contemplates the installation of the test set adjacent to the pipe. Since nearly all the mains and the greater part of the services are laid under sidewalks and public streets, which are usually paved or surfaced in some way, it is evident that considerable effort and money must be spent in making these tests. It might seem possible to drill test holes to the pipes to avoid the expense of excavating, but experience has shown that the average main or service pipe is too indefinitely located to permit this being done with precision. Aside from the uncertainty of the location of the pipe, rocks might be mistaken for the pipe or interfere with the drilling of the hole. In an attempt to overcome these difficulties the writer located the services beneath the parking between the curb and sidewalk by "listening in" to a high-frequency inductive current that was impressed on the pipe system by means of a head-set and an exploring coil made of fine wire wound on the wooden rim of a bicycle wheel. Tests were made for a time upon the service pipes at this location, which seemed the best from the standpoint of expense, but were discontinued after a time, for there was no reason for believing that the electrolysis was the same on the shallow service pipe in the drier soil as on the deeper mains nearer the car tracks where they were inaccessible except at the time of making repairs or running services.

Range.—Unlike rust, the corrosive action of electrolysis is not uniformly distributed over the surface of the pipe but is concentrated in pits and may be confined to a considerable extent to general areas, as on one end or side of a pipe. Since the test set is placed but a few inches from the pipe under investigation, it is evident that the range of the test is somewhat limited. Just as electrolytic conditions may vary minute by minute during the day, they will vary in a similar manner foot by foot along the length of the pipe. The same necessity exists for taking a number of readings at different locations to obtain a fair estimate of the district as a whole as exists for taking a number of instantaneous readings at various times in order to obtain a good idea of the average electrolytic condition during the entire day.

Distortion.—The term distortion is used to indicate a distribution of current at variance with the ideal condition assumed, that a current of dynamic origin flows

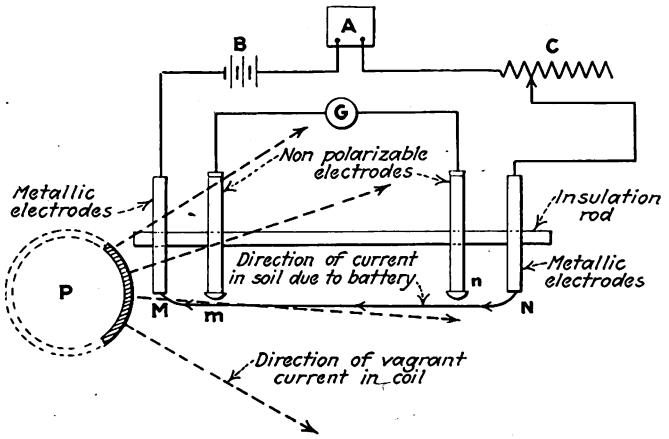

Fig. 4—How a Small Battery Current May Be Passed Through the Soil to Neutralize the Vagrant Current and Give a Zero Deflection

to or from a pipe in a continuous and homogeneous soil in radial directions at uniform intensity. The soil must be removed for the installation of the set, which violates the assumption of continuity of the soil. The earth, to which the non-polarizable electrodes are applied in making the test, will either have a lesser or greater moisture content, depending upon the weather, than the surrounding earth, which affects the homogeneity of the soil. A vagrant current may exist in the soil by reason of sub-surface conductors, other than that under inspection. A soil current of galvanic origin, due to chemical inequalities at the surface of the pipe or of the pipe and other metallic bodies, may act in a way to increase, decrease or neutralize the reading of the instrument that is due to vagrant current. For instance, if comparative tests are made upon a galvanized iron service water pipe in metallic circuit with a black iron gas service pipe, the former may show a current leakage to the soil and the latter may show a leakage from the soil.

VALUE OF THE METHOD

It is believed by the writer that this method has great value and will grow in favor as a means of making fairly accurate quantitative tests for electrolysis. In view of the necessity of uncovering the pipe it will probably be confined in practice in general to cases where the pipes are exposed for repairs, extensions, or running services and to particular cases where the expense of making excavations for the tests would be of little consequence.

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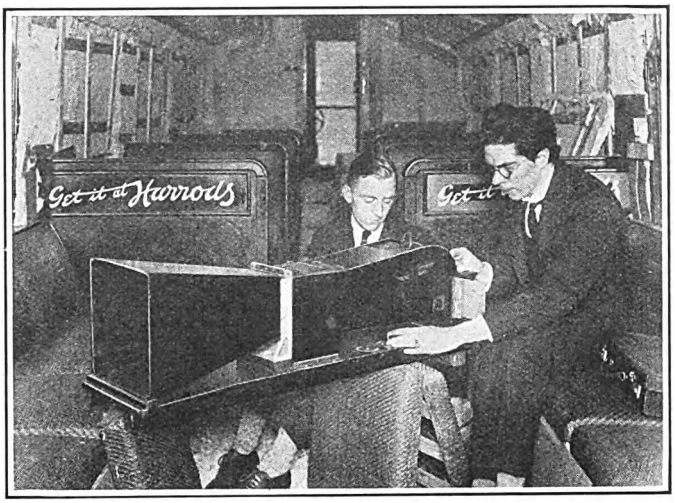
Noise in London Cars Photographed

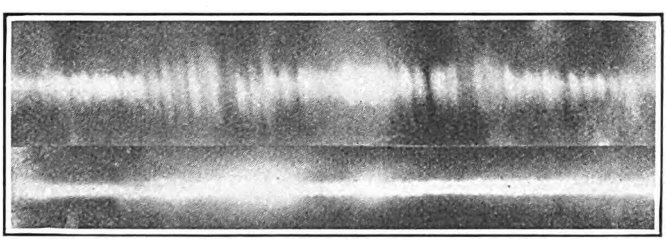
IN AN article in ELECTRIC RAILWAY JOURNAL for Jan. 26, 1924, page 135, on the reduction of noise in train operation, reference was made to a series of tests under the direction of Prof. A. H. Low with a device known as the audiometer. The accompanying illustration shows the audiometer as used in the work by Professor Low and an assistant. The sound caught in the horn causes a diaphragm to vibrate, which in turn operates a mirror, causing a beam of light to play on a



Measuring Noise with an Audiometer in Experimental London Tube Car

sensitized film. Temporary padding used in the experiment as one means of noise prevention is shown on the walls and roof of the car.

The two sound photographs reproduced show the influence of padding and other changes described in the previous article on the amount of noise within the car. The upper photograph shows the results with only the floor and lower sides of the carriage padded and before special treatment had been applied. The wide spread of the vibrations is an indication of the quantity of noise. The lower sound photograph shows the result



Sound Photographs Obtained by Audiometer
Above—With only floor and lower side of carriage padded, before treatment. Below—With padding and wheels shrouded, ventilators half open.

with the padding on all parts of the interior and with the wheel shrouded. The elimination of vibration is indicated by the concentration of the beam of light in a single line. With the padding arranged as in this test the ticking of a watch could be heard 1 ft. away from the ear.

The London Underground Railways is now obtaining delivery on 191 cars of the new type, in which the recommendations of Professor Low for noise elimination have been embodied. Tests made on the new cars show a considerable reduction in the noise.

The Readers' Forum

Should Have Rail Corrugation Investigation

ROBERT W. HUNT COMPANY, ENGINEERS
CHICAGO, Feb. 25, 1924.

To the Editors:

The article on "Rail Corrugation Experience" published in the JOURNAL of Feb. 16 is timely and very interesting. Apparently many companies suffer large expense annually because of this aggravating trouble, for which no specific cause or cure has yet been discovered. The opinion in some quarters that corrugation is in some way a feature of electrically operated roads is decidedly incorrect. One of the worst cases of corrugation the writer ever saw is on a steam-operated road of standard character in every way. Other instances of lesser degree can be easily found on almost any steam road. The facts go to show that the real cause of corrugation is probably in the rail when it leaves the mill. The cure is quite another matter, but if the cause could be definitely ascertained some effort could no doubt be made to effect a remedy.

Mere discussion of the subject will produce only a maze of confusing or contradictory statements. An extensive investigation is being made of various types of welded rail joints, and in the interests of economy it would certainly seem that funds should be made available for instituting an investigation into the cause of rail corrugation.

C. W. GENNET, JR.,
Manager Rail Department.

Detroit Train Increases Street Capacity

DEPARTMENT OF STREET RAILWAYS
DETROIT, MICH., March 21, 1924.

To the Editors:

In the discussion of the three-car articulated train for service on the Woodward Avenue lines at Detroit, one very important feature has been overlooked; that is, that by the use of this unit a greater volume of traffic may be handled than is possible with the present motor car and trailer equipment.

At present it is considered that we are operating as many cars on the street as is possible, and our problem is to move more people without further congestion. During rush hour the cars are spaced approximately 440 ft. apart, so on the assumption that this is the minimum spacing, it means a seating capacity of 0.198 per lineal foot of track with a motor car and trailer, while with the three-car articulated train the seating capacity per lineal foot of track is 0.249 or an increased carrying capacity of more than 25 per cent.

H. S. WILLIAMS,
Assistant Superintendent of Equipment.

Route Signs Differentiate Turnbacks

IN PARIS all tramway routes are numbered or lettered, and the cars carry the number or letter of the route conspicuously displayed. Where a car is scheduled to be turned back at a point short of the terminal, the car route sign or letter carries a broad red horizontal stripe. These numbers and letters are also used to distinguish the routes on maps issued by the company and sold for 25 centimes (or about 1½ cents) each.

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Association News & Discussions

American Railway Engineering Association Holds Largest Convention

Proceedings Contain Many Points of Interest to Electric Railway Engineers, the Gist of Which Is Given Here—National Railway Appliance Association and Signaling Section, A.R.A., Also Hold Meetings

THE largest annual convention in the history of the American Railway Engineering Association was its 25th meeting, held in Chicago, March 11 to 13. Final registration figures show a total of 987, which exceeds the previous maximum of 859 registered in 1922 by 15 per cent. Sessions were held morning and afternoon of each day, the time being devoted largely to the discussion of committee reports. The annual dinner was held on Wednesday evening. It was necessary to turn a number of applicants away, the last seat being sold hours before the time for holding the dinner.

The National Railway Appliance Association held an exhibit conjointly with the meetings, and the Signal Section of the American Railway Association held its annual meeting on Friday immediately following the session of the Engineering Association.

President Lee Stressed Importance of the Engineer

In his presidential address Edward H. Lee, vice-president Chicago & Western Indiana Railroad, stressed the place of the engineer in the development of American railroads. "It is hardly too much to say that, physically speaking, they created the railroads," he stated. "They invented the locomotive, and the tracks and roadbed upon which it runs. They likewise developed a multitude of structures, and the many types of equipment that, taken together, make up the railroads as a unit. They aided in the effective organization of the railroads for operating purposes, and had an influence upon establishment of the rate structure of the country's railroads."

Although twenty-five years ago relatively few engineers occupied high official positions, since then men of this training have been advanced to higher places in increasing numbers, according to Mr. Lee. In this period conditions have changed greatly, and new and grave problems are confronting the railroads. Excessive regulation, adverse labor conditions, and the decline of the morale of the working force, coupled with the great advance in the cost of materials and supplies, have largely increased the cost of transportation and been a source of great discouragement to railroad managements. He feels that the question of morale is possibly the one in which the engineers as individuals can affect the situation most actively. Proper education of the right kind will show the worker that his own best interests are tied up with the best interests of his company, and that a fair day's pay merits a fair day's work.

"Under the transportation act," Mr. Lee said, "the railroads are enjoying greater prosperity than for years past. But every single member of the association should be a publicity agent who leaves no stone unturned, when in contact with anyone outside the railroad game, to affect his opinion favorably toward the railroads."

At the Wednesday afternoon session G. J. Ray, chief engineer Delaware, Lackawanna & Western Railroad, was elected president of the association for the ensuing year.

At the exhibition of the National Railway Appliance Association, which occupied the Coliseum and annex during the sessions, 166 exhibitors had displays. At the annual meeting of this association, A. J. Filkins, president Paul Dickinson, Inc., was elected president.

Some of the more important points in the committee reports, which may be helpful to electric railway men, follow:

Wooden Bridges and Trestles

The committee on wooden bridges and trestles recommended a number of changes in the manual, including specifications for workmanship for pile and frame trestles of untreated material to be built under contract. Work in progress was reported on the useful strength of new, old and treated timber when used in railway trestles, which is being worked out in conjunction with the Forest Products Laboratory. The committee agreed unanimously that the ballast deck has many advantages over the open-deck timber trestle. The work indicates that the ballast-deck structure should be constructed with treated material. The report was adopted.

Ballast

A few changes in the manual were recommended by the committee on ballast, the principal one being the addition of the yardage of stone and gravel ballast to the ballast sections adopted as recommended practice. It also was stated that there seems to be considerable sentiment in favor of a smaller size of stone if the material is hard trap rock or granite. It was felt unwise to adopt general rules for the handling of mechanical tampers, but it was recommended where track is being lifted from 1 to 3 in., out of face and on stone, that for use as an individual section tool a two-tool pneumatic or a two-tool electric tamper be used. As an alternate two-section tool a four-tool pneumatic or electric tool may be used.

Ties

The committee on ties has brought up to date its tabulation on substitute cross ties, showing the various test installations in progress. A tabulation was included showing the use of ties of various grades, lengths and spacings in main line, branch line and yard tracks. Changes in the standard reported by various roads are principally for thicker, wider or longer ties for use under the heaviest main line traffic. In general these call for 7-in. x 9-in. x 8-ft. 6-in. ties, spaced 20 per 33-ft. rail. Tables also were presented showing the amount of tamping, the bearing area on the ballast, and various grades of ties in use. The least practicable space between ties to permit tamping was stated to be 10 in. After considerable discussion, particularly with regard to the permissible spacing of ties, the report was adopted.

Uniform General Contract Forms

A number of forms of agreement covering such relations as trackage rights, joint use of passenger and freight facilities and the placing of snow or sand fences beyond the company's property line were presented by the committee on uniform general contract forms. On the matter of arbitration, the forms of limited arbitration reported on to the association were (a) classification of material not clearly covered by contract; (b) delays arising not the fault of the contractor; (c) changes ordered not clearly covered within the terms of the contract. It was brought out in the discussion that sooner or later the National Conference for Uniform Construction Contract Forms and the other national organizations concerned will bring out some form of national construction contract. The report was adopted for inclusion in the manual.

Buildings

For freight houses a plank floor laid on wooden joists is recommended by the committee on buildings as satisfactory and economical, except in larger and more important freight houses, where a floor of concrete is usually justified. Concrete floors are approved for freight storage houses, which are usually of fireproof construction. For blacksmith shops it is stated that floors of cinders, earth or clay are to be preferred in all

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cases. For machine shops, wood plank floors are favored, as they are for freight car repair shops. Concrete floors meet all requirements for paint shops, and it is stated that it is doubtful if a more expensive type of floor is justified. Where paint is sprayed on, a floor of cinders is suitable. Wood-plank floors are considered desirable for carpenter shops, where considerable bench work is done, because of the comfort to workmen they afford. Because of the necessity for fireproof construction, concrete is recommended for oil houses.

On the subject of paint, the committee believes that satisfactory and economical results could be obtained by placing before the reputable manufacturers the requirements that the various classes of paints are to meet, and depending on their judgment and ability to produce the most efficient paint for the service expected.

Considerable discussion ensued, particularly regarding the subject of floors. It appeared that considerable success had been obtained with creosoted wood floors having a comparatively thin wooden wearing surface. The report was accepted with minor exceptions.

Standardization

The committee on standardization stated that its work during the past year had consisted principally in co-operating with the American Engineering Standards Committee and the Bureau of Simplified Practice of the United States Department of Commerce. Progress has been made in additional standard plans for double slip switches, solid manganese crossings and for spring rail frogs and slip split switch fixtures for heavy rails of 6½-in. height and over; general specifications for steel railway bridges and specifications for movable railway bridges; specifications for the construction of overhead electric supply lines for railroad use on railroad property; specifications for porcelain insulators for railroad supply lines; rules for the protection of all sidings from danger due to stray currents, and specifications for insulated wires and cables.

In the ensuing discussion the organization of the American Engineering Standards Committee, with respect to the approval of the project by the original sponsor association, was taken up by E. A. Frink, chairman of the committee, and the meeting adopted a resolution proposed by him, that the American Railway Engineering Association believes that it will be a serious mistake on the part of the A. E. S. C. to change its constitution and rules of procedure so as to eliminate, or even impair, the veto power now possessed by the sponsor of a project.

Economics of Railway Location

The committee on economics of railway location presented a progress report covering principally the relative merits of increasing tonnage by reducing ruling grades or by the use of more powerful locomotives, including consideration of momentum grades and the availability of the locomotive booster. Other subjects under consideration by the committee included the economics of railway location as affected by the introduction of electric locomotives. It was stated that the sub-committee did not feel justified in submitting a report on this subject at the present time. The report was accepted as information.

Stresses in Railroad Track

A progress report was presented by the special committee on stresses in railroad track. During the year an extensive series of tests was conducted on both straight and curved track on the electrified section of the Chicago, Milwaukee & St. Paul Railway in Montana, and another series on four Eastern railroads. The St. Paul tests were made at various speeds up to 60 m.p.h. on straight track, 50 m.p.h. on a 6-deg. curve, and 40 m.p.h. on a 10-deg. curve. Several types of electric locomotives and also a Mikado freight steam locomotive were used.

An interesting set of tests intended to determine the effect of the regenerative features of the electric locomotive upon flange wear was made by coupling two electric locomotives together and running them around a 10-deg. curve, first the head one motoring and the other regenerating and then the second pushing and the other regenerating. The results so far worked up appear to show that the position of the flange of the drivers with respect to the edge of the rail was not the same for the two conditions of motoring and regenerating.

The committee stated that sufficient progress had been made to indicate that interesting comparisons may be expected of the stresses in rails produced by the various wheels of the several forms of electric locomotives and those produced by the steam locomotive, both on straight track and curved track. The purpose of the tests made in the East was to try to determine the effect of canting the rail in producing changes in the stress in the rails, both on straight track and on curved track, as having a bearing on the wear of the rail and the maintenance of the track, as well as upon the strength of the rail. Not enough progress had been made in working up the data to indicate whether conclusive evidence had been obtained, but the many auxiliary observations on the tilting and lateral movement on the rails themselves promise to give information of real value.

Iron and Steel Structures

A large amount of material was presented by the committee on iron and steel structures, including classification of bridges, specifications for steel highway bridges, electric welding of connections in steel structures, tests of I-beams connected in groups by diaphragms and bracing, and column tests. Elimination of the options between punched work and reamed work now allowable in the specifications for steel railway bridges was recommended, as the committee stated that it proposed to make tests to determine the relative values of the two kinds of work and, if practicable, their relative cost. Classification of railway bridges with respect to their ratings and of the equipment they are designed to carry was proposed. The general specifications for steel highway bridges covering fixed spans less than 300 ft. in length have been revised to suit the conditions of heavy motor-truck traffic.

The report on electric welding of connections in steel structures contained a short description of the resistance and arc methods of welding, and a bibliography covering the latest articles on the subject. It is stated that it is quite evident that sufficient progress in the welding of steel structures has not yet been made to justify the association in taking any action, so that the committee thought it advisable to keep in touch with current experiments. The specifications for steel highway bridges were received as information by the association. The report on tests of I-beams, column tests, and electric welding were accepted as progress reports.

Roadway

On the economics of filling bridge openings, the committee on roadway made a continuation of an analysis comparing renewals under existing conditions and replacements by elimination of the bridge.

Further study was made by this committee on deferred construction costs chargeable to track laying and surfacing. A detailed study of 29 lines seems to prove that there are greater costs incurred in track maintenance labor during the period of operation immediately following construction than during the period after the roadbed has become seasoned. The costs determined by the investigations are stated to be specifically seasoning costs. The committee states that its studies indicate that the seasoning period averages a little over five years. It was also stated that if the standards of a low class branch line were raised to a higher standard, a secondary seasoning period would ensue.

Regarding the revision of roadway sections to meet requirements of standard ballast sections, the committee recommended a change in the manual to state that Class A railways, with constant and heavy traffic, should have a minimum permanent width of 20 ft. of subgrade. A roadbed shoulder of not less than 18 in. should be maintained outside the toe of the ballast slope.

The revision of the roadway section was adopted with the provision that it should apply to single track. The other reports of the committee were accepted as information.

Electricity

The committee on electricity, E. B. Katté, chairman, presented a 58-page report. Revised tables were submitted showing clearances for third rail and overhead working conductor, compiled from the returns from all the electrified steam railroads in the United States. The work of electrical interference has been delegated to a national joint committee on inductive co-ordination with the view of establishing common practice and general rules with regard to the mitigation of inductive interference.

The work of the sub-committee on electrolysis has been referred to a somewhat similar American committee on electrolysis, and it was recommended that representation on this committee be continued.

The committee on electricity has been

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co-operating with the Bureau of Standards in the revision of the National Electrical Safety Code, under the procedure of the American Engineering Standards Committee. This work is progressing in various sub-committees.

A tentative specification for the construction of overhead electric supply lines for railroad use on railroad property was submitted. This report covered such questions as types of construction; clearances; grading; mechanical loading of lines; material sizes and sags of wires and cables; insulators; conductor attachments; insulator pins; cross arms; strength of supporting structures; wood poles; steel structures; concrete; guys; grounding, and permissible unit stresses and proportion of ultimate strength for various supporting structures.

Standard specifications for insulators were presented as tentative recommended practice. It was recommended that the study be continued and that the committee collaborate with the appropriate committees with a view of next year submitting a specification acceptable to all the sections of the American Railway Association. The specifications submitted call for porcelain made by the wet process, and provide for inspection and assembly, and tests as required by the standards of the A. I. E. E. In an appendix some causes of insulator failures were given, and the methods of selection of insulators according to atmospheric and climatic conditions. The recommended revisions of the manual were adopted.

Track

A number of changes and additions to the nomenclature and definitions in the manual were proposed by the committee on track. These include general track terms, slip switch terms, frog terms, guide rail terms, crossing terms, and turnout terms.

Plans for No. 10 double slip switches with movable center points were offered for adoption as recommended practice. These plans were prepared on the basis of No. 8 double-slip switches adopted last year as recommended practice, and in line with adopted switch and frog plans.

Plans of solid manganese crossings of steam railroad over electric railway, and steam over steam railroad were also offered for adoption as recommended practice. These plans were drawn in co-operation with the standard committee of the Manganese Track Society, and were considered in conference with the committee on way matters of the American Electric Railway Engineering Association, and also with the American Railway Engineering Association committee on signals and interlocking. A number of plans were submitted for adoption as recommended practice of switch and spring rail frog details and bills of material for rails 6½ in. high and over. These plans, including the manganese crossings, were approved by the association.

Detailed specifications for track tools were presented.

Replies from 20 railroads regarding the limit of curvature on which rails are curved prior to being placed on the track led the committee to believe that the practice of pre-curving rail is gradually being discontinued, and to recommend that except on very sharp curves rails need not be curved before laying.

The conclusions reached by the committee with regard to the rerolling of rails is that there is no economy at the present high cost of doing this work, together with transportation costs necessary to move the rail to the mill and its return to points where it will be placed on the track. The resawing of rails for relayers is considered economical and is good practice, whether done by the company or the contractor. The committee stated that in its study of rerolling or resawing rails for relaying, it had concluded that the relative economies as between resawing and reconditioning rails or building up the joints in the track by acetylene, electric, or other processes is so interwoven that a study of the economies as between the two methods can best be made by a further study.

The committee presented a tentative table of dimensions for tie plates, both flat and canted. For use in track construction in and across paved streets and highways, the committee stated that the mills are prepared to roll girder rail sections 7 in. high and 9 in. high. Guard rail for curves, and straight guard rails are available in two sections 9 in. high and one section 7 in. high.

In the discussion the desirability of specifications for track tools was brought out, and it was stated that similar specifications for other material had assisted the railroads greatly in obtaining better quality. These specifications were adopted by the association, as were the recommendations for pre-curving of rails.

Yards and Terminals

The principal work of the committee on yards and terminals was the continuation of a study of the proper size and arrangement of large passenger station facilities, as determined by the business handled. Analyses were made of the movements of passengers, baggage and other material at terminals in order to determine the proper relationship between their size and arrangement, and the volume of business. The conclusions cover the time element in the discharge of passengers from cars onto platforms of various types and proper arrangements of stairways, ramps and platforms to insure separation of passengers from trucking operations. The report was approved for publication in the manual.

Rail

The committee on rail proposed revised specifications for quenched carbon steel and alloy steel track bolts and quenched carbon steel joint bars. The committee stated that, continuing a study of rail manufacturing practices, it had secured chemical and physical tests on approximately 100,000 tons of high-silicon dead-setting steel. The record in general, it stated, shows a better quality of material in the dead-setting steel rail than in the average output under the standard specifications, without additional rejections or hardship upon the manufacturer.

The rail failure statistics were brought up to date. The comment was given that the 1917 rollings show an increase in the number of failures during the five years' service period, but it appears that this registers the peak of bad performance, and the better records of later rollings justify the hope that the banner record of the 1914 rollings will at least be equaled within the next few years.

The committee stated that it is not yet prepared to recommend a definite rail length in excess of the present 33-ft. standard for adoption as an alternate standard. A design for 150-lb. rail section was submitted.

A joint investigation of the underlying cause of transverse fissures is being carried on by several national bodies. It is believed by members of the rail committee that the tabulated data will serve to establish a predisposition of certain furnace heats toward failures of this type, and that progress in co-operation with the rail manufacturers may be made toward eliminating such heats from mill shipments.

The report of the committee was approved with minor modifications.

Economics of Railway Labor

The attention of the committee on economics of railway labor was concentrated principally on the study of methods of obtaining and handling railway employees to promote continuity of service and efficiency in production. The outstanding feature of all data collected was the emphasis placed upon co-operation in industry, and that the recognition of the distinctive rights, responsibilities, and obligations of employers and employees has been the foundation on which all the plans rest. The duty of management is to provide means for the development and co-operation. This may be done by the adoption of methods which, by their natural workings in an organization, reflect the attitude of the managers. Methods to inspire co-operation automatically will not be a substitute for personality in management. Rather they will be aids providing channels for the constant expression of that relationship in industry so essential to the solution of the problem of the economic handling of labor.

The methods investigated by the committee were grouped under six headings. The conclusions with regard to the first, that of personnel, is that where roads are of sufficient size to warrant it a personnel department should be established. It should include (1) employment, promotion and transfer; (2) education, training and service, including foremen's training courses and apprentice systems; (3) discipline and separations from service.

The adoption of a plan of employee representation in management in railway work will, through the improvement of the spirit of co-operation, serve largely to stabilize labor and reduce the problem of obtaining new employees.

The extension of benefit associations providing insurance against the hazards of sickness, accident, superannuation, and death, is essential to the development of a loyal and co-operative spirit in railroad organizations. Saving funds and loan provisions placed at the disposal of all worthy employees are an added incentive of merit and of economic value.

The promotion of the mutual inter-

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ests of employers and employees through participation in the ownership of the industry on which they are dependent is an objective greatly to be desired, the committee states, and warrants the special consideration of railways as a means for stimulating co-operation in the common objective.

Plans for the establishment of satisfactory working conditions, including the provisions of sanitary and agreeable facilities while on duty, comfortable rest houses, rest rooms and dining rooms, maintained in cleanly condition, and service of a sufficient quantity of wholesome food should be in effect on all roads, it is stated.

Incentive plans have been extensively adopted by industries covered by the committee's examination. The objectives were numerous, but in their aggregate were designed to avoid the waste due to absences, lateness and loafing, to develop interest and skill in the work, to increase production and to inspire loyalty and co-operation.

The establishment of standards and units of measure for all work performed which is susceptible of measurement is a fundamental basis of harmonious understanding between employer and employee, and the foundation for economical and efficient handling of labor.

The committee suggests for further examination and such use by individual companies as their judgment may determine of plans for guaranteed employment or unemployment insurance, and bonus payments for continued service, avoidance of lateness and absence, prevention of waste and other features of economic operation.

On the subject of standard methods for performing maintenance of way work, for the purpose of establishing units of measure of work performed, the committee concluded that (1) the making of time studies and the comparison of performances of an individual gang with a standard increases the efficiency of the gang under observation. and of other gangs which are made acquainted with the results; (2) the general use of standard methods and units of measure of performance on divisions and districts of a railway has resulted in increasing the efficiency of track forces.

The entire report was approved for publication in the manual.

Masonry

Revisions of the manual proposed by the committee on masonry included definitions, specifications for stone masonry, specifications for constructing pre-molded concrete piles and specifications for driving pre-molded concrete piles. On the subject of design of concrete, plain and reinforced, for use in railroad structures, the committee made a preliminary report and presented a diagram showing proposed design load for culverts. In connection with the development in the art of making concrete, the year's work of the committee was devoted principally to a study of work being done in connection with various railroad projects. Reports on several of these were presented.

In the discussion there was some criticism of the diagram of proposed design loads for culverts presented by the committee, as it was felt that it was too conservative. It was pointed out in defense of the committee's report that, due to non-uniformity of pressure of the earth on the sides and top of the culvert, a sufficient margin of safety should be allowed. The revision of the manual was adopted and the remainder of the report received as information.

Records and Accounts

A detailed report was presented by the committee on records and accounts, in which numerous forms for analyses were given. A sub-committee also has been working as a part of a special committee under the authority of the American Railway Association, preparing a revision of the Interstate Commerce Commission classification of accounts. It was stated that a supplementary report will be issued separately covering this subject.

Wood Preservation

The committee on wood preservation stated that it has considered the possibility of making changes in the standard specifications for creosote, but that it was decided to retain the specifications as at present.

The committee continued its survey of treated ties which has been made for a number of years. It stated that although creosoted ties have been in use some 18 years none of those laid has as yet been approached an average life. Notwithstanding the incomplete state of the available data, it stated that certain fundamental conclusions may be drawn, which are briefly outlined as follows:

1. *Value of treatment*—The use of treated ties of one kind or another is not only an economic necessity, but an economic duty for all railways. In other words, none but treated ties should be laid, irrespective of climate or any other condition, except for such railways as still have available naturally long lived woods.

2. *Comparative value of treatment*—A study of the complete test records published to date indicates that definite figures as to length of life from different treatments cannot yet be given. The following, however, may be taken as a safe guide:

(a) *Zinc chloride treatment*—The committee adhered to its conclusion made in 1919 that the life of the most inferior untreated timber can be doubled by treating with zinc chloride, and in addition believed that a conservative estimate will place the life of ties treated with zinc chloride at from six to fifteen years, depending upon climatic conditions under which this type of treatment is used and the kind of timber treated.

(b) *Zinc creosote*—Depending upon climatic conditions the probable life of ties treated with this process may be placed at from 8 to 18 years.

(d) *Full-cell creosote processes*—Although ties treated by the empty-cell creosote processes have not been in track long enough as yet to give even a tentative figure, attention is called to the fact that in the most extensive experimental track laid in 1906, with pine ties treated with one of these processes, 96.2 per cent are still in tracks after a service of 17 years; on another railway, hardwood ties treated with another process of this kind, 89 per cent of ties laid in 1905 are still in tracks. It appears to be a safe conclusion that when properly treated a life of 16 years will positively be obtained, with a chance that this will run up to 25 years or more under proper maintenance conditions.

(d) *Full-cell creosote treatment*—Such ties have been removed in practically every case due to mechanical factors. It is generally recognized that the full-cell creosote process is not warranted at the present time, because mechanical life, under present conditions, will always be very much shorter than the life to be expected from decay.

3. *Choice of treatment*—It is stated that the choice of treatment should, in its first analysis, consist in comparing the life which is being obtained from ties in actual use and determining the annual charge against such ties, and then comparing this with the annual charge for ties treated by various methods. For example, if an untreated tie costs $1 and has four years' life, roughly figuring, the annual charge against such a tie is 25 cents. If such a tie be treated at a cost of 25 cents, one would have to obtain five years of life in order to have the same annual charge.

Summing up the committee presents the following conclusions:

1. Only treated ties should be used for permanent track construction, with the exception of a few durable woods.

2. Varying lengths of life may reasonably be expected for various types of treatments—zinc chloride, zinc creosote, empty-cell creosote and full-cell creosote.

3. The choice of treatment should be considered as a problem of risk in investment, as shown by probable annual charges.

Signs, Fences and Crossings

Revisions in the specifications for spacing of anchor posts and wire fences, and in the specifications for highway grade crossings were presented by the committee on signs, fences and crossings. Specifications for bituminous crossings, and substitutes for wooden crossing planks; highway grade crossing separations; and economy of steel, wood and concrete fence posts were presented.

The work of the committee was done along the lines of standardized practice. This is in line with the work done by Secretary Hoover of the Department of Commerce in endeavoring to bring about a reduction in waste in various industries. A survey showed 552 styles of fencing manufactured and 2,072 sizes of packages marketed. Through a conference it was found possible to reduce the styles of fencing to be manufactured effective January 1 of this year to 69 and the sizes of packages to 138.

The revisions in the manual covering spacing of anchor posts and wire fences and the strength of wire fences were adopted and the remainder of the report accepted as information.

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International Tramway and Bus Congress

THE technical sessions of the International Tramway and Bus Congress, to occur in Paris June 16-22, will be held in the large auditorium of the Institute of Civil Engineers of France, at 19 Rue Blanche. This congress is being held under the auspices of the Union Internationale de Tramways de Chemin de fer d'Interêt Local et de Transports Publics Automobiles. The program as announced is as follows: On Monday, June 16, there will be a registration of delegates at the office of the French Light Railway & Bus Association, followed by a reception in the evening at the Maison des Centraux.

The opening session will be held on Tuesday, June 17, at the Sorbonne, under the chairmanship of the Minister of Public Works of France, assisted by the president of the Municipal Council of Paris and other prominent officers of the municipality. The second session, at 2:30 p.m., and all subsequent sessions will be held in the auditorium of the Institute of Civil Engineers of France. At 5 p.m. on Tuesday, the delegates will be received at the City Hall by the Mayor.

Wednesday, June 18, will be given up to a trip to Versailles, Saint-Germain and Saint Cloud. In the evening at 8 o'clock, the delegates will be guests at a banquet tendered by the French Light Railway and Bus Association.

There will be two technical sessions of the association on June 19, one at 9:30 a.m. and one at 2:30 p.m.

The fifth and last session of the association will be held on the morning of June 20.

Owing to the demand for hotel space in Paris, the secretary of the association at 15 Avenue de la Toison d'Or, Brussels, will afford assistance.

Annual Meeting of New York Electric Railway Association

THE date for the annual meeting of the New York Electric Railway Association has been set for Saturday, June 21. It will be held at the Nassau Hotel, Long Beach, L. I., one of the most attractive shore resorts near New York City. Golf, surf bathing, and other recreations are available.

There will be a one-day session, with a business meeting in the morning, recreation features in the afternoon, and the usual annual dinner in the evening. A detailed program will be announced later.

Wisconsin Utilities Meeting

THE Wisconsin Utilities Association will hold its annual convention at Milwaukee, Wis., on April 17 and 18 at the Hotel Pfister.

Among those who appear on the program will be Halford Erickson, Chicago; F. R. Coates, Toledo; S. B. Hood, Minneapolis; Adolph Kanneberg, Andrew MacDonald, C. B. Hayden, and H. H. Wilson of the Wisconsin Railroad Commission; John A. Hoeveler of the Industrial Commission; O. L. Kowalke, James T. Rood, Edward Bennett and R. T. Ely of the University of Wisconsin.

British Meeting Postponed

THE dates for the next annual conference of the Tramways and Light Railways Association of Great Britain, which is to be held in Edinburgh, have been altered from June 26 and 27 to July 3 and 4.

Date Changed for C. E. R. A. Meeting

THE summer meeting of the Central Electric Railway Association will be held at Cedar Point, Ohio, on July 17 and 18.

The change in the dates for this meeting is necessary on account of the fact that several other conventions will be held at Cedar Point during the week of July 6.

American Association News

Electric Railway Men Present Case on Section 15a

Statements Made by Seventeen Companies and Appearances by About Sixty Representatives at Interstate Commerce Commission Hearing as to Application of Recapture Clause to Electric Lines

THE electric railways had a hearing before the Interstate Commerce Commission in Washington on March 19 to present their views on whether Subsection C of Paragraph 1 of Section 15a of the Interstate Commerce Act as amended Feb. 28, 1920, known as the "recapture clause," should be interpreted to include them. Commissioners Meyer and Potter were sitting.

The case for the electric railways was conducted by Charles L. Henry, chairman of the national relations committee of the American Electric Railway Association. Mr. Henry said briefly that whether Section 15a applied to the electric lines depended upon the interpretation of the clause, "engaged in the general transportation of freight." He then presented a statement prepared for the committee by C. D. Cass, Waterloo, Ia., which summed up the position of the electric lines. This statement is given in full later.

Mr. Henry called Mr. Cass to the stand to present statements for two Iowa roads, the Waterloo, Cedar Falls & Northern Railway and the Des Moines & Central Iowa Railway. These statements were for roads which were considered as clearly subject to the provisions of Section 15a.

W. H. Sawyer then presented a statement for the five companies operating in East St. Louis, Ill., and vicinity, of which he is president, these companies being cited as typical of those interpreted to be clearly without the provisions of the act.

R. R. Bradley, who appeared for the Chicago, North Shore & Milwaukee Railroad, was next called to the witness stand. He sought to show also that his road was clearly without the provisions of the act.

Other statements were made by Arthur W. Brady, Union Traction Company of Indiana; Frank Karr, Pacific Electric Railway; C. S. Burlingham, Wheeling Traction Company; Robert P. Woods, Kansas City, Clay County & St. Joseph Railway; William Chamberlain for the Grand Rapids, Grand Haven & Muskegon Railway and the Clinton, Davenport & Muscatine Railway and three other Iowa interurban lines; Robert R. Quirk for the Chicago, Aurora & Elgin Railroad; J. V. Norman for the Interstate Public Service Company; Frank R. Ford and Wilbur LaRoe for the Lackawanna & Wyoming Valley Railroad; John W. Shartel, Jr., Oklahoma Railway Company; Henry I. Green, Illinois Traction System; J. R. Whiting, Michigan Railroad and two other Michigan lines, and William G. Fitzpatrick for the Detroit United Lines.

The statement presented by Mr. Henry, previously referred to, follows:

THE PLATFORM OF THE ELECTRIC RAILWAYS

In the mind of Congress, when the Transportation Act of 1920 was written, the exclusion phrase (c) "or engaged in the general transportation of freight" must have had some relation to a general or common understanding of what those words meant. Some definite condition in the rail transportation industry of this country was the guide which directed Congress in the use of those inclusion words as applied to the electric interurban lines. Let us see if we can find this guide.

From the establishment of rail transportation steam railroads had been the common commercial carriers of the country—exclusively—until a very few years prior to the enactment of the Transportation Act of 1920. At that time—and for a few years previously—there had come into being a very few independent electric commercial carriers. The steam railroads also were operating an ever-extending portion of their own roads electrically, and in dealing with the general railroad subject comprehensively, as was intended by the Transportation Act of 1920, it was necessary to consider these comparatively new electric carriers and assign to them a definite position under the act, by some designated language that would fairly and properly classify them with the commercial steam carriers of the country. The language "or engaged in the general transportation of freight" was finally used as descrip-

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tive of a certain definite condition prevailing upon America's steam railroads, and where electric carriers' conditions corresponded, they became amenable to Section 15a—otherwise not.

Now, then, what does that phrase mean—"engaged in the general transportation of freight?" Let us take an illustration. Suppose you go to *any station* on *any steam railroad* at *any place* in this country and you say to the agent: "I have a carload of horses—a bushel of turnips—20,000 ft. of lumber—a gas stove—and a tank car of gasoline I want to ship to any town, *any place* on *any other steam* railroad in America." What does the agent say? He says: "All right, mister, we will spot the cars for your carload stuff to-morrow, and you can deliver the l.c.l. at our freight house or room any time." In other words, you can make this shipment from any steam railroad station in the United States to any other steam railroad station in the United States at any time you desire, assuming that the freight equipment is immediately available.

But suppose, instead of going into a station on any steam railroad, you go into the Highland Park station, or Glencoe, or Lake Forest, or any other station on the Chicago, North Shore & Milwaukee electric line—or into any other station on most electric railroads in this country, and you put the same proposition up to the agent of the electric railroad, what will he say? Unless it happens to be on one of the few commercial electric carriers in this country—the agent will say: "Why, mister, we haven't any facilities for handling those goods. We could accept your bushel of turnips and your gas stove, and send them by express—but we couldn't handle any of the balance of those goods."

Or on some electric roads the agent might say: "We can load your horses and take them up to Xtown, where you can unload them and put them in a steam road freight or stock car." Or he might say any one of a dozen or more other things which would indicate either an impossibility or a restricted ability on the part of the electric line to furnish transportation for the proposed shipment. In any event, on most electric interurban railroads this shipper would receive an entirely different answer from that received had he tendered the shipment to any steam railroad station anywhere in America. On some few electric carriers in this country this shipper would receive the identical answer he would receive from any steam railroad agent, and as to these electric railroads there can be no question concerning their status under Section 15a. But, obversely, is it not consistent, then, to determine that any electric railroad, handicapped in its handling of freight by any one or more impediments sufficient to eliminate it from the term "general transportation," is *not* amenable to said section.

The word "general" cannot be interpreted to mean "restricted"; and, per contra, the word "restricted" cannot be construed to mean "general."

Most electric railroads have peculiar characteristics as compared to steam railroads. Their physical facilities are not susceptible of being used by steam road equipment, except in a limited way. If freight is handled at all, it is usually handled in cars built especially to conform to the physical conditions of the road. Such conditions involve clearances and weight limitations—trucks and drawbars designed to negotiate short radius curves, etc., and where physical limitations are not enough to furnish good handicaps, then city ordinances finish the job with legal handicaps, such as requiring freight to be handled between the hours of 12 o'clock midnight and 6 a.m., or prescribing that no cars containing livestock may be transported over city streets. Any electric railroad subjected to these handicaps, either physical or legal, cannot properly be classed with steam railroads in their performance of freight business, even though such road does as a matter of fact handle a large volume of some special commodity like rock or sand or coal over some particular section of its line.

There is another angle to this subject that merits some attention. The inclusion words "engaged in the general transportation of freight" are purely descriptive. Nothing is contained in their meaning that lodges with the commission any power other than to determine whether a given road is or is not so engaged. It might well happen that although a given road was not subjected to either physical or legal handicaps, such road had decided, in its own wisdom, to restrict or limit its freight handling to a certain commodity or commodities, and while not "engaged in the general transportation of freight," there were no limitations in its freight handling ability, except its own definite and well considered policy. We submit that in such a case, even, your honorable commission could not at this time, and without other and additional action, legally determine that such road was amenable to Section 15a. It is granted, however, that by appropriate action in such case your honorable commission might require the filing of such tariffs and routes and divisions with other commercial carriers as would bring the given road within the purview of roads subject to the provisions of Section 15a. We are here in this case dealing, however, with a road having no physical or legal handicaps. As to a road under similar conditions, surrounded by physical and legal handicaps, it is our judgment that such road could never be legally required to place its facilities in condition to "engage in the general transportation of freight."

Summing up, then, it is obvious that any electric interurban railroad which could not accept a shipment of freight at any of its stations, such as was suggested in the typical illustration, could not be considered as amenable to Section 15a. And, further, that although a given electric interurban railroad does, in fact, transport a large volume of freight over a particular section of its line, or does, in fact, handle a large volume of some special commodity like sand or rock or coal—yet this fact, in itself, cannot justify a finding that such road is thereby classified with the commercial steam railroads of the country which were in the mind of Congress when it laid down its rule "engaged in the general transportation of freight." These words are *only* descriptive of the type of electric roads that Congress was holding within the provisions of Section 15a, and they must have some relation to the common or general understanding of conditions on steam railroads that brought about the use of such words.

An Electric Railway with Interchange Amenable to Act

In his statement for the Waterloo, Cedar Falls & Northern Railway, C. D. Cass showed that 36.9 per cent of the total revenue of the company was derived from freight. The company has direct physical connection with four main-line steam railways and indirect connection with four others through universal switching arrangements. A general railroad business is performed by the company, all classes of freight and passenger business being interchanged with practically all of the trunk line railroads in the United States. Through tickets are sold and through freight is routed to and with all other railroads in the country. The revenue from interchange freight business with other railroads constitutes 76.20 per cent of the total freight business of this company.

The company owns standard interchange steam railroad freight equipment to the extent of 120 box, flat, stock and coal cars. It has no freight cars which are not susceptible to interchange with steam railroads. Substantially all of the freight business of the company is performed on tracks located on private rights-of-way. It has full and complete lines of tariff with all steam railroads in the United States and is a joint party to all joint tariffs in its territory. There is no difference in the conduct of the business of this company from the conduct of the business of a steam railroad except that the power used is electric instead of steam. The company is a member of the following steam railroad associations: American Railway Association, Railway Accounting Officers' Association, Freight Claim Association, Western Weighing and Inspection Bureau, Association of Railway Executives and Chicago Claim Conference.

Mr. Cass maintained that his railroad is engaged in the general transportation of freight within the meaning of subsection C of paragraph 1 of section 15a as it handles as completely as any other railroad a general transportation business, and therefore considers itself amenable to Section 15a.

East St. Louis Companies Shown Not to Be Under the Act

W. H. Sawyer, in presenting a statement for the East St. Louis & Suburban Company and its five subsidiary railways, endeavored to show that his companies clearly were not engaged in the general transportation of freight. He showed that 113 miles of the total 191 miles of track owned by the company are on county highways and streets. The company has physical connection with seven steam railways, some of which are practically never used. Certain business is interchanged with steam railroads, the principal item being coal. The movement is almost

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wholly in one direction, namely, from the electric line to the steam lines. The companies' total freight revenue, including package freight, is about 13 per cent of its total revenue. While 814 coal cars are owned, no other type of freight car is owned and no interchange business with steam railroads is solicited because the company is in no position to handle it. The hauling of coal or other carload freight through cities and villages is generally prohibited, and the construction of track is such that standard freight cars cannot be handled except over a small portion of the lines.

Mr. Sawyer then undertook to define the meaning of the word "general" and from that to interpret the meaning of the clause "engaged in the general transportation of freight." The dictionary shows that "general" means "pertaining in common to all; widespread or prevalent; large or unlimited in scope; not restricted in application; viewed altogether as a whole; customary." He said that the antithesis of "general" is "exceptional," "unusual," "peculiar." The word "general" means general, not restricted. He said his companies are not in the general transportation business because they do not transport all kinds of goods. A much used synonym of "general," he said, is the word "universal"; others are "normal," "prevalent," "usual" and "customary." "General" applies to all with possible or comparatively slight exceptions; "universal" applies to all with no exceptions. These are the definitions as shown by the dictionary. Substitute any synonym in the dictionary, he said, and immediately it becomes apparent that "general transportation" does not apply to the East St. Louis companies. These companies have not only exceptions to general transportation, but the exceptions are the rule. They are not engaged in the general transportation of freight, but in a most restricted transportation of freight.

Maintaining that the Chicago, North Shore & Milwaukee Railroad did not come under the provisions of Section 15a, Judge Bradley showed that for the ten months ended Oct. 31, 1922, the revenue for carrying all kinds of property was $598,215, while only $75,848 of this was from carload freight, the balance being from merchandise dispatch and express. During the same period, the revenue of the company from passenger service was $3,411,285, showing the great preponderance of the passenger business as compared with the freight business of the company. The North Shore Line has no through freight rates with any steam railroads except the Elgin, Joliet & Eastern Railroad, known as the Chicago Outer Belt Line, and its through-rate agreements with that road are limited to the carriage of sand and gravel, slag, coal, coke, cinders, brick and cement. In all cases of interchange, whether originating on the North Shore Line or received from connecting lines, the cars for such service are furnished by the connecting line and movement is restricted to that part of the North Shore Line between Highland Park, Ill., and Harrison Street, Milwaukee. There is no interchange of l.c.l. freight with connecting steam railroads.

A point made by Judge Bradley and presented also by Mr. Henry and Mr. Brady was that the average cost of money to the electric line at the present time is about 8 per cent. Judge Bradley said that the average cost to the North Shore Line on money borrowed since Jan. 1, 1917, has been 8.30 per cent, and that a careful survey of capital requirements and of the company's ability to borrow, shows that it will be unable to get new money for a period of years for less than 7 per cent. The electric railway men undertook to show that if the cost of money to them was around 8 per cent that it would be fatal to them if their earnings in excess of 6 per cent were to be partly taken through a ruling of the commission.

Judge Bradley showed also that the North Shore line owns 109 miles of track, of which 41 miles is so restricted by its location in public streets, by franchise agreements, by its leases of property of other roads, and by the physical construction of its own and leased property, that it cannot handle carload freight or standard steam railroad equipment.

Equipment

A MEETING of the equipment committee of the Engineering Association was held at Pittsburgh, Pa., on March 17 and 18. Those present were: F. H. Miller, chairman; Daniel Durie, sponsor; W. S. Adams, R. S. Bull, A. T. Clark, J. L. Gould, J. M. Hipple, J. F. Miller, M. O'Brien, E. D. Priest, E. S. Sawtelle, P. V. C. See, R. B. Smyth, and W. G. Stuck.

The various subjects assigned to this year's equipment committee were taken up and discussed, and decisions were reached on many points for incorporation in the report of the committee. To obtain information on the use of helical gears, a data sheet has been sent out to the various users, and detailed information is being received. This will be tabulated for the next meeting. The matter of standardization of web holes in gears was discussed at considerable length, and the matter is to be taken up with the Gear Manufacturers' Association, in order to obtain additional information. The committee studying trolley contact devices reported that a questionnaire had been sent out, but replies had not started to come in yet.

Substantial progress has been made in revising various miscellaneous methods and practices for improvements in the Manual. Substantial progress is being made on these reports. The study of spring supports for railway motors is to include information from various companies, but sufficient replies have not yet been received to tabulate.

A detailed report was made on revisions necessary in the various equipment standards. Changes have been recommended for a total of twelve standards and specifications by this year's committee. Of this number, definite recommendations were arrived at for six, and the work on the remaining six has advanced so that definite decision can be reached at the next meeting of the equipment committee, which will be held in New York on June 6 and 7.

Monday evening the committee members were guests of the Pittsburgh Railways, the R. D. Nuttall Company, the Westinghouse Traction Brake Company and the Westinghouse Electric & Manufacturing Company at a dinner given at the Union Club, followed by a theater party.

Tuesday was spent inspecting some of the manufacturing plants in Pittsburgh under the guidance of representatives of the above companies. The members left the Fort Pitt Hotel at 9 a.m. on the two-car six-motor train of the Pittsburgh Railways and visited the works of the R. D. Nuttall Company, from where they went by auto to the Homewood carhouse of the Pittsburgh Railways, and then for luncheon to the Lunch Club of the Westinghouse Electric & Manufacturing Company at East Pittsburgh. After lunch an inspection was made of the East Pittsburgh works of that company and of the Westinghouse Traction Brake Company works at Wilmerding.

Buildings and Structures

A MEETING of the buildings and structures committee of the Engineering Association was held at Cincinnati on March 17. Those present were N. E. Drexler, chairman; J. D. Kent, B. R. Brown, Judson Zimmer, J. R. McKay, E. D. Eckroad, W. H. Stamm and T. H. Stoffel. The meeting was devoted principally to a discussion of progress reports of the sub-committees.

A sub-committee on passenger terminals is to study a number of the more important electric railway terminals as examples of present practice. The sub-committee is to prepare general recommendations on important points in terminal design, such as ramps, subways to avoid crossing of tracks by passengers, adequate capacity and architectural appearance.

The sub-committee on freight terminals for city and interurban service is to obtain plans of several typical electric railway freight station layouts and prepare a suitable questionnaire to obtain further data. The final report is to include plans of several layouts giving data as to number of cars that can be handled, capacity in tons, cost of handling, etc. Combination terminals will also be studied.

Designs of buildings for proper storage and maintenance of buses is also to be considered in the committee's report. It is planned to stress the importance of proper precautions for taking care of carbon monoxide gas, for the storage of gas and oil, proper fire protection and pleasing architectural design.

Akron Publicity Material

THE Committee of One Hundred of the American Electric Railway Association is distributing a leaflet on the Akron bus situation, giving in a few words the results of the bus service and reasons that impelled the public to demand the return of the street car service again.

It is also distributing a broadside containing reprints of articles and editorials on the plight of the Rubber City.

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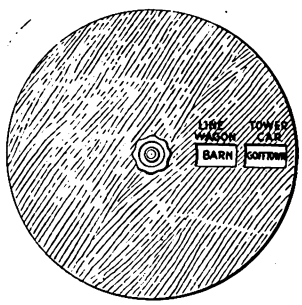
Maintenance of Equipment

Indicator Tells Location of Emergency Wagon

ON THE wall of the carhouse of the Manchester Street Railway Manchester, N. H., a novel type of indicator has been installed to tell the location of the emergency wagon and the line car. This is done by the movement of two circular disks on which are listed the names of the various railway lines. The disks are of different diameters. There is one opening through the face of the apparatus near the circumference of each disk. Through these openings



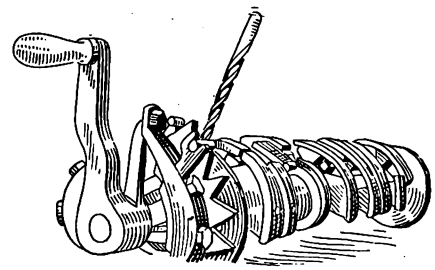
The Names Read Through the Openings Tell the Locations of the Emergency Wagon and Car

the names of the routes are read. Before the line wagon or emergency truck leaves the carhouse its driver sets the indicator to show where he has gone. When he returns the indicator is set back to read "Barn."

Locating Star Wheels on Controller Shafts

THE United Electric Railways, Providence, has adopted a star wheel for its controller shaft of a design different from the ordinary. The chief feature of this wheel is that it has a more pronounced tooth at the point of change from series to parallel, thus accelerating the rotation of the controller shaft at this point. It is the practice of the company to immediately install its own star wheels as soon as new controller shafts are received from the manufacturer.

Accurate locating of the star wheel in relation to the controller handle and to the broached portion of the shaft is important. In order



Jig for Locating Star Wheel

to facilitate this work and secure accuracy, a jig for boring the star wheel in position has been devised. A standard controller handle is used with an attachment fitting into the notches of the star wheel. The wheel is thus held in its proper position in relation to the controller shaft. The outside portion of this attachment has a hole accurately located for drilling.

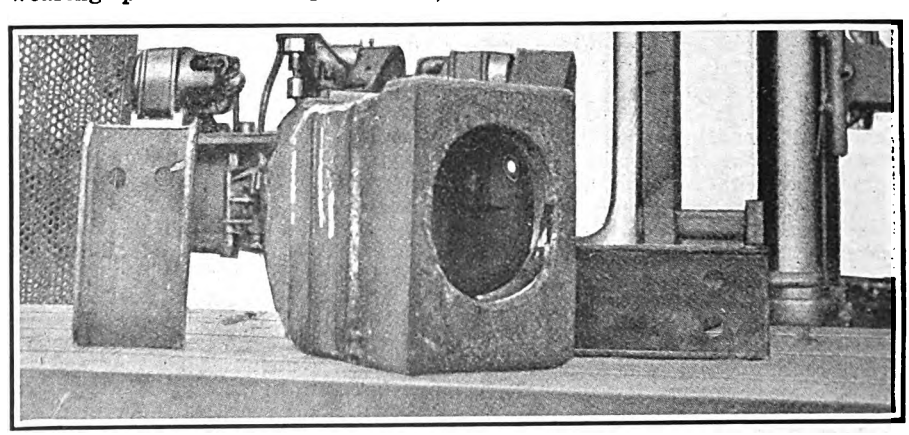
Renewing Journal Box Pedestal Guides

DUE to the spring support between the truck frame and journal boxes movement takes place constantly between the pedestals and the sides of the journal box. On some old-style trucks no provision was made for wear plates, and so the repair of the journal box pedestal guides must be done by building up the worn surfaces by electric welding, or else renewing these entirely.

The Philadelphia & Western Railway, Norristown, Pa., is welding mild steel wearing plates to its journal boxes. This has proved a very satisfactory construction. These wearing plates are of ¼-in. stock, bent to shape, and when finished are 6 in. wide by 8 in. high and of a channel section. The journal boxes have a recess planed for them to fit in and to give clearance for the welding metal and then they are welded firmly into position, which is done around the edges of the plate. In addition to this the plate is anchored to the journal box by welding to fill two holes drilled through the plate.

The accompanying illustration shows a journal box which has been planed out to receive the wearing plates, and the two plates ready for application. The two plates are clamped in place during the welding operation, which takes about one-half hour. As the plates are of finished stock, forged accurately to shape, no inside machining of the wearing plates is necessary after they are welded in position.

The practice of the railway also is to add material to the opening in the journal box for the axle at the dust guard seat. With any wear on the outside of journal bearings there is a tendency for these to rotate slightly inside the journal box with every application of the brake. This forces the axle over toward the side of the journal box, and eventually there is rubbing between the axle and the journal box at this point. This wears out the opening provided for the dust guard, and in some cases also wears a groove in the axle. This rubbing between the journal box and the axle is sure to cause heating, and in some cases results in hot bearings.



Journal Box Machined Ready for Welding in Wearing Plates

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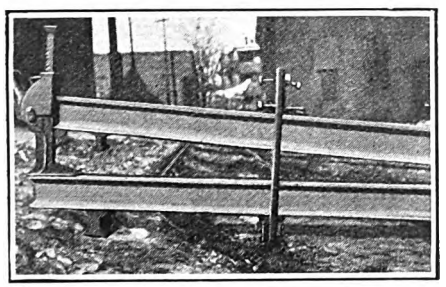
In order to bring these openings back to their normal dimensions, and also to provide a proper surface in case the journal boxes happen to rub against the axle at this point, a ¾-in. square wearing plate is welded in. Metal is also added to the opening so as to make a proper fit. Since this construction has been used, the number of hot bearings has been reduced from an average of eight or ten per month to less than one per month. The grinding out of the inside of the journal box opening after metal has been applied by welding is accomplished through the use of a hand grinder with an extended spindle. This makes it easy to get inside of the journal box and provide a proper bearing fit.

In order to prevent rapid wear of the journal bearing sides, a steel wearing plate is screwed onto one side of the bearing. This is anchored in place by brazing, and the screw heads are also prick punched to prevent their working loose.

Eight to One Leverage for Straightening Rail Joints

BY A skillful application of levers the maintenance of way department of the Springfield Street Railway, Springfield, Mass., obtains a pressure of 120 tons for straightening battered rail joints with a 15-ton jack. The lever arm is a piece of 7-in., 103-lb. grooved rail, 7 ft. 6 in. long. A collar composed of pieces of 3-in. by 1-in. steel encircles the lever arm and passes underneath the joint to be straightened. An ordinary hand jack is then placed under one end of the lever. The relative length of the arm can be varied, with a ratio of 8 to 1 as a maximum. The 15-ton force of the jack can thus be multiplied into a pressure of 120 tons exerted on the joint. Welded joints are straightened in place simply by removing the surrounding pavement and placing the collar underneath the joint. Convenient handles have been welded to the upper rail to aid in carrying it from place to place.

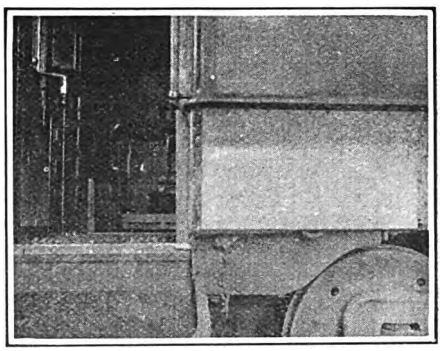


The Collar Is Placed Around the Joint to Be Raised and Pressure Applied by Means of the Jack

Galvanized Sheeting Protects Car Sides

THE practice of re-covering the lower side panels of its cars with galvanized steel sheeting has been adopted by the Middlesex & Boston Street Railway, Newtonville, Mass. This is done in short sections as shown in the accompanying illustration. Whenever a car is brought into the shop for overhauling examination is made of the condition of these lower side panels and when they are found to be in poor condition this sheeting is applied. An important saving is accomplished because the wood panels originally used were very prone to split after having been steamed and bent to fit the curved sides of the car.

No serious trouble has been experienced with rust, nor has there been any difficulty due to water seeping in around the edges of these galvanized pieces. Painting, which is very carefully done, consists of one coat of primer, one coat of flat color, one coat of enamel and one coat of finishing varnish. This is the normal painting procedure on the Middlesex & Boston Street Railway and has been found to afford adequate protection to these panels. Cars are brought into the shop and repainted on the average every two years.

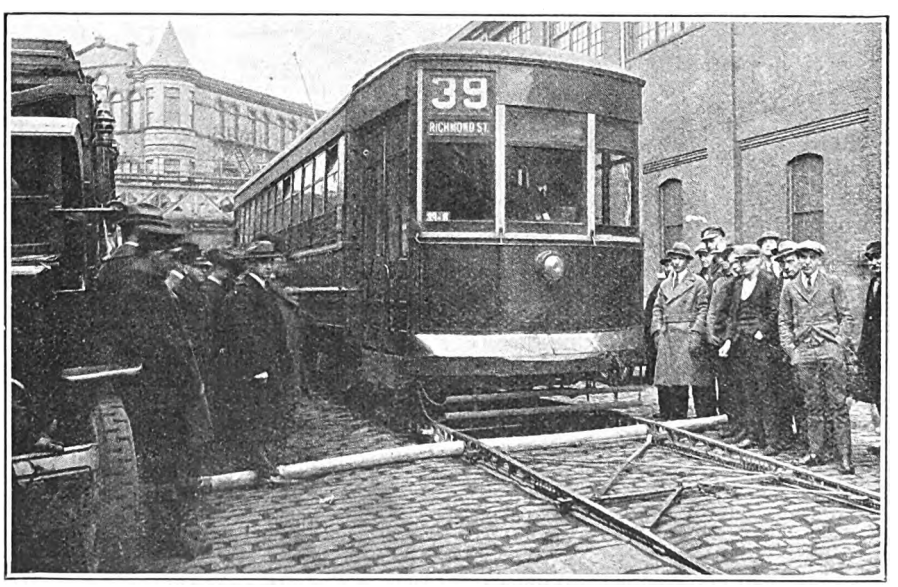


Galvanized Steel Panels Are Used to Protect the Woodwork on the Cars of the Middlesex & Boston Street Railway

New Equipment Available

Special Fire Hose Bridge Used in Philadelphia

A NEW type fire hose bridge has recently been adopted by the Philadelphia Rapid Transit Company. The design was worked out in collaboration with the Ohio Brass Company, and differs from types previously used in that it is longer and has a more gradual slope. The development of the high-pressure water supply system for fire protection was an important factor in creating a need for this apparatus. So long as the low-pressure system was in general use in the city, it was possible for the railway to lift the lines of hose over its tracks and support them on its tower wagons. A high-



The Gradual Slope of the Hose Bridge Facilitates the Passage of Cars

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pressure hose, however, is too lively to be treated in this way and it was necessary to adopt other means of keeping the cars moving.

The track layout in Philadelphia is such that a fire anywhere in the downtown district is likely to necessitate the laying of hose across the rails. An old-fashioned fire hose bridge was unsatisfactory because of the steep slope, and for that reason a new steel bridge was designed. It is 26 ft. long and weighs 500 lb. The bridge is built in four sections which can be assembled in less than five minutes. Nine more of the same kind have been ordered. They will be carried on all the emergency wagons of the P. R. T. One wagon is located in each district of the city, and responds to every fire alarm in its district.

Combination Woodworker with New Features

RECENT features added to the Combination Woodworker No. 2, manufactured by the Buffalo Forge Company, Buffalo, N. Y., include a change in the planer guide arrangement to provide for quicker and more accurate adjustment. A positive drive for the ripsaw and jointer mandrel have also been added. The drive is by means of a rawhide pinion and gear.

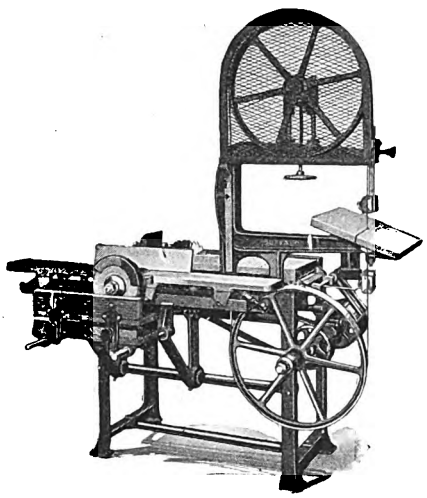
The new planer guide arrangement provides for moving the planer guide forward and backward in a slot or groove. This guide is locked in position by means of a thumb nut. The older type used a two screw adjustment and did not have the slide arrangement. This guide can also be set at any angle desired for beveling purposes.

The former method of drive has been replaced in the new woodworker by a positive drive of the pinion and gear pulley type, which makes a smooth running machine and eliminates belt slippage. The gear ratio of the two pinions is approximately 2 to 1. The pulley pinion is cast in one piece, while the main shaft pinion is keyed to the shaft.

Other important features of this new machine consist of tight and loose pulleys, 8 in. x 3 in., and a handy belt shifter.

The table for the crosscut saw and ripsaw is 37 in. x 15 in. wide, and is made of heavily ribbed cast iron. The table is hinged at one end and can be raised or lowered to adjust the depth of the cut. A cast-iron crosscut guide is furnished with the machine, which slides in a milled groove in the table and is adjustable for varying angles.

The jointer fastened on the same spindle as the saw is 6 in. long and 3 in. in diameter. A screw and hand wheel arrangement is used to make both sides of the jointer table



Woodworker with Positive Drive Ripsaw and Jointer Mandrel

adjustable. The jointer shaft has an outboard bearing and outside of this is an 8-in. x ¾-in. emery wheel. A ½-in. reamed hole in the shaft end and a tap for a headless set screw allows straight shank bits to be inserted.

In order to facilitate the holding of work to be drilled, a slide table is provided which is readily adjustable to different heights. An 18-in. disk sander may be placed on the lower bandsaw shaft. The bandsaw wheels are 22-in. diameter by 1½-in. face, and are covered by an endless rubber band which reduces slippage of the saw.

Switchboard Instruments

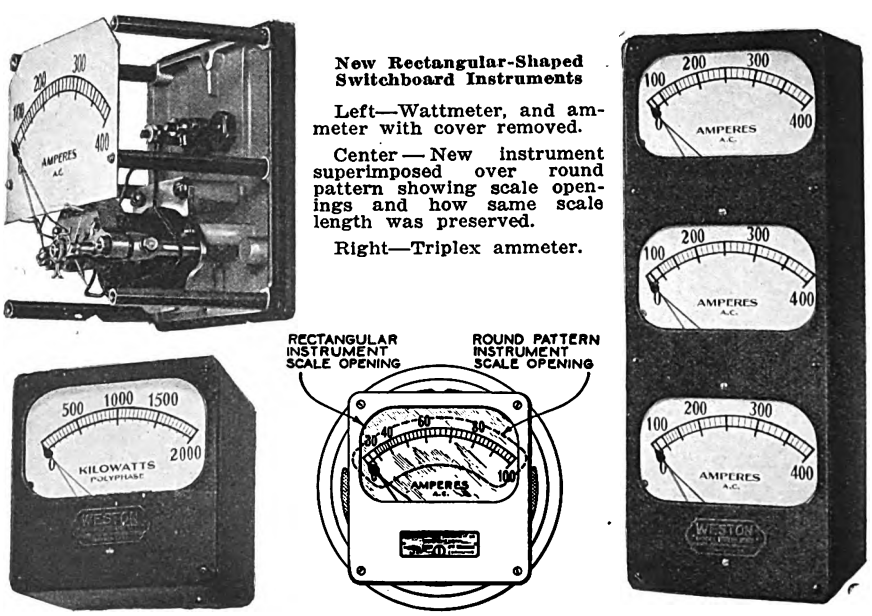
A COMPLETE line of rectangular-shaped instruments, including direct-current voltmeters and ammeters, for use on switchboards controlling alternating-current machines has been developed by the Weston Electrical Instrument Company, Newark, N. J. All the instruments of the group have uniform case size dimensions—5¾ in. wide and 6 in. high.

Four of the rectangular type of instruments may be laterally accommodated on a 24-in. panel, whereas the round pattern instruments require a 32-in. panel and a greater vertical space. A triplex ammeter, as shown in the illustration, contributes to the saving in space where an ammeter is required in each phase.

Although the new instruments occupy a much smaller space, reference to the illustration shows how it was possible to preserve exactly the same scale length as in the round-pattern instruments. Further, there has been obtained a much larger scale opening, permitting better illumination and improved legibility, which is also facilitated by larger and heavier scale numerals printed on a horizontal plane.

The wiring studs in the rear of the instrument have been grouped in the center and have been kept uniform on all types. The resistors, where used, are mounted back of the switchboard on studs projecting from the rear of the instrument. These resistors have also been made smaller.

These meters are suitable for substation panels and other uses in the railway field.



New Rectangular-Shaped Switchboard Instruments

Left—Wattmeter, and ammeter with cover removed.

Center — New instrument superimposed over round pattern showing scale openings and how same scale length was preserved.

Right—Triplex ammeter.

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The News of the Industry

Legislation to Regulate Motor Vehicle Fails in Oklahoma

All measures were killed that were proposed in the recent extra session of the ninth Legislature of Oklahoma to protect existing electric and steam railways from cut-throat competition by buses and trucks, by compelling the latter to conform to the regulations imposed by the state on carriers of other classes, and by imposing a tax upon motor transportation that would in a measure compensate for their use of the public highways. In the meantime the Corporation Commission continues to grant permits for the operation of motor transportation lines, both freight and passenger, many such permits being for lines which will be in direct competition with existing facilities. The commission is made the judge of the necessity for the service for which application is made, and by the granting of permits to lines competing with existing facilities in effect holds such facilities to be inadequate to the public demand for service.

Pennsylvania Extends Philadelphia Electrification

An extension of the electric service of the Pennsylvania Railroad on its Fort Washington branch was placed in service on Feb. 27. This is a branch about 6 miles long, extending from the Chestnut Hill line to White Marsh. It is equipped with the same general type of electrification as that now in service on the Chestnut Hill branch.

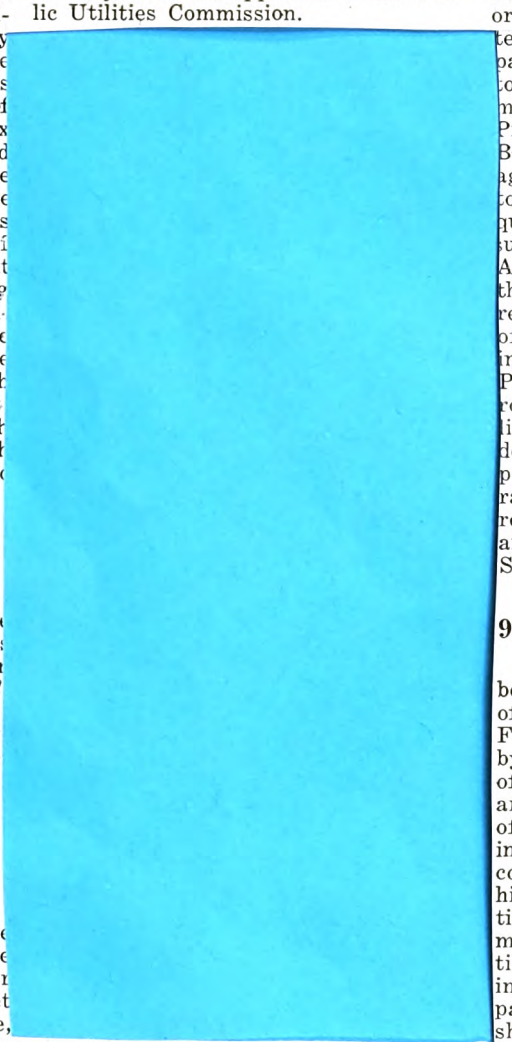
Maine Commission Announces Bus Regulation

Rules and regulations governing the operation of motor vehicles used for the carrying of passengers for hire over regular routes upon any public street or highway within the state of Maine, were announced recently by the Public Utilities Commission to become effective on April 1.

The rules which apply to any automobile, automobile truck or trackless motor vehicle require that a certificate from the Public Utilities Commission be obtained, the application to give the name of the owner, the make of the motor vehicle, seating capacity, rated horsepower, factory number, state license number, where the motor vehicle is to be operated, the fares to be charged, the time of leaving designated points, and the names of any other form of transportation with which the application may compete.

In addition to the mechanical requirements the operating schedule of the vehicles must be maintained and none of them will be allowed to carry passengers in excess of the rated seating capacity. The vehicle must also be stopped before crossing the tracks of any steam or electric railroads at grade.

All rates of fare and practices are to be subject to the approval of the Public Utilities Commission.



sonal service, standard equipment, steam line connections, and joint through rates. Under the slogan "for satisfaction ship by traction," W. H. Wylie, the traffic manager, tells the shippers that he wants to prove to them what the personal traffic service is. One advertisement shows the increase in the volume of freight shipped by traction. Another ad gives the territory of the Illinois-St. Louis field for the shipper and the manufacturer. Still another describes the complete carrying facilities of the traction system, which "gives effective accommodations to shippers of all classes of commodities," explaining the switching arrangements with other carriers that make it possible to reach all industries in St. Louis, East St. Louis, Peoria and other points in traction territory.

Philadelphia Rapid Transit Must Pave in Swarthmore

The Philadelphia Rapid Transit Company, Philadelphia, Pa., lost its case recently when the State Supreme Court ordered the company to comply with the terms of a franchise calling for the paving of Yale Avenue from curb line to curb line in the Borough of Swarthmore and the township of Nether Providence, Delaware County. The Borough of Swarthmore some years ago granted a franchise to a railway to operate over Yale Avenue. Subsequently the Philadelphia Rapid Transit succeeded to the other company's rights. A provision in the franchise called for the keeping of Yale Avenue in good repair by the railway. Increased use of the avenue by automobiles resulted in damage, and the borough notified the Philadelphia Rapid Transit to fix the roadway. Upon complaint to the Public Service Commission that body ordered the company to repair "only that portion of the highway occupied by its rails and ties." The Superior Court reversed the ruling of the commission and the case was then appealed to the Supreme Court.

9,000 Pass Users in Fort Wayne

How popular the weekly pass has become with the public using the lines of the Indiana Service Corporation in Fort Wayne in just two years is shown by the fact that from a first week sale of 2,967 now practically 9,000 passes are issued each week. When the idea of issuing a weekly pass was conceived in Fort Wayne the officials of the local corporation had little more than the history of the pioneer Racine installation to guide them, but, by careful management and widespread advertisement the system immediately grew in favor. As a result thousands of passes are now being sold weekly to shopmen and others who otherwise would probably have continued to use the cars sparingly at the regular fare of 7 cents cash or 6¼ cents token. To many of these persons the use by them of the pass has meant the possibility of from four to six rides every day, warm lunches and some time away from the factories and shops and all at a cost of only 14 cents daily.

The economy in the use of the pass was immediately impressed upon the shop and factory workers as well as those in downtown offices and stores through a system of newspaper and car advertising and as a result the sale of passes at $1 each mounted until now the 10,000 mark appears at hand.

As a result of the careful study of the weekly pass privileges it has been found that the average fare per revenue passenger has been reduced from 7 cents of two years ago to 5 2/5 cents

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for the second year of pass usage. More than 20,000,000 passengers were handled on the city lines in Fort Wayne during 1923 and it is expected that this figure will be exceeded by more than 5,000,000 during the present year through greater use of the pass.

Jitney Men at Houston Seek Court Intervention

Seven jitney drivers at Houston, Tex., through their attorney, have filed a petition in the District Court asking that the city be enjoined from enforcing the terms of the ordinance adopted by popular vote on Jan. 19, and providing that the jitneys cease operation on April 1.

The jitney men claim in their petition that thirty-three days elapsed between the final adoption of the ordinance calling the election and the date when the election was held, and that constitutes a violation of the charter provision governing such elections.

Another contention is that the Mayor failed to post notices at some of the polling places thirty days in advance of the election; that the form of the ballot was confusing and misleading and that the ordinance is void on the ground that in effect it grants a franchise to passenger carrying vehicles of more than fifteen passenger capacity.

The City Attorney has prepared another ordinance, which may be passed by the Council without submission to the people, and which will legislate the jitneys off all routes in the city. He has been working on this ordinance several days in anticipation of the injunction suit.

In case the city is restrained from enforcing the ordinance of Jan. 19, the Council is expected to pass the one which is now being drawn up by the City Attorney.

The ordinance of Jan. 19, under which the settlement was arranged, was passed by a vote of two to one.

Small Chance for Transit Legislation in New York

Three bills introduced by Senator Walker, which give to New York City "home rule" powers in the regulation of public utilities, including transit, as well as the right to own and operate transit lines and other public utilities, and three bills introduced by Senator Twomey vesting similar powers in all cities throughout the state were passed by the New York Senate on March 26. The bills were passed by a party vote of 26 to 24 and with no attempt by the Democrats to defend the measures when they were attacked by the Republicans.

Included in the number was a bill

Party says that ultimately the transportation facilities in the city of New York shall be self-sustaining. This is contemplated by the Republican measure in the Assembly.

The Democratic Party says: Charge whatever deficit may result from municipal operation back on the taxpayers of the city.

The Republican Party takes the position that ultimately in the aggregate, the transportation roads in New York must be self-supporting. It may take three, four or five years, but we insist that the service on the whole must be self-supporting.

The only question is: Which principle shall we adopt? Are you going to make transportation pay for itself or charge it on the taxpayers? We are willing to stand on that issue. The only class of persons which should have the assistance of public funds are those known as the indigent class. Patrons of New York's transportation facilities cannot be classed as indigent persons. There is a question of principle at stake.

If the Democrats are sincere they will accept the principle that the ultimate service should be self-sustaining. They know if they would accept this principle that they would get their legislation from this Legislature, but they would lose their political issue.

Increase in Free Rides a Menace

Commissioner Paul H. Maloney of the Department of Public Utilities has discovered that the number of free rides by the New Orleans Public Service, Inc., had grown to 1,673,271 during the year ended Jan. 31, 1924, representing a possible revenue of $117,129. The free rides were taken by the heads of the city department and their clerks and stenographers, uniformed policemen, firemen and members of religious orders.

In January, 1924, the number of free rides was 5,000 a day, an increase of 5 per cent over the average for January, 1923. Commissioner Maloney regards every free ride as a tax upon those who pay their fares. It is his intention to learn the sources of request for passes for men and women in the employ of the city.

The indeterminate permit under which the New Orleans Public Service, Inc., is operating in New Orleans provides that only uniformed policemen and firemen shall ride free.

OUT of a clear sky has come a bo
wonderfully fine record of hav
passengers without fatality occ
through the sole fault of the employee
four years seven months and twenty
number of people and during that t
cars over a total of 37,761,041 miles.
road tracks at grade 12,950,630 times,
and passed at sidings in single track interurban operation 1,450,053 times.

It was a splendid record, the best our company had ever attained. . . . It meant so much to us! It gave us a greater pride in our company and in ourselves. It stimulated us to greater carefulness, greater effort. It gave us something to work for. It permitted us to feel that our company and we were making progress of a definite sort. We could go to our work or take passage on our cars with a feeling of security and safety.

Then, as unexpectedly as a flash of lightning from a clear, blue sky, came the smiting, blighting bolt, at first stunning and benumbing our senses, then almost crushing us to earth with the weight of work and care it brought.

The wonderful record has been broken, but the cause of SAFETY, the worth of SAFETY WORK, has not failed.

Let us turn our faces to the sun. There has not been the storm of public criticism and denunciation which there would have been if we had not done the tremendous amount

e have done and have in various ways
have done and what we accomplished.
inking, fair-minded public, I am sure,
e representative business man said to
occasion to stop me on the street and
u fellows have been hit an awful blow.
ny heartfelt sympathy. Perhaps you
feel now that your safety work has resulted in failure, but I want to tell you that I don't feel that way and I don't believe fair-minded people do. GO RIGHT AT IT AGAIN AND DO IT BETTER THAN EVER!"

There's the keynote. Let's go right at it again and DO IT BETTER THAN EVER! Let us remember that more than 99 per cent of us HAVE NOT FAILED. Let us set ourselves resolutely, grimly, if need be, to the task of building up from the ruins of the old record a NEW, BIGGER and BETTER record. In this new structure the bricks will be our ACTS; they will be put in place by SUPERVISION, and the mortar to cement them into the strong, rugged structure of SAFETY must be the RULES. It cannot be otherwise.

Building this new structure is your job and my job and the job of every Union Traction employee. Let us do it well, never forgetting for an instant the lesson this failure has taught.

The CAUSE of SAFETY, the WORTH of SAFETY WORK, has not failed!

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Grade Crossing Legislation Likely in New York

Legislation has been prepared to carry out the provisions of the recommendations of Governor Smith for grade crossing elimination in New York State. One bill amends the railroad law by transferring all of the powers now vested in the Public Service Commission with respect to control over crossings to the Superintendent of Public Works, the Highway Department retaining, of course, the jurisdiction it now has in such matters. It is the opinion of the administration that the passage of this bill will facilitate greatly the issuance of a final order for crossing elimination as the request for the elimination and the action on it would be taken by the same department of state government. The general provisions of hearing and determination remain about the same in the amended law as now prevail.

Another provision of the bill does away with alteration of existing grade crossings and provides, in effect, that whenever any such crossings are altered they shall be converted into overhead or underground crossings. The present provisions of law is retained requiring expenses incurred by railroad corporations in any one year shall be as equitably distributed as practicable throughout the state so that one railroad will not be called to make a much larger expenditure than another railroad system for crossing elimination.

The constitutional amendment would pledge the credit of the state for the state's share of the elimination program to the extent of $100,000,000.

The Republican leaders are for the constitutional amendment lending the state's credit to the project, but are opposed to the transfer of jurisdiction

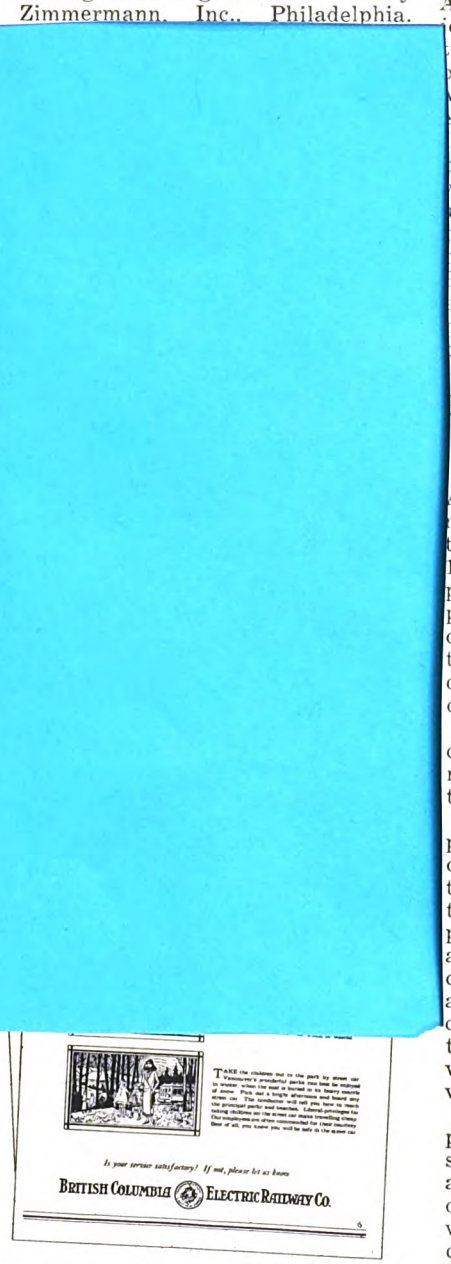
Red Egg Symbol Shows Real Originality

The doctrine of association of ideas is not new in advertising, but clever applications of it deserve mention. To J. S. Bleecker, when he was general manager of the Columbus, Newark & Zanesville and the Indiana, Columbus & Eastern Railways, occurred the thought that if there was merit in associating a cigarette with the comparatively infrequent camel, why not try to associate the electric railway with the popular and ubiquitous egg? To make the egg symbol still more representative of vitality, it was decided to color it a vivid red. Thus came the slogan of the "Red Egg Lines." The egg is found not only on the company's rolling stock in red, but also nestles within the "S" and the "E" that form part of the good-will periodical entitled "Safety and Service."

The adoption of this original symbol gave Mr. Bleecker the opportunity for a prize contest on "Why Is Our Transportation Service Like an Egg?" Most of the replies were serious or witty, with little evidence of the flippancy that an egg evokes among some persons. One customer wrote: "Because both imply careful transportation"; a second, "Because no adequate substitute has ever been found for either"; a third, "Because both were laid for the benefit of mankind" (second prize); a fourth, "Something to crow about" (third prize). The first prize was won by a patron who compared the railway and the egg as embodiments of the principle of life.

The prizes were $50 for the first, $35 for the second and $15 for the third. The winning answers were published in Vol. 1, No. 4 of "Safety & Service."

Mr. Bleecker, who has also done notable work in Ohio to set forth fairly the position of rail and bus, is still connected with the railways named through the management organization of Day & Zimmermann, Inc., Philadelphia.



Posters Typical of the British Columbia Campaign

were set up at a job plant and furnished to the newspapers in the form of electros. Besides giving some general information on its daily carrying capacity on the electric railway the posters enumerate the many advantages gained by riding on the electric cars. They have a message for the shopping fiend, the social belle, the matinee addict and the anxious churchgoer. The patrons of the British Columbia Electric Railway are told that on any occasion and in any weather the street car will furnish dependable service. In each "ad" the company asks the customer the question, "Is your service satisfactory? If not, please let us know."

Traffic Improvement Plans Now in Effect in Grand Rapids

Recommendations with regard to speeding up traffic on the downtown streets of Grand Rapids, Mich., have been made by Gerald J. Wagner, consulting electrical engineer for the city. After repeated conferences on the subject of how to cope with the rush hour traffic, it was decided in every way possible to keep the motorist from Monroe Avenue along which practically every street car line in the city passes. In addition loading platforms are being installed in the downtown section which will enable two cars to load at once and men are placed at certain loading platforms from whom passengers can purchase tickets before boarding cars. Policemen at intersections, though governed by the signal lights, are to be permitted greater latitude in handling traffic tangles on their corners.

Peculiar Angle Given to Accident Case in Los Angeles

Before the Superior Court in Los Angeles is the question of the possible necessity for an amendment to one of the State laws of California, passed in 1872, which controls the carrying of passengers by a public conveyance corporation. The matter arose at a trial of a suit by a woman against one of the traction lines in Los Angeles for damages alleged to have been suffered on a crowded car.

The question is whether a railway can be held liable for damages by permitting more passengers to enter a car than can be accommodated with seats.

Attorneys are reported to see ahead a possible need for traction lines to reorganize their entire system, provided the court's decision favors the plaintiff. The plaintiff claimed she was a passenger on a crowded car in 1923 and suffered serious injuries when the car lurched suddenly and threw her against a rear section. She alleges the company was negligent in permitting the car to become overcrowded and with not properly providing passengers with seats.

The company asserts that if the plaintiff boarded an overcrowded car she did so voluntarily and, therefore, assumed the risk of injury with her own knowledge. Probably the injury was to be anticipated, the defendant contended, at the time the plaintiff boarded the car.

The two sections of the Civil Code of California affecting the control of street car traffic, and the status on which is involved the suit, follows:

A common carrier of persons must provide every passenger with a seat. He must not overload his carrier by receiving or carrying more passengers than its rated capacity allows.

A common carrier of persons must provide a sufficient number of vehicles to accommodate all passengers who can be reasonably expected to require carriage at any one time.

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Application to Make Improvements in St. Louis Denied

Applications of Receiver Rolla Wells of the United Railways, St. Louis, to build 100 center-exit cars, known as Type 700, and to double track the Missouri Electric Railway's main line from St. John's station to the Woodson Road, St. Louis County, was denied by Federal Judge Faris on March 20. Judge Faris acted on the recommendation of acting Special Commissioner Fred L. Williams, who held that the contemplated expenditures would be in the nature of permanent improvements and should not be paid for out of the earnings of the company while it is in receivership. Holders of the bonds of the St. Louis & Suburban System opposed the improvements. The cars would have cost $1,050,000 and the double tracks $15,000 for the Wellston-St. Charles line a distance of three-fifths of a mile.

Thomas E. Francis, attorney for Receiver Wells, argued that the proposed cars were in the nature of repairs, as they were intended to replace cars now in service, and that the new track on the St. Charles line was necessary to preserve that property's earning powers.

The United Railways shop at Thirty-ninth Street and Park Avenue is now working on the last fifty of 200 similar cars built since Receiver Wells took charge of the property, and it was intended to obtain permission for the construction of the additional cars in time to permit ordering of the necessary lumber, motors, etc., so that the shop forces could continue their present schedule of work.

Granted Bus Permit Between Los Angeles and Santa Monica

The California Railroad Commission on March 3, 1924, granted a permit to the Pacific Electric Railway to operate bus lines between Los Angeles and Santa Monica. It is stated that the railway proposes to have the line in operation in time to take care of the heavy summer travel to the beaches. Twenty-five passenger buses or larger will be used. The schedule of fares announced by the company to be put into effect was: One way, 38 cents; round trip, 60 cents, with a minimum charge of 6 cents for rides between fare breaks, or points in different zones. Special rates have been arranged for patrons desiring to purchase commutation books.

The Mayor of Santa Monica has made it plain that he will not vote for a franchise for any transportation line into the city which charges more than a 5-cent fare. The Pacific Electric local fare is now 6 cents.

During last December the California State Railroad Commission conducted a five-day hearing in Los Angeles in the matter of a bus line permit for the operation of motor bus service between Santa Monica Bay District and Los Angeles. The territory, a distance of 19 miles, at present is without motor bus service. Passengers between Los Angeles and Santa Monica are served by the Pacific Electric interurban lines, there being two separate interurban routes between the two cities. Three companies sought permit to render motor bus service, the Pacific Electric Railway, the Bay Cities Transit Company, which now serves the Santa Monica Bay District with a local bus system, and the United Stages, Inc. The Pacific Electric Railway also operates a system in Santa Monica.

Freight Station at Indianapolis Nearing Completion

Work is progressing rapidly on the interurban electric railway freight station on Kentucky Avenue, Indianapolis. The buildings are near completion and the tracks are being laid. It is pos-

[redacted]

boat trip on Lake Geneva, will correspond with the trip conducted a year ago. The longer trips are to be made once a week, the coaches leaving Chicago every Monday, from June 16 to Sept. 22, inclusive.

A four-color folder is being prepared as part of the tour advertising program. In it the attractions of the territory will be outlined. This folder is to be illustrated with attractive scenes of the territory visited. It will also contain prices and other details of interest to the prospective traveler. The tour prices include lodgings and all meals, a feature which it is expected will appeal to the public as it will relieve the tourists of much of the detail usually encountered on vacations.

As in the past, the North Shore Line will continue its operation of motor coaches for special charter parties.

Jitney Injunction in New Jersey Creates Precedent

Vice-Chancellor Backes of New Jersey has granted to the Board of Public Utility Commissioners an injunction restraining Frederick D. and Louis Sheldon from operating a bus line through Dover and Wharton, alleging defiance of the board's order to cease. This is the first time that the commission has resorted to injunction to compel compliance with its orders. The decision by the vice-chancellor is regarded as establishing a precedent.

Counsel for the bus operators held that the order of the utilities board to cease operation, amounted to confiscation of property rights. The board had revoked its approval of the license granted the Sheldons because of violations of conditions imposed.

After reviewing the facts in the case and calling attention to the recent law by the Legislature imposing certain penalties for disregard of the utility commission's orders, the opinion by the vice-chancellor states:

> The jurisdiction of equity to protect the rights of the State is one of common exercise, usually upon the relation of the Attorney-General. But where, as here, the duty of protecting the public interest as against the unlawful operation of public utility jitneys is vested by the State in the board, the authority to vindicate the public right is conferred by necessary implication, if not by express terms, and the functions of the Attorney-General are bestowed. Proceedings at law by certiorari or madamus are obviously inappropriate. The board's action may be reviewed by certiorari or mandamus issues only to enforce legal rights, not to restrain unlawful acts.

Bus Plan for Aberdeen Abandoned

The City Council of Aberdeen, Wash., has abandoned its plan to grant a permit to a proposed stage line operator to compete with the Grays Harbor Railway & Light Company on its South Aberdeen Cosmopolis line. The decision followed the securing of promises from the railway to pave permanently the space between its tracks at different points; to double-track its line for a distance of 2,700 ft., and to place sufficient cars on the route to provide fifteen-minute service or better. A. E. Bertrand, manager of the company, assured the Council that important improvements to the company's traction system would be made during the present year.

The Mayor of Cosmopolis and other city officials had appeared before the Aberdeen City Council and registered complaints against the railway service, declaring that competition was necessary in the district. Business men from South Aberdeen joined in the appeal for better service and urged the granting of a permit to the bus operators, who had applied for a permit to operate between Cosmopolis and Aberdeen. Following the bus men's application the City Council of Aberdeen, had instructed City Attorney A. E. Cross to prepare a measure repealing a portion of the ordinance which granted to the Grays Harbor Railway & Light Company exclusive operating rights over streets on which tracks of the company are laid between F Street and the limits of the city at the Cosmopolis line.

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News Notes

Public Hearing on Fare Petition.—The Maine Public Utilities Commission on April 1 will hold a public hearing on the petition of the Androscoggin & Kennebec Railway, which asked for an approval of an increase in its single fare from 9 to 10 cents. A schedule increasing the fares on the Androscoggin & Kennebec Railway from 7 to 9 cents, became effective Sept. 1, 1920.

Rates Reduced.—A change in mileage book rate on the Salt Lake & Utah Railroad, Salt Lake City, Utah, which will reduce the cost of the 1,000-mile book from $25 to $22.50, will become effective April 7. The mileage scrip will be honored by the Salt Lake & Utah Railroad, Bamberger Electric and Utah-Idaho Central Railroads.

Will Hold Election on Car Purchase.—An election is scheduled for May 20 in St. Petersburg, Fla., calling for a bond issue of $135,000 for the purchase of fifteen cars to be operated by the Municipal Railway of St. Petersburg.

Will Acquire Bus Line.—The Compton Transportation Company has applied to the California Railroad Commission for permission to sell its bus rights, properties and equipment used in the operation of the Long Beach-Huntington Park line to the Pacific Electric Railway. The application states that $43,707 will cover the sale. The sale does not include the Long Beach-Venice line.

Wage Hearings Started.—Hearings in the arbitration between the Worcester Consolidated and the Springfield Street Railways and the union were begun March 24. The first witness heard was Arthur Sturgis, Washington, D. C., who presented budgets pertaining to the cost of living, intended to support the petition of the men for a wage increase from 58 to 80 cents an hour.

Law Would Forbid Sale of Transfer.—A bill has been introduced in the General Assembly of Maryland passage of which would make it a misdemeanor for any person to sell or give away a transfer or for any person to use a transfer issued to any other person. The measure provides a fine of not less than $10 for the first offense and a fine of not less than $100 or six months imprisonment, or both, for the second or subsequent offenses.

Establishes Truck Line.—The Fitchburg & Leominster Street Railway has established a motor truck line between Winchendon and Fitchburg, Mass., accommodating freight patrons of the road in Winchendon, Westminster and Gardner and replacing the old electric express formerly operated by the Northern Massachusetts Street Railway.

Electric Railway Man Will Arrange Transport.—E. W. Ford, vice-president of the Memphis Street Railway, Memphis, Tenn., has accepted the chairmanship of the transportation committee of the Confederate reunion to be held in Memphis June 4, 5 and 6. He will arrange all schedules and rates, organize the transport resources of the city and hold them in readiness for emergencies. Arrangements will also be made to handle record automobile traffic.

Measure Fixing Size of Crew Defeated.—The bill before the Kentucky House for two-man cars in Louisville was defeated on March 11, forty to thirty-six.

Course Helpful to Many.—At the University of Colorado, Boulder, Prof. C. M. McCormick, with the use of moving picture slides, will endeavor to make clear many points connected with the short course for electric railway motormen. This is the second year the university has given this course, and while it is intended principally to school the men who handle cars, there is much about it that any one interested in elementary electrical engineering will find helpful.

Office to Be Moved.—The general offices of the Columbus, Newark & Zanesville Electric Railway will be moved from Springfield to Zanesville on April 1.

Lost Tickets Subject for Argument.—The Montreal Tramways, Montreal, Que., has objected to a decision of the Tramways Commission ordering it to establish a reserve fund of $500,000 to provide for the item of unredeemed tickets. An appeal has been entered with the Quebec Public Service Commission stating that this item should continue to be dealt with as at present, and shown as a liability in the annual statement. In the last annual report of the company the item of unredeemed tickets is shown as a liability amounting to $519,346. The matter will be discussed during the sitting of the Quebec Public Service Commission to be held in Montreal some time during the month of April.

Another Bus Service Started.—The Seattle Municipal Railway, Seattle, Wash., will operate a bus service on Beach Drive, between Orleans Street and West Dawson Street, connecting with the railway line at Orleans Street. West Seattle residents donated half the $6,500 cost of putting the bus in operation.

Voters Approve Rehabilitation.—The Canadian National Railway franchise for the rehabilitation of local and interurban electric lines at Niagara Falls, Ont., was approved by the voters of the city at a special franchise election March 19. Work on the new system will be started at once. An initial 7-cent fare will be charged and all future fare adjustments will be on the service-at-cost basis.

Jury Disagrees on Platform Employee's Theft.—The jury in Niagara County Court at Lockport, N. Y., disagreed in the case of Francis Reilley of Buffalo, former striking platform employee of the International Railway, Buffalo, on trial for alleged participation in the theft of dynamite. The theft occurred three days before the dynamite outrage on the Buffalo-Niagara Falls high-speed interurban line of the International at Ellwood Station during the strike. Reilley is the first of eleven men under indictment in the state courts for alleged participation in the theft and hauling of the dynamite from the town of Lockport to Buffalo.

Named National Councillor.—H. F. Dicke, general manager of the Utah Light & Traction Company, Salt Lake City, Utah, and vice-president of the Salt Lake City Chamber of Commerce, has been named national councillor of the organization to attend the twelfth annual meeting of the National Chamber of Commerce at Cleveland, Ohio, from May 5 to 12.

Rerouting Plan in Abeyance.—At the first reading of the plan submitted by Commissioner W. E. Cann for rerouting the lines of the Community Traction Company, Toledo, the City Council indicated that it was at present unwilling to finance improvements by increasing the capital value of the company as provided in the Milner Ordinance. It is anticipated that it will be several weeks before the plan will go through if it is adopted as a whole or in parts.

Will Start Bus Operation.—The Connecticut Company will install at once bus service on the Compo Beach line in Westport, Conn.

No Action by Council.—It is not decided whether the City Council of Everett, Wash., will protest the proposed elimination of the transfer privilege on the bus system of the Puget Sound International Power & Railway Company, as proposed in a new tariff. The railway operates the bus system in place of its former traction lines. It proposes the elimination for ninety days, claiming that it is unable to furnish this privilege for the 5-cent fare charged. All but one line is involved in the proposed change. The busmen's wages have been increased. After a week's hearing in the wage controversy between the company and the busmen's union, the arbitration board has granted a wage increase of 5 cents to 7 cents to busmen, according to time of service. The award is retroactive to Feb. 1. The increase asked by the busmen was 19 per cent. The company offered the men 3 per cent more. Busmen will now receive 55 to 61 cents an hour, instead of 48 to 56 cents.

Will Pay with Check.—The Market Street Railway, San Francisco, Cal., has adopted the plan of paying its employees by check instead of cash.

Boulevard Stop System Effective in April.—The City Council of Los Angeles, Cal., enacted an ordinance on March 13, effective April 13, applying the boulevard stop system to some streets devoted to street car lines. The boulevard stop system was tested on two main thoroughfares for several months, but protected only automobile traffic. The ordinance requires that all vehicles crossing certain streets must stop before passing the line of intersection. In the summary of Los Angeles traffic conditions made by George Baker Anderson, manager of transportation of the Los Angeles Railway, at the Midyear Meeting of the American Electric Railway Association and published in the ELECTRIC RAILWAY JOURNAL of March 8, page 372, mention was made of the boulevard stop plan then being of benefit only to traffic of largely non-necessity type.

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Foreign News

Through Service in London

Through electric trains will be running between Hendon, Middlesex, and Moorgate Street in the city of London, England, by the middle of April. This is made possible by the completion of the connecting line between the Charing Cross and Hampstead Railway and the City & South London Railway, the connecting line being from Euston to Camden Town, and the opening of the reconstructed northern section of the City & South London line from Euston to Moorgate. Reductions in time of trips between various points will be from 5 minutes to a half hour.

In the rejuvenation of the City & South London Railway, the whole of the tunnels between Euston and Moorgate have now been enlarged to the standard diameter of the other tube lines. All the platforms have been lengthened to accommodate the longer trains. The Angel Station has been practically rebuilt and high speed lifts are being installed, while Moorgate is to have a larger station equipped with escalators and having a capacity of 10,000 passengers an hour.

Java Electrification Progresses

According to United States *Commerce Reports* rapid progress is being made by the railway authorities of Java with the electrification of the principal lines of that island. Completion of the work of constructing the power house at Tjibadak near the city of Solkaboemi, Java, and the transmission line from the power house to Batavia, a distance of 100 km., is expected to take place by June of the coming year. In addition to supplying power to the Batavia Loop Line the plant at Tjibadak, which will distribute at 70,000 volts, will also supply current for the city of Batavia and for Solkaboemi. The present plant of the Batavia Electric Light Company will be kept as a reserve station. It is said that the current will be very cheap, but the rates have not yet been made public, nor is it definitely known whether the electric light company will reduce its rates, which are rather high at present. The company has an exclusive franchise.

French Deficits to Be Lowered by Electrification

The French Minister of Public Works makes known the following figures as showing the deficits in railway operation in France during the last three years:

OPERATING DEFICITS OF FRENCH RAILWAY SYSTEMS, 1921-1923

Systems	1921 Francs	1922 Francs	1923 Francs
State	642,000,000	383,000,000	460,000,000
Alsace-Lorraine	78,000,000	82,000,000	50,000,000
Nord	247,000,000	119,000,000	188,000,000
Est	159,000,000	7,000,000	55,000,000
Paris, Lyons, Mediterranean	407,000,000	244,000,000	180,000,000
Paris-Orleans	369,000,000	237,000,000	215,000,000
Midi	186,000,000	156,000,000	140,000,000

Of these companies the Midi, the P.L.M. and the Paris-Orleans have the most extensive electrical projects under way, principally in the Alps and Pyrenees. Various short-line feeders are already in operation and others are about to be put into service. It is claimed that with lighter, shorter, more frequent trains on short lines and the general saving in coal resulting from the electrification schemes which will be in operation throughout in from three to five years these deficits will be completely annulled. Incidentally, the present week fares and freight have been raised on all French railways, 50 per cent for the former and 12½ per cent for the latter.

Receipts of Paris Lines

The Metropolitan subway section of the Paris Transports en Commun during the calendar year of 1923 had receipts of 160,786,133 francs, corresponding to the sale of first and second class and workmen's return tickets to the number of 468,845,616.

The Compagnie Générale Parisienne de Tramways, the street car section of the all-inclusive Transports en Commun of the Paris district, increased its profits in 1923 by 1,245,590 francs as compared with 1922, the total profit of 1923 being 4,370,222 francs. It is proposed to use this entire profit for retiring priority shares, after first raising dividends 1 franc per share. Priority shares thus earn 16 francs and ordinary shares 13.50 francs. It may be mentioned that this profit really comes from the sale of property, rather than from operating.

Progress in Austrian Electrification

The electrification costs of the Austrian Railways from the middle of 1919 up to the close of November, 1923, as announced by the Austrian Federal Railways was 375,000,000,000 crowns, of which 270,000,000,000 were expended on the Arlberg line, 80,000,000,000 on the Salzkammergut railways, and 25,000,000,000 on the Mallnitz and Stubach plants. The budget for 1923 allocated 223,000,000,000 crowns for railway electrification. This amount was recently increased to 300,000,000,000 crowns in order to carry on the building activities to advantage. The same amount is set aside in 1924.

The operation of the electrified Innsbruck-Landeck section of the Innsbruck-Telfs line was commenced in July, 1923, and a trial run was successfully made on the Telfs-Landeck section in December last. Operation on the Innsbruck-Bludenz line after completion of the Spullersee plant is scheduled to take place in 1925. The cost of the locomotives to be used on the Innsbruck-Bludenz line will have to be carried over to 1925. Upon completion of the contemplated building activities 270 km. of Austrian federal lines will be electrified by the commencement of 1925.

A partially electrified operation will result in a considerable economy of coal, as the saving for 1924 alone is estimated at 25,000,000,000 crowns or $360,000. Progress has been made in electrifying several stretches of the Austrian railway and some of the most difficult tasks were accomplished during the summer of 1923, according to recent commerce reports.

African Electrification in Prospect.—The Congo Railway will be rebuilt. The work has been started on two sections. Supplementing the original proposal, according to the *African World*, the line will now be electrified, using the trolley system. It is believed that four years will be required to change over the line, which is at present narrow gage and 400 km. long.

Railway Proposed in Spain.—A committee from one of the industrial centers of Spain recently waited on the government in Madrid to secure authorization for the construction of an electric railway between Corunna and Santiago, and at the same time to request the government to guarantee interest of 5 per cent on capital already invested. Construction will begin as soon as authorization is granted.

Nice Tramway Gains.—The Compagnie de Tramways de Nice, France, had receipts for the calendar year of 1923 of 12,689,636 francs, as compared with 11,231,110 francs in 1922. For at least seven months of the year this line caters to a vast tourist traffic, it being estimated that in the height of the season the normal population, some hundred and fifty thousand, more than doubles itself.

Another Tramway Into London.—The construction has been authorized of an extension to the tramway of the London County Council across Southwark Bridge with a northern terminus at Queen Street Place, within almost a stone-throw of the Bank of England and the Mansion House. The extension still must obtain the sanction of Parliament.

Electrification Planned for South Manchuria.—A project is being worked out to electrify the lines of the South Manchuria Railway, which operates a system of railroads between Fusan, Seoul, Mukden, Dairen and Changchun. The engineers have calculated that the fall in the Yalu River at a point 100 miles north of Antung is sufficient to develop 100,000 kw. of electrical power. It is likely that the section of the road between Mukden and Dairen, about 200 route-miles, will be the first to be electrified. The intention is also to supply power, light and heat from the hydraulic plant, using the surplus power in the development of agriculture.

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Financial and Corporate

$12,815,416 Divided in Chicago

This Amount Split Between Two Companies Before Payment of One Made to City

Residue receipts of the Chicago Surface Lines for the year ended Jan. 31, 1924, were $12,815,416. This sum was divided on the basis of $7,689,249 to the Chicago Railways and $5,126,166 to the so-called South Side Lines. These amounts include, of course, the city's 55 per cent of the net divisible receipts as defined in the 1907 settlement ordinance.

As of Feb. 1, 1923, the total purchase price at which the city could recapture the properties was $160,944,225, while on Feb. 1, this year, that price stood at $162,161,129. During the seventeen years of the ordinance period the companies have increased their facilities for serving the public by capital expenditures of $106,386,000, or a yearly average of more than $6,250,000.

Comparisons of statistics of the Surface Lines system at the end of the first year of unified operation (Jan. 31, 1915) and at the close of the tenth year (Jan. 31, 1924) follow:

Item	1915	1924	Per Cent Increase
Gross earnings	$31,966,049	$57,655,170	80.36
Operating expenses	$19,889,276	$44,839,753	125.45
Total wages paid	$12,379,615	$29,744,012	140.27
Revenue passengers carried	627,731,550	824,850,103	31.40
Total rides	1,115,312,129	1,467,344,286	31.56
Average fare per revenue passenger	4.99c	6.91c	38.48
Average fare per ride	2.81c	3.88c	38.08
Trainmen in service	8,847	11,745	32.76

During the ten-year period of unified operation $52,017,331 has been paid out for public benefits. Since the 1907 ordinances a total of $85,752,727.08 has been paid out for similar purposes.

In June, 1920, revenue passengers on the system reached a new daily average high peak of 2,238,760. After that business fell off and this record was not reached until March of last year. It was again passed in April, May, June, October, December and January —the highest mark being October, with 2,327,181. The highest traffic day was Dec. 15, 1923, when 2,690,857 revenue passengers were hauled, total rides on that day being 4,688,158.

In the combined system are included 1,063 miles of single track. The rolling stock equipment consists of 3,904 cars, of which 3,417 are passenger cars.

During the year 219 passenger cars were added to the equipment divided as follows:

169 double truck two-man cars (of which 69 were built at company shops);

43 double truck one-man cars (built at company shops);

7 trail cars (to replace an equal number destroyed in Devon Avenue car house fire).

The shops are now constructing twenty-three double truck two-man cars.

As an illustration of increased use of equipment the following figures for various years are of interest:

Year Ending	Av. Miles per Car
1-31-24	37,400
1-31-23	37,152
1-31-22	37,226
1-31-21	37,122
1-31-20	36,195
1-31-19	35,871

Henry A. Blair, president, in reviewing the affairs of the company, says that since the coming into office of Mayor Dever and a new Council of fifty members the fairest relations have prevailed between the new administration and the management of the companies and that the outlook is for a continued square deal. Public relations have also been improved during the year. Reference is also made to the wage arbitrations during the year and to the award to Amalgamated men of 3 cents an hour more during the year starting June 1, 1923, and an additional 2 cents an hour during the year which will begin on June 1, 1924. So far as the bus is concerned, Mr. Blair indicates that the principle appears to be pretty well established in Illinois at least that it would be contrary to public policy to authorize competing lines where the existing carriers are furnishing an essential service.

On June 1 the company established its own insurance department. After a thorough inspection of the various properties and a comparison of insurance rates and schedules, an average rate reduction in policies of nearly 50 per cent was made effective on the date of expiration, Oct. 4, for a period extending to Feb. 1, 1927. The actual saving in premium was at the rate of $94,685 a year, or $310,883 for the period. Savings were also effected in cost of burglary, holdup, automobile and

EARNINGS STATEMENT OF THE CHICAGO SURFACE LINES FOR TWELVE MONTHS ENDED JAN. 31

	1923	1924
Earnings:		
Passenger cars (including M. C.)	$55,495,310	$56,985,687
Chartered cars	9,594	7,942
Newspaper cars	15,868	13,618
Freight earnings	1,864	3,023
Hospital car service	5,078	5,870
Advertising	253,677	260,804
Rents of buildings, etc.	100,244	141,349
Sale of power	89,340	95,993
Interest on deposits	119,032	126,864
Miscellaneous	13,054	13,019
Gross earnings	$56,103,061	$57,655,169
Expenses:		
Way and structures	$2,556,627	$2,682,066
Equipment	3,788,170	3,858,865
Renewals	4,488,244	4,612,413
Power—maintenance	316,449	361,955
Power—operation	3,175,390	3,321,683
Conducting transportation—trainmen	19,662,636	19,640,721
Conducting transportation—other	2,912,780	3,030,585
Traffic	42,097	44,208
General and miscellaneous—damages	2,356,328	2,421,517
General and miscellaneous—other	1,859,348	1,695,740
Taxes	3,258,000	3,170,000
Total expenses	$44,416,069	$44,839,753
Residue receipts	*$11,686,992	*$12,815,416
Divided:		
Chicago Railways 60 per cent	*$7,012,195	*$7,689,249
South Side Lines—40 per cent	*4,674,797	*5,126,167

* Includes city's 55 per cent of net divisible receipts, as defined by ordinances.

REVENUE PASSENGER STATISTICS OF CHICAGO SURFACE LINES

Year Ended	Weekday Average	Saturday Average	Sunday* Average	Total for Year
Jan. 31, 1924	2,354,139	2,521,487	1,623,414	824,850,103
Jan. 31, 1923	2,204,425	2,356,385	1,563,911	762,629,211
Jan. 31, 1922	2,129,217	2,251,293	1,560,310	750,515,622

* Includes holidays.
Trainmen's strike Aug. 1 to 6, 1922, inclusive.

STATISTICAL DATA OF CHICAGO SURFACE LINES FOR THE FISCAL YEARS ENDED JAN. 31

	1918	1919	1920*	1921†	1922	1923‡	1924
Rate of fare	5 Cents	5 Cents	5 Cents	6 Cents	8 Cents	8 Cents	7, 6 2/3 Cents
Revenue passengers	692,815,889	685,300,718	743,746,584	769,025,413	750,515,622	762,629,211	824,850,103
Passenger receipts	$34,566,601	$34,186,578	$43,417,639	$54,726,740	$59,706,412	$55,495,310	$56,986,687
Total earnings	35,114,633	34,710,097	43,963,438	55,327,384	60,343,733	56,103,061	57,655,169
Operating wages	12,854,406	14,768,088	19,854,173	28,204,341	29,676,981	27,163,996	27,458,736
Other operating expenses and taxes	10,247,289	10,963,848	13,399,841	15,096,050	16,839,168	17,252,072	17,381,016
Residue receipts	12,012,937	8,978,160	10,709,423	12,026,992	13,827,583	11,686,992	12,815,416
Less: Joint account expenses	648,205	478,831	181,862	164,733	449,000	620,000	885,000
	$11,364,731	$8,499,329	$10,527,561	$11,862,258	$13,378,583	$11,066,992	$11,930,416
5 per cent on purchase price	$7,661,542	$7,802,574	$7,893,292	$7,974,289	$8,024,104	$8,039,343	$8,076,569
55 per cent to city	$2,036,754	$383,216	$1,448,848	$2,138,383	$2,944,963	$1,665,207	$2,119,616
45 per cent to companies	$1,666,435	$313,539	$1,185,421	$1,749,586	$2,409,516	$1,362,442	$1,734,231

*5-cent fare in effect 2-1-1919 to 8-7-1919; 7-cent fare in effect 8-8-1919; to 11-30-1919; 7-cent, 6½-cent and 6-cent fare in effect 12-1-1919 to 12-26-1919; 6-cent fare in effect 17-27-1919 to 1-31-1920. †6-cent fare in effect 2-1-1920 to 6-30-1920; 8-cent fare in effect 7-1-1920 to 1-31-1921. ‡8-cent fare in effect 2-1-1922 to 6-14-1922; 7-cent fare and 6½-cent fare 6-15-1922 to 1-31-1923.

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other forms of insurance. An inspection system was put in effect to maintain the highest standards in general housekeeping and fire prevention.

The balance in the reserve for renewals on Feb. 1, 1923, was $12,366,120. The similar balance on Feb. 1, 1924, was $13,141,525. The balance in the special reserve on Feb. 1, 1924, was $1,396,117, so that the total balance on Feb. 1, 1924, was $14,537,642. This balance is a cash balance and is on deposit in various banks.

Surplus of Hudson & Manhattan Larger

The report of the Hudson & Manhattan Railroad, operating under the Hudson River between New York and New Jersey, for the year ended Dec. 31, 1923, shows a surplus of $1,356,355, after taxes and bond interest including adjustment income bonds compared with $835,731 in the preceding year. After allowing for 5 per cent dividend requirements on the preferred stock the balance of surplus available is equivalent to $2.73 a share on the $39,994,890 of outstanding common stock, compared with $1.43 in 1922.

President Oren Root says that while the net return from railroad operations shows a satisfactory increase during 1923 it is still very much less than the 5.75 per cent determined by the Interstate Commerce Commission as a fair return upon the aggregate value of the railway property of carriers as defined in Section 15-A of the interstate commerce act.

The income account for 1923 compares as follows:

	1923	1922
Operating revenue	$8,228,522	$7,862,419
Expenses and taxes	4,634,287	4,494,372
Operating income	$3,594,235	$3,368,047
Other income	1,553,954	1,291,365
Non-operating income	279,245	264,154
Total income	$5,427,434	$4,923,557
*Bond interest, etc	$2,425,979	$2,432,726
Balance	$3,011,455	$2,490,831
Adjustment in bond interest	1,655,100	1,655,100
Surplus	$1,356,355	$835,731

* Exclusive of interest on adjustment income bonds.

Fewer Passengers Being Carried in Grand Rapids

A decrease of 954,819 passengers during 1923 on the Grand Rapids Railway is reported in an audit received by City Manager Locke from James B. Hogarth, Chicago. Every line carried fewer passengers in 1923 than in the previous year, totals for the two years being 23,103,961 and 24,058,780 respectively.

Gross receipts for 1923 were $1,818,318, and after deducting $1,119,114 for operating expenses, $135,543 for taxes and $171,696 for depreciation, a net income of $391,543 was reported.

The auditor investigating for the city determined that $457,857 was necessary to provide the 8 per cent which the city has agreed the company should receive. The report also showed that the deficit found by Mr. Hogarth corresponded with the company's own audit, which the city wished to check following a recent fare raise of from seven to six rides for 50 cents.

Mr. Hogarth said he believed that when the riding habit grows there should be a reflection at once in the affairs of the company of an ability to lower the present rate of fare.

Only in March and April was there an increase in the number of passengers over the previous year. Tickets were purchased by 83 per cent of the riders, while the rest paid the alternative straight 10-cent fare.

The valuation on which the company is permitted to earn a return increased during the year from $5,605,704 to $5,814,509.

Labor Troubles Affect Mexican Results

The net income of the Mexico Tramways for the year ended Dec. 31, 1922, was $2,097,918 in Mexican currency. In 1921 in Mexican currency the net earnings amounted to $2,335,436. This fact was disclosed in the ninth annual report recently submitted to the shareholders. The total expense from operation plus maintenance and taxes was $10,244,498 in 1922, compared with $10,139,854 in 1921. An allowance of $600,000 was made for depreciation in 1922. The total number of first and second-class passengers was 109,286,678 in 1922 and 110,708,925 in 1921.

In accordance with the program of the company developed in connection with the reorganization two half-yearly coupons on the first mortgage bonds of the company were paid during 1922. Interest still in arrears at the end of 1922 on the first mortgage bonds is $3,278,450, while the unpaid interest on the 6 per cent mortgage bonds is $3,627,443.

In an appendix G. R. G. Conway, managing director resident in Mexico, stressed the labor agitation which he said had a marked influence on the growth of the jitney competition. To meet this competition he said it would be necessary to rearrange a number of its existing routes and also to add very considerably to the rolling stock.

Rochester Reports Surplus for Quarter

Operations of the Rochester lines of the New York State Railways for the quarter ended Jan. 31 show a surplus of $25,118. So reports Commissioner of Railways Charles R. Barnes. The report covers the operations both of the street car and bus and trackless trolley lines in the city. The bus and trolley bus routes are operated by the Rochester Co-ordinated Bus Lines, Inc., a subsidiary of the New York State Railways.

The operation of buses, which began on Nov. 1, 1923, show a deficit of $2,836.

On the Dewey Avenue motor bus line 23,156 cash and 11,988 transfer passengers were carried during the quarter. The trackless trolleys carried 163,256 cash and 82,480 transfer passengers. In all 18,563 bus miles were run on the bus line and 42,513 on the crosstown trolley bus system.

The total revenues were: Dewey Avenue bus line: $4,467; trolley bus line, $10,134.

Advice of Court Sought on St. Louis Valuation

Definite court action toward accepting the Missouri Public Service Commission's valuation of $53,620,059 was taken by Counsellor Rolla Wells, receiver for the United Railways, St. Louis, on March 22. On that day an application was filed in the United States District Court asking the court for advice on the advisability of withdrawing a petition for a review of the state board's valuation.

Both Mr. Wells and the city of St. Louis had applied previously for a Circuit Court review of the commission's findings, but several days ago it was announced that the receiver and financial interests connected with the United Railways had decided to ask the court for instructions with respect to accepting the valuation in view of the desirability of lifting the receivership as promptly as possible and of avoiding litigation that probably would consume at least another two years.

A motion has also been filed in the Federal Court on looking toward a consolidation of the various foreclosure suits now pending against the company. This motion was submitted on March 24 without argument as counsel for the Suburban bondholders, who have been contending for a separate valuation of that part of the United Railways, cannot say what their attitude will be until the valuation matter has been finally disposed of.

Motions to dismiss the foreclosure suits also were submitted without argument. Federal Judge Faris several days ago overruled a similar motion. The dismissal motions raise the question of the court's jurisdiction. As the court has already held that it has jurisdiction the new motion will probably be overruled also.

P. R. T. Proposals Accepted at Meeting

The stockholders of the Philadelphia Rapid Transit Company, Philadelphia, Pa., at a recent meeting adopted several resolutions recommended by the management. One provided for the renewal of the present agreement between the company and T. E. Mitten, upon the same terms, but with Mitten Management, Inc., rather than with T. E. Mitten personally. Another resolution approved the payment of a co-operative wage dividend of not more than 10 per cent of the annual wage for 1924, to be paid employees after the payment of the regular 6 per cent dividend to the stockholders. A third resolution gave the consent of the stockholders to the proposed increase of the company's indebtedness from $15,000,000 to $25,000,000. Another approved a guarantee given by the company to an issue of $3,500,000 of first mortgage, 6 per cent real estate bonds of C. Benton Cooper, dated Jan. 1, 1924, undertaken in connection with the sale of these bonds. The final resolution gave consent to the company's becoming guarantor of notes, and other obligations that may be issued in connection with the development of the bus business of the Philadelphia Rural Transit Company.

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$8,496 Increase in Duluth-Superior Net

The gross revenue of the Duluth-Superior Traction Company, Duluth, Minn., for the year 1923, after adjusting the passenger revenue to include receipts from the use of conditional redeemable coupon tickets, shows an increase of $121,589, or 6.71 per cent as compared with the figures in the report for the year 1922.

Operating expenses for 1923 show an increase of $95,622 over 1922. This increase is due to increased service and better upkeep of the equipment and track.

General taxes in the city of Duluth and the federal corporation income taxes increased $18,501 over the previous year.

The net income for 1923 transferred to profit and loss shows an increase of $8,496 over the year 1922.

In accordance with the order of the Railroad Commission of Wisconsin the company began to collect a 10-cent cash fare and to sell tickets at the rate of five rides for 30 cents in Duluth on Oct. 1, 1923, but it was deemed too early for the purpose of the annual report to attempt to state with any degree of accuracy the effect of this rate upon the earnings.

CONDENSED INCOME STATEMENT OF THE DULUTH-SUPERIOR TRACTION COMPANY

	1923	1922
Operating revenue	$1,904,606	$1,784,774
Operating expenses	1,500,987	1,405,365
Net revenue	$403,618	$379,408
Taxes	134,991	116,489
Operating income	$268,627	$262,919
Total non-operating income	28,730	26,973
Gross income	$297,357	$289,892
Interest of funded debt, etc.	174,247	175,277
Net income transferred to profit and loss	$123,110	$114,615
General mortgage sinking fund payment	25,284	20,614

STATISTICAL STATEMENT OF DULUTH-SUPERIOR TRACTION COMPANY

	1923	1922
Total revenue	$1,933,337	$1,811,747
Total operating expense including depreciation	$1,500,987	$1,405,365
Net revenue	$432,349	$406,381
Revenue passengers carried	31,343,815	32,036,900
Transfers redeemed	5,354,872	5,366,154
Operating, per cent of revenue, taxes included	84.62	84.00
Per cent on preferred stock, paid	6.00	5.00
Per cent on common stock, paid	1.00	.00

Birmingham Sale Continued

The sale of the Birmingham Railway, Light & Power Company's property, Birmingham, Ala., which was advertised to have taken place on March 24, was continued until March 31 on the grounds that the receivers of the company thought best to make final settlements of some franchise extensions with the Birmingham city commissioners, and also some other agreements with the city. All of these matters are now straightened out, it is announced, and the sale will take place on the last day of March.

The sale of the Tidewater line, which is included in a separate company, but which is under the same control as the Birmingham Railway, Light & Power Company, was also advertised for sale. The sale of this line was likewise continued until March 31.

The bulk of the stock of the Birmingham Railway, Light & Power Company is owned by the National Power & Light Company, and this company is expected to bid on the purchase of the entire concern, it is announced.

The Tidewater line runs from East Lake to Ensley, a distance of about 15 miles. Much of the territory along the line is thinly settled, hence the traffic over this line is not heavy.

Extension of Maturity Date Proposed

Holders of the 6 per cent five-year first mortgage bonds of the Michigan Railroad, Jackson, Mich., due on May 1 this year, will probably receive an offer in the next few days for an extension of maturity date on the bonds in exchange for a bonus of between 20 and 25 per cent in preferred stock.

Earnings of the company, it was pointed out, while sufficient to meet all interest payments and provide a sinking fund, which has taken care of a large part of the bonds, were insufficient to make attractive to investors an issue of refunding bonds just at this time.

The bonds were issued on May 1, 1919. They are outstanding to the amount of $4,050,000, and are a first mortgage on approximately 159 miles of electric railroad from Grand Rapids to Kalamazoo to Battle Creek, and from Bay City, through Saginaw, to Flint.

Auction Sales in New York.—At the public auction rooms of A. H. Muller & Sons there were sold this week 100 shares of the Interborough Consolidated Corporation preferred, $2 a lot.

Bond Issue Authorized.—The Holyoke Street Railway, Holyoke, Mass., at its recent annual meeting authorized the issuance of $200,000 in bonds, maturing in 1935, to pay for improvements and equipment since 1915.

Trolleys Will Go.—Notices have been posted by the York Utilities Company, York Beach, Maine, which state that the railway between Kennebunk and York Beach will be discontinued after March 31. S. T. Dow, manager of the road, has also sent letters to this effect to the Selectmen of Kennebunk, Wells and York. This section of the York Utilities Company line has not been a paying proposition for a number of years.

Track Abandoned Permanently.—The Massachusetts North Eastern Railway has permanently abandoned the 14 miles of track from Nashua, N. H., to Pelham. The Nashua Street Railway, under a three months lease, will run cars to Hudson Center, and Pelham officials have been in consultation with the Nashua company endeavoring to have it extend operations through Pelham. The New Hampshire Public Service Commission has given the Nashua company six months to buy the roadbed at $3,000 a mile. If this offer is not accepted the road will be torn up.

Prior Preferred Stock Offered.—The National City Company, New York, is offering at 98 and accrued dividend yielding more than 7⅛ per cent $500,000 of the 7 per cent accumulative prior preferred stock of the Portland Railway, Light & Power Company, Portland, Ore. The stock is known as Series A. The proceeds will reimburse the company for construction expenditures, including those in connection with its new hydro-electric station.

Reduction in Taxes Ordered.—In line with the decision recently rendered by Federal Judge John G. Sater, reduction of taxes of the Columbus, Delaware & Marion Electric Company, Columbus, Ohio, amounting to $180,000, was ordered by Judge G. M. Wright, Marion. Recently Judge Sater held that public utilities should not be forced to pay taxes proportionately greater than those assessed against real estate in the district in which they operate. The property value was accordingly cut from $3,106,120 to $2,851,828. The company owns and operates city railway service in Marion and Delaware.

Town Takes Over Road.—The 7-mile stretch of electric railway between Athol and Orange, Mass., was taken over by the town of Athol March 22 and operation under a municipal commission of three members was commenced March 24. The plan of selling twelve tokens for 50 cents will be maintained. Each token is good for one zone, but nothing less than two tokens are collected, however short the ride. The taking over of the road has been delayed several times. It was necessary, finally, to introduce a bill in the Legislature to allow the town to operate the road, as it lies partly in Orange.

Asks Rehearing on Dues.—The Denver Tramway, Denver, Col., has asked for a rehearing in the matter of dues on its franchise. The United States Circuit Court of Appeals had decided against the property, ordering the company to pay the city the sum of $205,000 in back dues. When the city started the suit the tramway owed it $60,000, the amount increasing $5,000 monthly. The company paid it until it went into the hands of a receiver. It has been trying to place franchise dues in the same class as any ordinary bill. The court has decided against this practice.

Operation Will Cease March 30.—D. P. Abercrombie, receiver for the Connecticut Valley Street Railway, Greenfield, Mass., says that the line from Greenfield to Northampton will cease operation on March 30. At the annual town meeting on March 17, voters of Greenfield authorized the selectmen to negotiate with the receiver for the purchase of the line from Greenfield to Turners Falls, co-operating to that end with the town of Montague.

Taxes Increased.—The Athens Railway & Electric Company, Athens, Ga., has paid to the city of Athens taxes amounting to $3,000 on its gross income for 1923. The tax was about $300 more than was paid in 1922.

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Abandonment Recommended in Atlanta.—Recommendation that the railway on Jackson Street between Auburn and Forrest Avenues, on Mills and on Richardson Streets, Atlanta, Ga., be abandoned has just been made before the streets committee of the City Council by Preston S. Arkwright, president of the Georgia Railway & Power Company. This course was urged in a statement to the effect that the company is unable at present to meet the city assessments towards paving these streets. Mr. Arkwright said that paving assessments levied against the railway this year bid fair to reach a total of $360,000. He said that if the company paved Kelly Street, Edgewood Avenue, Richardson Street, South Boulevard, Copper Street, Jackson Street and Peachtree Road, outside the city, it would cost $360,000 and possibly more. Yet that was what the city wanted the company to do.

Repurchase Proposed.—The Montreal Tramways & Power Company, Montreal, Que., is said to intend to exercise its option for the repurchase of the Canadian Light & Power Company. The latter company is at present owned by the Montreal Public Service Corporation (now the Quebec & New England Hydro-Electric Corporation). It will be recalled that minority shareholders criticised the sale of these properties by the Tramway & Power Company during the controversy of a few months ago. It came out at that time that the Montreal Tramway & Power Company had sold the Canadian Light, Heat & Power Company to the Public Service Corporation in order that the company could pledge the common stock and bonds as security for a bond issue. A recapture clause was put in the agreement of sale and the Montreal Tramway & Power Company has until July 2 to repurchase the securities that were transferred and pledged. The directors, it is learned, have decided to exercise their option and thus bring the Canadian Light & Power Company, with its 20,000 hp. plant at St. Timothee, directly under their control.

$39,000 Surplus in Worcester.—Gross earnings of the Worcester Consolidated Street Railway, Worcester, Mass., for the year ended Dec. 31, 1923, increased $144,736. The company finished the year with a surplus of $39,000, approximately the same surplus as was reported a year ago. Operating expenses increased $155,659 over the previous year. Gross revenues for the year were $4.544,132, compared with $4,399,396 in 1922. The operating expenses for 1923 totaled $3,601,755, compared with $3,446,095 in 1922.

Partial Discontinuance Authorized.—The Pacific Electric Railway, Los Angeles, Cal., has been authorized by the Railroad Commission to suspend, until further order, operation of its passenger service on the Laurel Canyon line of its western division, between Gardner Junction and along Sunset Boulevard to the end of the line. Bus service paralleling the rail service is now being given on Sunset Boulevard by the Los Angeles Motor Bus Company, in which the railway is interested, and discontinuance of railway service has been requested by the Board of Public Utilities of Los Angeles.

Personal Items

T. H. Kendrigan Elected New England Club President

Thomas H. Kendrigan, superintendent of the Manchester Street Railway, was elected president of the New England Street Railway Club at its business session on March 27. Except for a short term of service in the textile industry Mr. Kendrigan's entire career has been spent in the railway business. He began street railway work as a motorman on the former Lowell, Lawrence & Haverhill Street Railway. This was in May, 1899. After two years on this property he took a similar position on the Manchester Street Railway, but at the end of one year he changed to the claim department. In 1912 he was appointed superintendent of the Manchester Street Railway, though still retaining the duties of claim agent. Both positions he has occupied ever since.

T. H. Kendrigan

Mr. Kendrigan was born in Ireland on Jan. 3, 1860. His parents removed to Manchester when Mr. Kendrigan was a child. He was educated in the public schools of that city. As was indicated previously, he was first employed in the textile industry in Manchester and later was employed in the Pacific mill at Lawrence, Mass., as a loom repairer from 1895 to 1899. He then began his railroad career. Mr. Kendrigan has always taken an active part in the work of the New England Street Railway Club. Last year he was vice-president of the club, representing New Hampshire.

Louis O. Hoff has succeeded Roy S. Preston as commissioner of public property in Pekin, Ill. He has charge of the Pekin Municipal Railway.

M. Williams is now treasurer of the Peoria Railway Terminal Company, Peoria, Ill., succeeding H. E. R. Wood.

E. J. Hinely has been appointed purchasing agent of the Savannah Electric & Power Company, Savannah, Ga., filling the vacancy caused by the death of F. M. Martzall. Mr. Hinely's appointment is a promotion. He had served in the storeroom as a stock clerk for a number of years.

A. C. Babson has been added as one of the vice-presidents of the Northern Indiana Power Company, Kokomo, Ind.

J. H. Seabright has succeeded B. R. Kuss as claim agent of the Gary & Valparaiso Railway, Gary, Ind.

V. H. Sayre has replaced R. N. Weaver as freight claim agent of the Ford Dodge, Des Moines & Southern Railroad, Boone, Iowa.

S. B. Severson, at one time president and general manager of the Manhattan & Queens Traction Corporation, New York, N. Y., has been appointed general manager of the natural gas subsidiaries of the Cities Service Company with headquarters in Buffalo.

F. H. Bird has succeeded Arsene Pujo as vice-president of the Lake Charles Railway, Light & Water Works Company, Lake Charles, La.

George Kelly has succeeeded C. W. DeForest as chief engineer of the Cincinnati, Newport & Covington Railway, Covington, Ky.

T. J. Clements has replaced E. A. Turpin as superintendent of transportation of the Miami Beach Electric Company, Miami, Fla.

F. W. Woodstock has succeeded Nicholas G. Roosevelt as vice-president of the Washington-Virginia Railway. Mr. Woodstock's headquarters are in Philadelphia.

V. A. Sisler has replaced R. W. Crowell as purchasing agent of the Washington Railway & Electric Company, Washington, D. C.

W. E. King, formerly engineer way and structures of the Washington & Old Dominion Railway, Washington, D. C., is now chief engineer.

John W. Stanley has succeeded Allen Blanchard as master mechanic of the Hartford & Springfield Street Railway, Warehouse Point, Conn.

C. P. Landry has succeeded E. D. Loper as master mechanic of the Columbus Electric & Power Company, Columbus, Ga.

Fred C. Morton is now general superintendent of the Savannah Electric & Power Company, Savannah, Ga.

T. B. Webber, formerly secretary of the Kankakee & Urbana Traction Company, Urbana, Ill., has taken on the duties of vice-president as well. In the latter capacity he succeeds U. G. Fowler, who also performed the duties of treasurer.

F. A. Jordan has succeeded J. P. Dick as purchasing agent of the Atlanta Northern Railway, Atlanta, Ga.

John T. Jackson of New Orleans has been appointed special master in chancery in the New Orleans Railway & Light Company case by Judge Rufus Foster of the United States Court for the Eastern District of Louisiana. Mr. Jackson is a member of the firm of D. B. H. Chaffe, who held this office up to the time of his death, a few weeks ago.

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J. M. Pneuman, well known in the Mid-Western electric railway field, has entered the commercial field as manufacturer's agent for electric railway supplies and equipment, operating from Berea, Ohio, a suburb of Cleveland. He will handle the products of the Columbia Machine Works & Malleable Iron Company. Mr. Pneuman's experience with electric railways started in 1902 as motor and controller inspector with the Brooklyn Rapid Transit Company, on the elevated division in East New York when electric service supplanted the steam. Leaving in 1906, he went with the Westinghouse Electric & Manufacturing Company at East Pittsburgh as wireman on New York, New Haven & Hartford Railroad locomotives and from that time until 1912 served in different capacities at East Pittsburgh and Stamford, Conn., in the electrification of the New Haven road in the rolling stock department. He has also been identified with the Allen & Peck Corporation as master mechanic of the Annapolis Short Line, Maryland, and with the Buffalo, Lockport & Rochester Railway. A few years ago he started in the practice of consulting engineering, which he has followed up to the present time.

Obituary

F. M. Martzall, formerly purchasing agent of the Savannah Electric & Power Company, Savannah, Ga., died recently.

F. A. Blanchard, lubrication engineer, for the past five years with the Texas Company in the electric street railway division, died in the Elizabeth, N. J., General Hospital on March 13, following an operation. Mr. Blanchard was connected with the S. L. Moore Engineering Company at Elizabeth, N. J., for a number of years before he became connected with the Texas Company.

Transportation Then and Now in Louisville

The Louisville Railway, Louisville, Ky., over the past several days has given an exhibit of progress in the form of an old mule car used in 1880 and one of its new double-truck Kuhlman cars that has just been received. The car of 1880 cost $1,000. It was 18 ft. over all and weighed 4,500 lb. It had a seating capacity of twenty-four persons and was drawn by one or two mules. The 1924 car cost $13,000. It is 45 ft. 1½ in. over all, weighs 39,000 lb., seats forty-six persons and has four 40-hp. motors.

So that the public could see and appreciate the progress made in car development, the company placed one of the new cars and the little old mule car on a siding track in the heart of the downtown district. The company had made a picture postcard containing a view of the two cars and called it "Forty-four Years of Street Railway Transportation." In small type printed on the card the public was asked to compare the type of car built in 1880 with the new car just purchased. Facts concerning the cost, weight and seating capacity of each car were also given.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

G. E. Enlarges Its Repair Shops

A recent review of the supply and repair parts required in connection with the great variety of apparatus manufactured by the General Electric Company has led to the establishment of a wider and more adequate group of service and repair shops.

In addition to the service and repair shops maintained at all General Electric factories, thoroughly equipped shops have been installed and are in operation at the following points: Atlanta, Chicago, Los Angeles, New York, Kansas City, Minneapolis, Oakland, Philadelphia, St. Louis and Seattle. The personnel and facilities of these shops prepares them for any form of service work on machines up to 500 hp. In some of the larger shops apparatus of any size can be handled.

These shops are also prepared to furnish competent men on short notice in case of accidents or for any emergency work. An enlarged system of distributing replacement and supply parts is also in effect.

Galvanizing Plant Being Built for Bates Company

The Bates Expanded Steel Truss Company, Chicago, manufacturer of Bates poles used in electric railway and light service, is building a new galvanizing plant with all equipment of the latest design at East Chicago, Ind. Heretofore, such work has been done for it by outside companies. By doing this work in its own plant the company hopes to speed up deliveries.

A complete handling scheme is expected to decrease production costs and materially improve the shipping service. Five overhead electric carriage cranes are part of the new equipment. The plant is expected to be in actual operation by June 1.

Wire Company to Move

Plans to move all the machinery of the Atlantic Insulated Wire & Cable Company from Stamford, Conn., to Rome, N. Y., have been announced. Transfer is to be made next summer. This addition will make the Rome Wire Company one of the largest manufacturers of rubber-insulated wires and cables in the country.

The Rome company purchased all the capital stock of the Atlantic company in 1922 and since that time the plant of the latter has been continued under its former management, manufacturing rubber-covered wire and cable. The recent death of Edward Sawyer, who had been president of the Atlantic Insulated Wire & Cable Company since its organization, led the officers of the Rome Wire Company to the conclusion that it would be desirable to consolidate the company's operations at Rome.

The land and buildings at Stamford were sold to the Atlas Powder Company on March 5 and under the terms of the sale the Rome Wire Company agrees to remove all machinery prior to Oct. 1. The Atlantic company has been operating with about 200 employees. It has been a large purchaser of copper wire, buying practically all of it from the Rome Wire Company.

Mack Reports Good Bus Business

Mack Trucks, Inc., which recently placed on the market a specially designed passenger-carrying bus, reports the development of this branch of its truck business has been so rapid that directors foresee the necessity for enlarging factories and increasing facilities to handle the amount of business expected in the future. Partly on this account stockholders are being asked to approve an increase in the number of shares of common stock from 320,000 to 500,000. It is not proposed to issue additional shares at present, but it will be possible to take care of expenditures on this account in the future from sale of the proposed authorized shares to stockholders pro rata. Thus a flexible means will be provided to permit the company to work out expansion policies, without depending on current earnings or depriving stockholders of the dividends warranted by current business conditions.

Industrial Lull Causes Decrease in Orders

Sales of the General Electric Company for the first quarter of 1924 are estimated at $66,000,000. This compares with $80,010,045 for the first quarter of 1923 and $74,452,442 for the last three months of 1923. Operations are now about 75 per cent of capacity, having been curtailed as a result of the decline in orders. The reduction in sales is attributed largely to a lull in industrial business.

Metal, Coal and Material Prices

Metals—New York	March 25, 1924
Copper, electrolytic, cents per lb.	13.60
Copper wire base, cents per lb.	16.375
Lead, cents per lb.	9.00
Zinc, cents per lb.	6.712
Tin, Straits, cents per lb.	52.25
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.675
Somerset mine run, Boston, net tons	2.30
Pittsburgh mine run, Pittsburgh, net tons.	2.125
Franklin, Ill., screenings, Chicago, net tons	1.825
Central, Ill., screenings, Chicago, net tons.	1.55
Kansas screenings, Kansas City, net tons..	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.75
Weatherproof wire base, N.Y., cents per lb.	18.00
Cement, Chicago net prices, without bags.	$2.20
Linseed oil (5-bbl. lots) N. Y., per gal.	$0.93
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	12.25
Turpentine, (bbl. lots), N. Y., per gal.	$1.03

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Rolling Stock

Monongahela-West Penn Public Service Company, Fairmont, W. Va., has received two new interurban cars for use between Fairmont and Clarksburg. They will accommodate seventy-two passengers instead of fifty-six, as the present cars do, and are provided with side doors.

Wheeling Traction Company, Wheeling, W. Va., has decided on the details for the twenty-one new cars being built by the Cincinnati Car Company at Winton Place, Ohio. The specifications follow:

Date order was placed.....Feb. 27, 1924
Date of delivery,
Starting June 15, five per week
Builder of car body,
Cincinnati Car Company
Type of car,
Pass. motor; one-man; two-man double-end
Seating capacity 44
Total weight .....32,000 lb.
Bolster centers, length.....21 ft. 6 in.
Length over all.....42 ft. 6 in.
Truck wheelbase.....5 ft. 6 in.
Width over all.....8 ft. 6⅜ in.
Height, rail to trolley base.....10 ft. 6 in.
Body .....Semi-steel
Interior trim .....Cherry
Headlining .....Agasote
Roof .....Arch
Air brakes...Westinghouse semi-automatic, dead-man latch; Safety Car Devices Co.
Armature bearings .....Sleeve
Axles,
Standard Motor Truck Company, 4½ in.
Bumpers,
Channel iron; anti-climber; West Penn Railways
Car signal system.....Faraday buzzer
Car trimmings .....Oxidized bronze
Bearings,
Center and side roller; West Penn Railways
Conduits .....Flexiduct
Control .....Westinghouse K-35-KK
Curtain fixtures..Curtain Supply Company
Curtain material...Pantasote double-faced
Designation signs,
Hunter illuminated side and dash
Door-operating mechanism,
National Pneumatic
Fare boxes .....Cleveland
Fenders..Consolidated Car Fender Company, Type H-B
Gears and pinions.....Nuttall helical
Hand brakes .....Cincinnati geared
Heater equipment.Consolidated; truss plank
Headlights,
Crouse-Hinds incandescent and 250W
Journal bearings,
Sleeve, 3¾ in. x 7 in., MCB
Journal boxes .....MCB
Lightning arresters
Westinghouse condenser type
Motors,
Westinghouse 510-A; four per car, inside hung
Paint .....Enamel
Sanders .....Ohio Brass air operated
Sash fixtures,
National Lock Washer Company
Seats .....Hale & Kilburn
Seating material .....Rattan
Slack adjuster .....Gould Type B
Step treads .....Kass Safety Tread
Trolley retrievers....Ohio Brass Company
Trolley base.....U. S. No. 13
Trucks,
Standard Motor Truck Company, pressed steel
Ventilators.....Nichols Lintern Type A
Wheels.....Rolled steel—26 in. diameter

Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., has received from the Inter-State Car Company five new 40-ft. box cars.

Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., has received from the Inter-State Car Company six stock cars which were rebuilt.

Track and Line

Eastern Wisconsin Electric Company, Sheboygan, Wis., will repair, straighten and level its trackage to eliminate bumps now present on the lines.

Northern Ohio Traction & Light Company, Akron, Ohio, which recently purchased at public auction the properties and equipment of the Cleveland, Alliance & Mahoning Valley Railway, Ravenna, Ohio, has plans underway for the expenditure of $225,000 in improving lines and service of that line.

Louisville Railway, Louisville, Ky., expects to build a double-track loop and siding at Eastern Parkway and Brook Street, to handle the crowds at Parkway Field, the baseball park completed last year.

Indiana Service Corporation, Fort Wayne, Ind., has purchased a 20-acre tract of land just inside the city limits which is to be used as a location for an entirely new maintenance of way department. The tract will be connected to the city lines, two of the interurban lines and the Lake Erie & Western Railroad, thereby providing unlimited switching accommodations for the loading and unloading of cars and carrying materials to and from the yards. The improvements completed will cost more than $100,000.

Power Houses, Shops and Buildings

Escanaba Power & Traction Company, Escanaba, Mich., with the recently acquired Escanaba Paper Company, plans to construct and install new equipment at its hydro-electric plant at Groos, Mich. The improvements are estimated to cost $100,000.

Connecticut Company, New Haven, Conn., has authorized H. R. Stamm, New Haven, to prepare plans for a repair and service station for buses at Waterbury, Conn. The building will be one-story high, 43 ft. x 175 ft.

Milwaukee Northern Railway, Cedarburg, Wis., has completed plans for the erection of a new and combined interurban passenger, freight and express terminal in Sheboygan to cost approximately $75,000. The passenger station will occupy an area of 36x60 ft. and will be one story high. The express and freight depot will occupy an area of 40x100 ft. The improvement will involve the installation of considerable track and overhead equipment.

Trade Notes

Zenas W. Carter has joined the Erickson Company, New York, advertising agency. For the past two and a half years Mr. Carter has been engaged on the special bus promotion program for the White Company. This work has been described as "the promotion of an idea to develop the opportunity for sales." The complete co-ordination of the White Company's branches and salesmen on this promotion program aroused the interest of the entire electric railway industry in the operation of buses. Included in the special work on which Mr. Carter has been engaged previously was the development and management of the national program of promotion for the Material Handling Machinery Manufacturers' Association. He also originated and developed the publicity and sales plans of the Granite Paving Block Manufacturers' Association. During the war Mr. Carter was chairman of the war service committee on metal lath, stationed at Washington, D. C.

General Electric Company, Schenectady, N. Y., announces the establishment of the Richard H. Rice Memorial Scholarship in memory of the manager of the Lynn Works, who died suddenly at Bolton, Lake George, Feb. 10, 1922. The scholarship, a permanent one, is to be at Stevens Institute of Technology, where Mr. Rice was graduated and was a trustee. All sons of Lynn Works employees may compete.

Portland Cement Association, Chicago, Ill., announces the appointment of C. D. Franks as assistant general manager in administrative charge of association work in the districts covered by the Minneapolis, Milwaukee, Des Moines, Chicago, St. Louis and Indianapolis offices. Until June 1, 1924, Mr. Franks' headquarters will be the Merchants Bank Building, Indianapolis. After that date his headquarters will be 111 West Washington Street, Chicago. L. C. Miller succeeds Mr. Franks as district engineer in charge of the Indianapolis office. The Indianapolis office of the association, located in the Merchants Bank Building, is in charge of the association work in Indiana and Kentucky. A new association office is open in Charlotte, N. C. John E. Tate, heretofore district engineer in charge of the New Orleans office, has been appointed district engineer in charge of it.

New Advertising Literature

Crouse-Hinds Company, Syracuse, N. Y., has issued Bulletin No. 2053, an eight-page illustrated pamphlet, on "interlocking safety switch and plug."

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has recently published a fifty-six-page booklet entitled "High Voltage Porcelain Insulators — Their Design and Manufacture." This publication, which is known as S. P. 1690, has been issued for the purpose of presenting to engineers responsible for the design, installation and maintenance of high-voltage transmission systems information describing the design and manufacture of porcelain insulators. The booklet opens with a short chapter on the development of the art of pottery, which is followed by a description of the various manufacturing processes used in making porcelain. A succeeding chapter gives technical data on the experimental investigation of porcelain mixes. A study of the design of high-voltage insulators is next included, from the standpoint of electrical theory and from that of ceramics. This is followed by a chapter concerning the design of pin-type insulators, with photographs, sketches and drawings illustrating all the points included. A similar chapter on suspension insulator design and a brief description of the Westinghouse million-volt laboratory concludes the booklet.

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New York, April 5, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 63
Number 14

'Tis the Spirit of Terry O'Toole, We Need

WHEN Terry O'Toole discarded the bricks in Erin and brought blarney to Americky, he laid the foundation for a public-be-pleased policy which embodied loyalty, service and sacrifice rather than duplicity, indifference and compromise. There were three beneficiaries when the earthly day of reckoning came—his employer, the public and himself.

There is a lesson for trainmen everywhere in the tale of Terry O'Toole, a one-man car operator in Loteda, Ohio. He ran the car, rang up the fares, helped patrons up the step, carried the babies, later depositing them in the mothers' laps, trained the fender to scoop up bodies which were on the point of landing in the next world, ran into a burning building to save his aged father and became the owner of two shares of the traction company's stock. All this he did and even more. He won the fair daughter of the president of the railway, and that terminated his fare-collecting days.

Unfortunately, Terry O'Toole can't be located for confirmation of the story. The Loteda Traction Company never employed a motorman of that name, for the Loteda Traction and Terry O'Toole are only screen realities in "Conductor 1492," produced by Warner Brothers. But an hour watching Terry at work will probably do trainmen more good than a score of service sermons and a billion booklets on courteous conductors.

With a good start and a definite objective Terry was sure to be a success, and a smiling one, too. His getting on in the world was an accomplishment in thought long before it was a reality. Back in the old country, when his father and grandfather were fighting (not discussing) whether they would send Terry to the United States or to Americky to try his luck, the hero of the plot was dreaming of trolleys, tracks and traffic. Terry knew the secret of success was service, civility and loyalty. Then, too, Terry liked his work. He knew that one used many more muscles to frown than to smile, and he didn't believe in working overtime. Though Irish enough to have a temper all his own, he never showed it. Rather did he show up his tempters and turn the tables, but never the trolley, on them. On one occasion, when all his passengers talked at him at once, he pulled down a shade on which was written "$50 Fine for Talking to the Motorman." With equal finesse did he spurn a lift in the vice-president's seven-passenger Cadillac, declining graciously with "No, thanks, I prefer my fifty-passenger car."

The lesson of Terry has been told many times in many ways. His methods are worth trying even if the measure of success is not often so great as was Terry's, for not every president's daughter can win a motorman. But every operator of a one-man car or a conductor on a two-man car can bring credit to himself, prestige to his company and satisfaction to his public. The trainmen are the real salesmen of service, with the company backing them up. The industry has another proof of this is in Terry O'Toole.

Saginaw Benefits by Car-Bus Franchise

CO-ORDINATION of car and bus, as exemplifield by the Saginaw operation under the new franchise which brought the trolleys back after two years cessation of service, perhaps offers a solution for the transportation agitations prevalent in some of the smaller cities today. Placing the bus under the management of the railway and giving the community a voice in the operation of the combined system has satisfied the people of Saginaw and resulted in unprecedented patronage during the first three months of operation, as noted in the article on page 531.

What has taken place during the last two years in Saginaw may be taken as indicative of what will occur in other municipalities if the street railway is forced to cease operation because of competition and too low a fare. The novelty of the motor-driven vehicle and the desire to have the latest mode of transportation has led to the tendency in many cities to refuse an increase in fares to the railway, but to permit competitive bus service, even at a higher rate than that asked by the car company. The service given by the trackless routes has been by "jitneys" and individually owned buses. This was the case in Saginaw, and while there was not a true test of organized bus transportation, nevertheless the two years of suspended car operation should have been ample in which to organize and demonstrate the feasibility of the bus for a city of that size.

The difficulty in Saginaw, as well as elsewhere, was that the city administration insisted upon a rate of fare so low that no responsible bus interests would undertake the service. It made a good political issue to do this. But when the people got tired of keeping the problem in politics, the public officials not only found that they would have to permit a fare higher than 5 cents, but that they could make a better bargain with the railway company than with any one else. In fact, it was the only way they could be sure the people of Saginaw would have adequate and dependable transportation. With politics displaced by common sense, the people readily approved the franchise and are now enjoying the benefits of a modern car-bus system conducted on the most economical basis.

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"Personalize"

IN THE business world in general there has been no satisfactory substitute for personal contact, and the utility business is no exception. Elimination of the popular concept of the "soulless" corporation is one of the important results which may be accomplished.

In this connection it is gratifying to note the spirit that was manifested during the recent joint meeting of the Illinois railway, gas and electric associations in Chicago. The organization of a speaker's bureau to qualify employees for carrying the facts regarding the utility business directly to the people was indeed a long step in advance, and one which, if properly applied, has far reaching possibilities.

The word "personalize" aptly defines the desired objective; personalized relations between the management and employees on the one hand, and personalized contact between the utilities and the public, on the other. Adding this thought to the phrase used by the JOURNAL to express Mr. Budd's ideas as set forth in an interview with him last December rounds out an inspiring slogan:

"Modernize, Merchandize and Personalize"

Cleveland Railway Can Do It Best

BUSES have been proposed for use in Cleveland. One set of interests appears to be demanding certain rights whether or not the Cleveland Railway is willing to go into the bus business. Another set has gone on public record as desiring rights only if the local railway is unwilling or unprepared to operate buses. As for the railway, its position is quite clear. President Stanley has said that if the city craves buses the railway should be allowed to operate them.

One thing is certain. Buses can be expected to operate in Cleveland only at a fare which will insure a profit to the operators. In fact, the proposal of the People's Motor Bus Company contains a provision for a 10-cent fare. The apparent excuse behind this request is that a parlor car service—something between that supplied by the taxicab and the street car—will be furnished, and that largely for this reason the service will not compete with that of the railway. As a theory, part of that is all right, but in the case of the Cleveland Railway, under the present service-at-cost grant, the cost in fares to patrons would be only 6 per cent on the value of the capital required to be put into the system. Thus if the Cleveland Railway operated buses at a 10-cent fare and showed a profit, the excess over 6 per cent could be turned back to benefit the street car rider. Of course, some will ask why the bus rider should pay anything toward the cost of the ride on the railway. In a combined transportation system, the same answer applies to this question as to why the rider on a profitable car line should have to help to pay the deficit on the unprofitable lines.

Entirely aside from the question of whether the bus would serve a real public need in Cleveland the position of the railway is a sound one. The Cleveland Railway has functioned uniformly well in the interest of the public. There is no good reason why it should not do so indefinitely. If Cleveland wants to have buses the best way is to turn the bus operating rights over to the Cleveland Railway as this will make certain that the city will continue to secure in full the transportation benefits which it now enjoys. The greatest benefit of the bus will unquestionably come when it is operated by the same organization as the railway, so that it can be made to extend and amplify the service of the rail lines without the competitive results, if operated separately, which injure the prospects of both systems.

Interurbans' View of Billboards

THE announcement made a few days ago by the Standard Oil Company that it intended to discontinue the practice of billboard advertising where such signs deface attractive scenery is welcome news. Other large manufacturers have agreed to do the same. While the immediate object of this plan is to render the highways more attractive to automobilists, perhaps this program of removal will eventually extend to routes of the interurban railways and steam railroads. At present the unsightly billboards lining the tracks in many places are a source of annoyance and displeasure to passengers.

Advertising is a good thing in its place, but, like many good things, it can be done in the wrong way. Every manufacturer has a story to tell the public, and his prosperity depends to some extent upon the skill used in telling it. It is doubtful, however, whether advertising on a billboard located where it mars the beauty of a picturesque spot really promotes sales. A better place to advertise is in the advertising racks of electric railway cars and in stations, making use of the attractive cards that often display real art as well as present a selling appeal. Such advertising is not a transgression upon any one's outlook. As with newspaper and magazine advertising, it comes to the reader when he is in a receptive mood to receive information, and thus serve a useful purpose. But billboard advertising along the highways and railways is displeasing to many, and it sometimes constitutes an accident hazard as it cuts off a clear view.

If It's Worth a Picture, Make It a Real One

THESE days the electric railway industry is making use, as never before, of window posters, cards in the advertising racks and pamphlets for distribution to passengers. To brighten up the appearance of such publicity material, many companies have introduced pictures of their cars and other equipment. In so doing, some have had the good judgment to make the pictures accurate and lifelike, while others have carelessly presented unreal objects and labeled them cars, or whatever they were intended to represent.

If it is worth while to use a picture at all in publicity work, it is worth while to make it a real picture of the desired object. It is almost always a mistake to think, "The public doesn't know anything about that. People will never notice the difference." The public has hundreds of thousands of eyes, and includes many persons trained to accurate observation. Such people at once notice any inaccuracy in the railway company's advertising. There are also a great many people who perhaps do not know why a picture impresses them unfavorably, but who somehow subconsciously recognize that it is not as it should be. It is quite worth the cost to have a professional photographer take the pictures needed for publicity matter. The railway equipment will then be shown as it really is.

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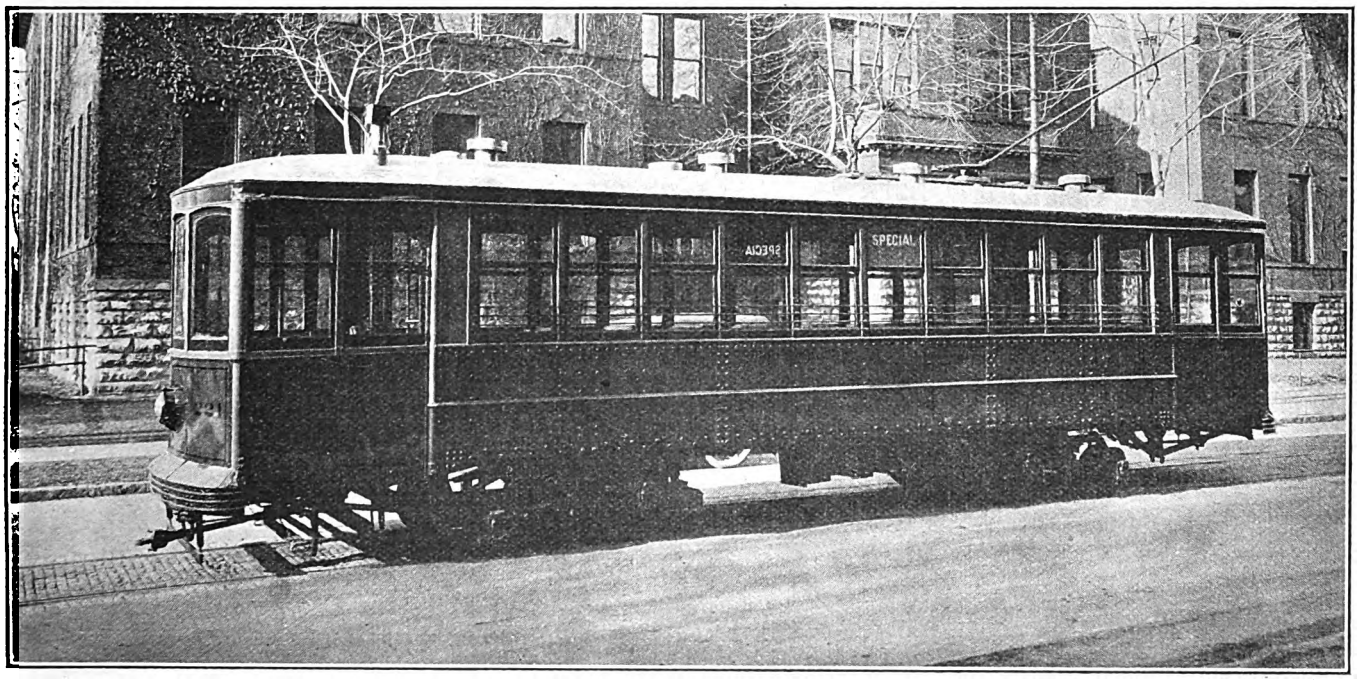
How Saginaw Has Co-ordinated Railway and Bus

Unified System of Transportation Result of People's Referendum—25 Modern Buses Operate on Three Routes Specified in 15-Year Franchise—Control of System in Hands of Public—Railway Equipment Rebuilt and Painted



Double-Truck, Two-Man Car Rebuilt for One-Man Operation and Equipped with Safety Car Devices

SAGINAW—no longer the recognized "Jitneyville" of America—has emerged from an unsuccessful two-year trial of exclusive jitney operation and has set up a new system of transportation service. Street cars and modern motor buses have been co-ordinated to furnish a complete transportation system to this city of 66,000 inhabitants. Supervised by the people, financed and managed by private capital, the arrangements insure adequate service and at the same time retain the stimulus toward economy which accompanies private enterprise. Routes, equipment and organization of the new Saginaw Transit Company are specified in the new 15-year franchise which was granted by an ordinance adopted by a three to one vote of the people in June, 1923, to become effective as soon as facilities could be procured and placed in service.

It will be recalled that two years ago the Saginaw-Bay City Railway Company ceased operation following the refusal of Saginaw to grant a new franchise which included an increase in fare. "Jitneys" and buses of every type and form thereafter attempted to give the local service, while numerous efforts were made to come to a settlement with the railway and later with some responsible organization to inaugurate a dependable bus system. But no one could be found to take a 5-cent bus franchise, and when a 10-cent bus franchise was submitted to the people it was turned down.

The local transportation in the hands of small companies and individuals with little or no responsibility became so bad that certain civic organizations, notably the Chamber of Commerce, finally undertook the work of finding a solution. The object was to develop a comprehensive transportation plan that would supply the city's needs and prove attractive to an operating company. An ordinance providing for a combination railway and bus system was prepared and passed by the City Council. This was submitted to the people and approved at a special election, whereupon the newly organized Saginaw Transit Company became the grantee of the franchise and took steps to start operation.

Financial Status

Purchase was made of the bankrupt Saginaw-Bay City Railway Company by the Commonwealth Power, Railway & Light Company in the name of the Saginaw Transit Company. The first mortgage bonds of the Saginaw-Bay City Railway Company were taken up by the new company, an equal amount at par of 5 per cent cumulative preferred stock being given in lieu thereof. The new company also took over the old underlying bonds of the former company, namely, the Saginaw Valley Traction Company, giving in return $500 worth of 5 per cent first mortgage bonds (1949) and one share of common stock for each $500 worth of old bonds. All other securities are in the hands of the holding company, with the exception of one share of preferred stock held by each of the directors of the

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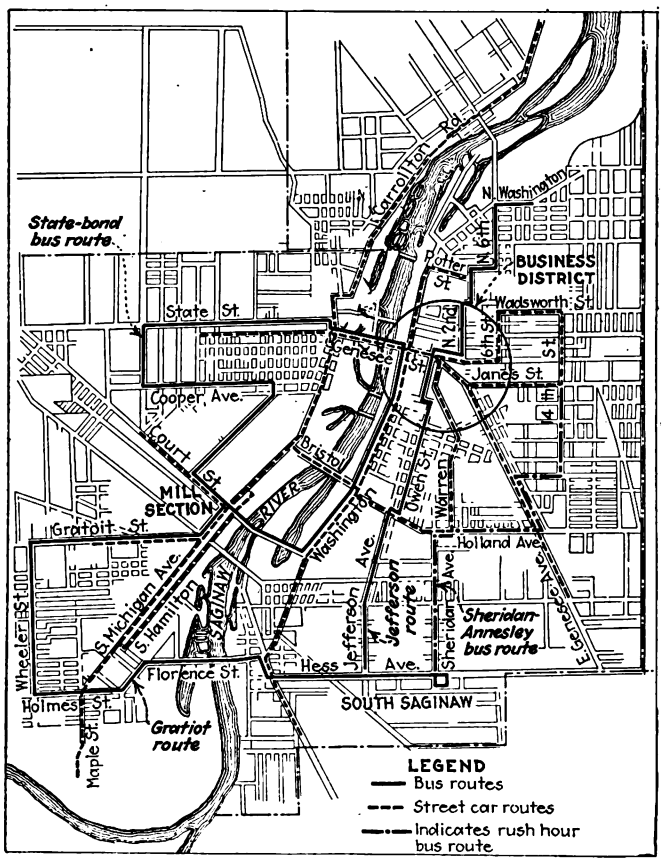
Saginaw Transit Company. The present distribution of securities of the Saginaw Transit Company is as follows:

	Issued and Outstanding	In Hands of Public	Securities Owned by Holding Company
First mortgage bonds, 5 per cent (1949)	$1,184,000	$564,000	$620,000
Note for car equipment	5,000	.....	5,000
Preferred stock, 5 per cent (cumulative)	1,479,000	981,000	498,000
Total	$2,668,000	$1,545,000	$1,123,000
Common stock (shares of no par value)	20,000	1,137	18,863

In evidence of good faith the new company was required to deposit $400,000 in the banks of Saginaw as a fund for rehabilitation work on the cars and tracks and for the purchase of motor vehicles.

When the people of the city approved the car-bus franchise under which the Saginaw Transit Company is operating, they placed their approval on a system



Map of Saginaw Indicates Car-Bus System Recently Placed in Operation

whereby two-thirds of the directorate of the company represent the public. Thus, six of the nine directors of the corporation are resident citizens approved by the Mayor and the two Circuit Judges of Saginaw County. These six, with three directors representing the security holders, have control of the management and policy of the company. All of these directors serve for fifteen years, the life of the franchise. The filling of vacancies which may occur from time to time is intrusted to the City Council in the case of the six representatives, and to the security holders in the case of the other three. The board elected C. S. Kressler as president and general manager of the company.

Before operation could be undertaken, the track, particularly the special work, had to be repaired and in places rebuilt. The old available cars, consisting of 21 Birney type safety cars, 7 double-truck converted one-man cars and 12 two-man, 40-passenger cars, were put through the overhaul and paint shop. The 12 two-man cars were rebuilt for one-man operation and equipped with safety devices. Every car was given a thorough overhaul, which included repairs and replacements to motors, trucks and bodies. "Traction" orange and "chrome" yellow exterior with black trim were used as the color combination. The orange is the predominating color, with yellow used between the belt rail and letterboard. The interiors were made equally pleasing by finishing the trim in mahogany and the ceiling in white enamel. Lettering is eliminated as far as possible and at the present time includes only an insignia below the center windows, the number on each side of the dash, and a sign stating "Please Have Fare Ready" near the door. All equipment, including the new buses, is painted in these same colors. The work of rehabilitating cars was carried out as rapidly as possible.

As operation of the railway began in November, only limited trackwork was possible. Further track rehabilitation will be undertaken in the spring.

In addition to the street car lines, all of which are about the same as before operation ceased, the company is required to operate three motor bus routes as specified in the franchise. For this service, ten White, Model 50, bus chassis with Bender, 25-passenger bodies and 15 Reo bus chassis with Fitz-John-Erwin 21-passenger bodies were purchased. As rapidly as equipment, buses and cars became available, the routes specified in the ordinance were taken over from the jitney operators. After operation on all routes had been established, the Council, acting in accordance with requirements of the ordinance, took the necessary steps to carry out the provisions restricting competition. Throughout the duration of the franchise, the Council has agreed to protect the transit company from competition.

A survey of industrial plants furnished the data which determined the location of these bus routes. On some streets these parallel the car routes. Through the business center of the city, the prospective passenger is given the choice of using a bus or a car. However, after leaving the transfer center at Washington and Genesee Streets, the bus and car take widely diverging routes, the bus covering portions of the city not served by the car.

Bus Routes Described

An example of this is indicated in the peculiar franchise route traversed by the so-called State-Bond buses, as shown on the accompanying map. It was found by checking that people living in the southeastern portion of the city traveled to business mostly in the heart of the city. Workers living in the northwestern portion of the city were largely employed in mills in the southwestern section. So a bus route laid out in the form of a triangle gave both these classes of people a more direct route than the car lines and supplied a load both outbound and inbound.

For the north and south traffic, the franchise specified a through bus route on Jefferson Avenue. This street passes through the business district and extends from the residence section on the north to the mill district on the south and is referred to as Saginaw's Fifth Avenue. The third route laid out to fulfill the requirements of the franchise is the Gratiot line, which starts at the junction with the State-Bond route and after traversing the southwestern suburban district terminates in the mill section of South Saginaw.

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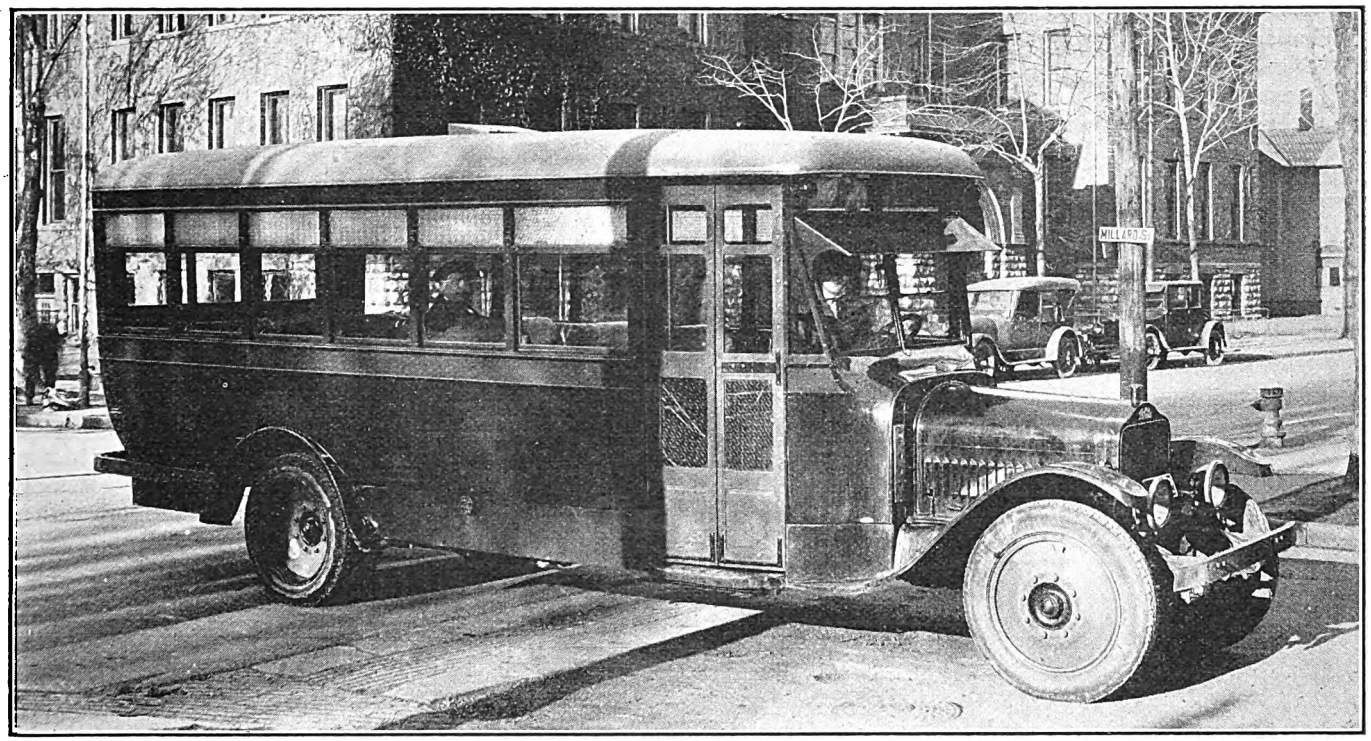
In addition, a rush-hour route known as the Sheridan-Annesley line was recently established to carry the workers in the mills of South Saginaw between the factories and their homes in east and southeast portions of the city. Several empty buses are waiting at the factories at quitting time to carry the workers homeward, while a like number of buses leave the northern terminal of the route on definitely scheduled time in the morning to transport the men to work. Very little transferring is done between these buses and the two or three car lines crossed en route, as the direct route of the buses serves the full needs of the riders.

During the month of February, 1924, a total of 861,210 revenue passengers and 161,522 transfer passengers were carried by the combined system. Of this number, 577,029 revenue passengers and 102,346 transfer passengers were carried by the street cars, while 284,181 revenue passengers and 59,176 transfer passengers were carried by the buses. These figures indicate that with 16 scheduled buses during the day and 25 in the rush hours, the bus system is carrying nearly one-half as many passengers as the car system with a schedule of 26 cars during the non-rush hours and 40 in the peak hours. From this it appears that each bus is carrying about four-fifths as many revenue passengers as each street car. Standees are allowed on both systems.



Twenty-five-Passenger, Street Car Type White Bus, Used on Car-Bus System of Saginaw

Headways on both rail and bus routes vary from 6 to 10 min. during the day, and schedules have been so arranged that connections are made between buses and cars at the terminals and intersections of routes. Service has been further improved by staggering the cars and buses along the streets traversed by both. Free transfer is given between the buses and cars, and the fare of 10 cents cash or four tickets for 25 cents is the rate on both.

MAINTENANCE

Maintenance of the vehicles, both cars and buses, is done on a mileage basis. Inspection, however, is given to each piece of equipment at least once a day. In this co-ordinated system, the bus is as important a factor as the car; therefore, enough vehicles have been provided to meet the heavy rush-hour service. During the day only 16 buses are operated, leaving nine in the garage for inspection, cleaning and repairs.

Provision has been made in a section of the old car-house for the storing and maintaining of the buses. This garage is approximately 50 ft. wide by 200 ft. long. The rails have been left in place and the floor level brought up to the face of the rail by filling in with cinders. A portion at the rear has been covered with a concrete floor and is used for inspection and repair purposes, the forward section serving as a storage area only. In an adjoining bay a wash rack has been provided where the buses are washed inside and out once a day. A battery-charging outfit occupies one corner of the garage at the rear, while a 50-ton wheel press is mounted in the opposite corner.

All maintenance work with the exception of tire repairs will be undertaken by the company in this garage and the railway machine shop. It was found advisable to have a local vulcanizing repair shop do all the tire work, which includes removing the tire from the wheel, vulcanizing and replacing the tire. During the three months of operation this work has amounted to approximately $40 per month. If the company had undertaken this work the cost to it would have been approximately $150 per month. An extra White and an extra Reo engine have been purchased and are kept in the storeroom, with a complete set of replacement parts for the Whites. This was not necessary with the Reos because of the adequate stock maintained by the local dealer.

When difficulty is encountered on the road by any of the buses, the driver immediately calls the garage. The garage foreman sends out the service truck and a replacement bus. The driver has been instructed to make no attempt to repair the bus he is driving, but to continue if possible to the terminal of his route, where he will take the replacement bus and continue his

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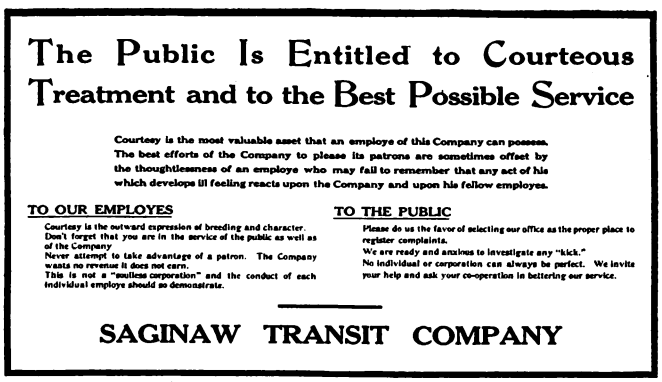
trip. If it is merely tire trouble, the crew on the service truck will make the change. If it is some minor mechanical defect correction is made on the road, but if the trouble is found to be serious, the vehicle is towed to the garage. In any of these three cases, the bus is returned to the garage, where it is repaired and stored until needed.

Ample Gasoline Capacity Provided

Gasoline and oil records are very accurately kept by checking the quantities used against the speedometer mileage reading. To eliminate the necessity of purchasing gasoline on the road, the gasoline carrying capacity of the buses was increased. The 25-gal. tank on the Reo cars was replaced by a 35-gal. tank, and the tank on the White buses has been augmented by an auxiliary 16-gal. tank. These capacities make it unnecessary to replenish gasoline during an entire day's run. Two 8,000-gal. storage tanks have been buried in the ground adjacent to the garage and supply the vehicles with fuel through the customary measuring pump. The oil supply is maintained in drums and is furnished to the vehicles in small quantities whenever necessary. However, a complete change of oil is made every 500 miles. Plans are being formulated for burning the old oil under the boiler used for heating the carhouse and garage.



Sample Window Poster Being Used in Cars and Buses to Set Forth Policies of New Company

Before starting on his run, each operator is supplied with $10 worth of tokens. He furnishes his own change. All fares are collected by means of a Johnson fare box. An operator's trip sheet is used to record the fare box readings, a space is provided for the opening and closing numbers, and settlement is made to the cashier on the basis of these readings. The register readings on the trip sheet are checked in the general office by means of a statement of register readings taken by a barn man during the time the vehicles are in the barns. This reading is entirely separate and independent of the readings taken by the car and bus operators.

The classification for bus accounting, tentatively adopted by the American Electric Railway Accountants' Association, is used. For the first three months of operation, the figures showed the operating expense to be 14½ cents per revenue bus-mile, exclusive of taxes, interest and depreciation. Depreciation on the buses has been figured at 33⅓ per cent, which makes the total life of the bus approximate 250,000 miles.

Keeping the public sold on its own transportation system has been the aim of the management in speeches given before local business organizations at noon-day luncheons. "Leave your car home" is the theme of these talks and of the advertisements run in the local papers. It is pointed out to the local merchant and business man that they are losing money on the space at the curb in front of their establishments if such space is used for parking purposes. Formerly, less than 25 per cent of the merchants left their cars home, but now more than 45 per cent do so, and in that way provide a convenient loading zone for their customers. Interesting figures from local retail merchants show an increase of 20 per cent in sales, while those who are located near the transfer corner report an increase in sales of 30 per cent since the movement was started.

Parking has been changed from a position of 45 deg. to the curb to a parallel position, and time limits have been strictly enforced. All streets upon which routes of the traction company operate have been made "stop streets." This has done much to eliminate collisions between private automobiles and the cars and buses of the company.

Concrete Poles Used Because of Ornamental Appearance

Although More Costly than Steel or Wood Poles, They Are Used by the Municipal Railway of San Francisco Because They Are More Sightly and Permanent

FOR a number of years the Municipal Railway of San Francisco has been using concrete poles to support its overhead construction. Various types have been tried, and although concrete poles are more expensive than steel poles in first cost they are favored by the railway on account of their ornamental appearance and because they require comparatively little maintenance once they are installed.

Forms for the poles are built as a series of horizontal troughs in which the poles are cast. The top surface is given a float finish. The poles are then covered with wet sand and are sprinkled with water every day. Wooden forms are very thoroughly wetted, particularly in the case of panel poles, so that the swelling of the wood will not crack off the corners of the pole along the edge of the panel. After the poles have been erected and finished, all exposed surfaces are painted with two coats of "Concreto" as manufactured by the Muralo Company, or some other equivalent concrete paint, of whatever color may be desired.

A concrete mixture in the proportions of 1-2-4 is used. The cement is carefully tested. At least 92 per cent by weight must pass through a sieve of 10,000 meshes to the square inch, and at least 77 per cent must pass through a sieve 40,000 meshes to the square inch.

Briquettes made from neat cement, after being kept one day in moist air and the remainder of the time in water, must develop a tensile strength per square inch as follows: After seven days 500 lb. and after twenty-eight days 600 lb. Briquettes made with one part cement and three parts sand and exposed in the same way in the neat tests must develop a strength of 200 lb. after seven days, and 300 lb. after twenty-eight days.

Pats of neat cement about 3 in. in diameter and ½ in. thick at the center, tapering to a thin edge, being kept in moist air at normal temperature for twenty-

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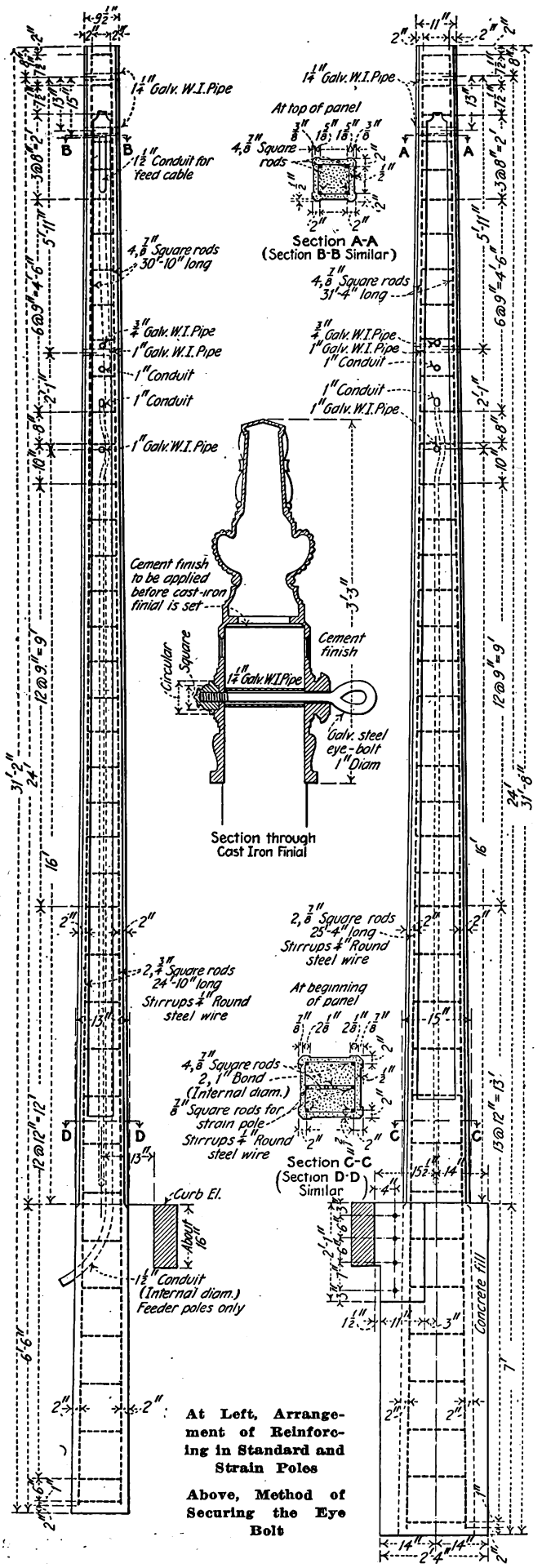
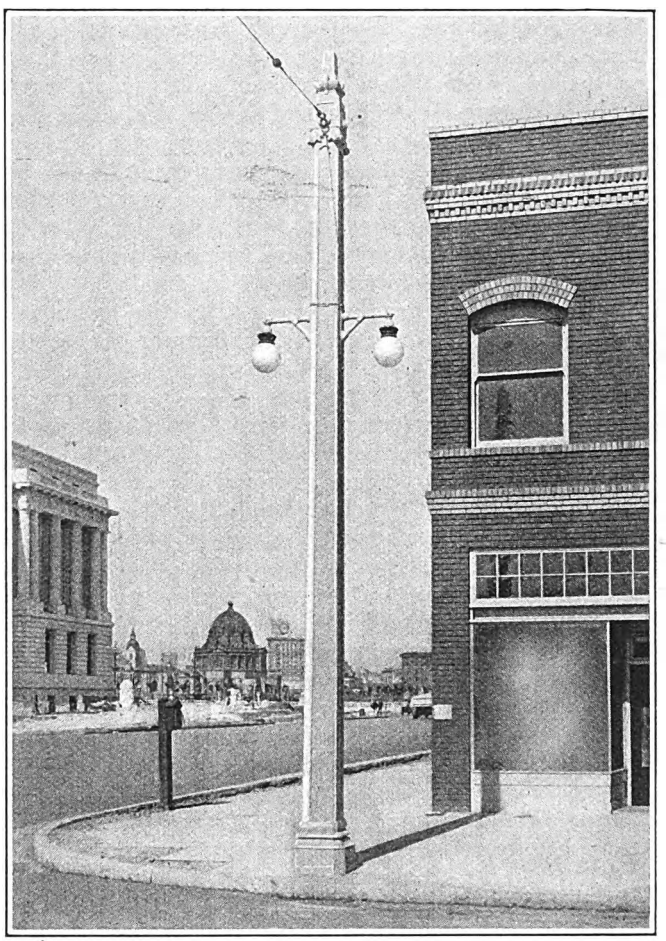


At Left, Arrangement of Reinforcing in Standard and Strain Poles

Above, Method of Securing the Eye Bolt

four hours and then placed in water and raised to a temperature of 212 deg. F. in one hour and maintained at such temperature for five hours, and other pats kept, one in the open air and one in water, at a temperature of about 65 deg. F. for twenty-eight days must show no signs of distortion, blotching, cracking or disintegration.

Poles are erected by means of a movable derrick with sling. No special tests have been made of their strength, but those in service are satisfactorily carrying a load of 800 lb. at the eyebolt. Besides sustaining their legitimate load, concrete poles have stood up well in many automobile collisions. However, these poles are very heavy, weighing approximately 150 lb.



Type of Concrete Pole Used by Municipal Railway of San Francisco

per cubic foot and the railway has found that great care must be exercised in placing them in order to avoid setting up excessive stresses before they reach an upright position.

To increase the ornamental effect created by the concrete poles, a cast iron base is used. This was originally cast in one piece and was slipped over the top of the pole at the time of erection. Later, however, in order to facilitate the replacement of broken castings, these bases were made in two parts and bolted together. An ornate lighting fixture is placed on the upper part as these poles serve a combination purpose. In the accompanying illustration of a pole on Van Ness Avenue a temporary lighting fixture has been installed. Cast iron lamp brackets of a more elaborate design will eventually replace this temporary system. In 1918 the contract price for poles used by the Municipal Railway was $92 each for the standard poles and $110 each for the strain poles.

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Twin City Starts Thrift Fund

Rapid Transit Company's Plan for Encouraging Savings Nearing Completion of First Year —Men Get Increased Life Insurance Besides 4½ per Cent Interest

TO ENCOURAGE its employees to save money, the Twin City Rapid Transit Company on April 1, 1923, introduced a thrift plan, and offered to give a life insurance policy to each employee who would begin and continue saving a part of his wages according to the plan. The amount of the life insurance policy thus offered varies with the length of service of the employee and his period of saving. Insurance policies in the sum of $500 are taken out by the company for all of its employees who have been in the service for six months or longer. This amount of policy is increased to $1,000 during the first year of saving to all employees who join the thrift fund and have been with the company for five years or less. It is increased to $1,100 if the employee has been with the company for six years, and to higher amounts by gradations up to the maximum of $2,000 for the man who has twenty years of service when he entered the thrift fund.

There is also a gradual increase in the amount of the principal of policy (up to the maximum of $2,000) with the length of time that the employee continues in the thrift plan. Thus, the man with one year or less of service in the company must continue his saving for five years to increase his policy from $1,000 to $1,100. Then it grows by $100 each year until the maximum of $2,000 is reached. The older man gains this maximum sooner. Thus, the man with ten years service reaches the $2,000 mark after only five years of savings, and the eighteen-year man after only three years of savings. The insurance is in addition to the death benefits.

The amount of saving required under the plan is 2 per cent of the wages of the employee, this amount to be deducted from the portion of his wages payable on the 25th of each month. The deduction from his wages for his dues in the benevolent association is made from the portion of his wages payable on the 10th of the month. The amounts for the savings fund thus obtained are deposited in one of the strongest local banks and draw interest at 4½ per cent, compounded semi-annually.

If any portion of the principal or interest is withdrawn by the employee during the first five years (except under conditions described below) his insurance automatically drops to $500, but after the fifth year his insurance policy remains at the point at which it reached when the deposits were withdrawn. Employees of sixteen years of service and more have to continue their savings for only one year to secure the same benefits. Employees placed on the pension roll are exempted from obligations to make future savings and may withdraw their savings without decreasing the face value of their policies. Exemption is also allowed to those who desire to apply their savings to the purchase of homes, as they may withdraw their deposits for that purpose without forfeiting any of their insurance. The case of special emergencies is taken care of by allowing an employee at any time to borrow from the company up to 90 per cent of the amount of his deposit, but he must pay 5 per cent on the loan, and it must be repaid in ten months after being contracted by deductions semi-monthly from the employees' wages. The purpose of charging ½ per cent more interest than that paid by the bank is to discourage applications for loans on the basis of the deposits.

Employees who leave the service have the privilege of leaving their deposits in the same bank, but in that case they will draw only 4 per cent instead of 4½. Employees leaving the service also have the privilege of continuing their life insurance policies without medical examination for the same amounts in any of the forms of policy customarily issued by the insurance company, except term insurance, and thereafter pay the premiums direct to the insurance company determined by the age at the time of leaving the service, but application to do so must be made within a certain time. In this way it is impossible for the employee to lose his life insurance after leaving the service because of inability to pass the examination. Various provisions are contained in the thrift plan to cover conditions of sickness, etc.

The plan has met popular approval on the part of the employees, and the aggregate savings under it from April 1, 1923, up to the middle of February, 1924, amounted to about $115,000.

The Car Riders Make the Pay Check Possible

A PUBLICITY slip distributed by the Olean, Bradford & Salamanca Railway, Olean, N. Y., was described in ELECTRIC RAILWAY JOURNAL for March 22, page 472. These slips are attached to all outgoing checks and are used to supplement a publicity campaign in the local newspapers. A line of type was omitted in the story referred to and the wording of these slips was on that account improperly given. The slip itself is reproduced below:

It Is the People
Who Ride on Our Cars That Make
This Check Possible

Red Call Lights Summon Inspectors

THE dispatcher at the carhouse of the Holyoke Street Railway keeps in close touch with his inspectors on the road by means of a system of call lights. Nine red electric lights are located at strategic points along the lines of the railway. To correspond with these there are also nine lights on the wall of the dispatcher's office and nine snap switches close at hand. By a turn of the wrist he lights simultaneously one of the lights on his office wall and a light located on a pole out on the system.

On the same pole as the red light there is also a telephone communicating with the dispatcher's office. As soon as any inspector sees the red light he immediately calls up the dispatcher. The particular advantage of this scheme lies in the fact that the red light can be seen for a much greater distance than the ringing of a telephone bell could be heard. As soon as an answer has been received from the point with which the dispatcher wishes to communicate he turns off the light again. In case no inspector answers the telephone and the red light continues to burn the car crews are instructed to telephone in before passing the point. This system enables the Holyoke Street Railway to reroute its cars in an emergency and delays have been avoided.

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Rail Welding in Connecticut

An Especially Interesting Feature of the Connecticut Company's Track Is the Tilted Joint Plate and Base Plate, Adapted to Twenty-three Different Rail Sections—Precautions Adopted to Secure Good Welds

ALTHOUGH rail welding with the electric arc has been practiced on a commercial scale for more than a decade, it is only within the last few years that the subject has received the intensive study which it deserves. As it was a comparatively new field of endeavor, a great deal of individual experience had to be gained before those interested in rail welding could meet and discuss intelligently its problems. But out of the methods adopted and the results secured during the first years and through the war period, the principles of rail welding may now be regarded as more or less established.

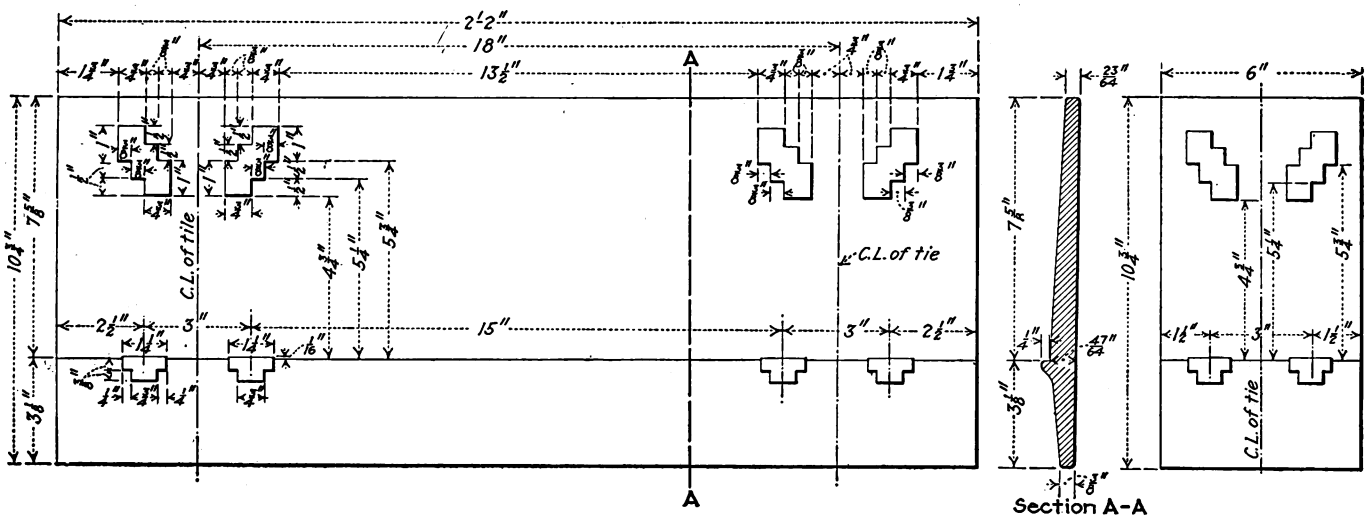
The experience of the Connecticut Company in electric arc welding has undoubtedly been that of hundreds of others. Commencing in 1914 with the resistance type of arc welder using metal electrodes, the work was confined to the surface welding of cupped rail joints. During the war the delivery of rail was curtailed. This condition required the purchase of additional welders to maintain track, and for the most part these welders were of the motor-generator type and capable of using both metal and carbon electrodes.

The first carbon welding by the Connecticut Company was done on joint splices in old rail, which had to be left in place when the street was paved. Obviously the combination of old rail, high carbon rolled plates, new welding machines and methods with which the operators were unaccustomed could hardly be expected to give a very high-class product. Nevertheless, much creditable work was done at this time, and the object of "tiding over" the war period was attained. With the resumption of easy deliveries of rail after the war, the use of the arc weld for rail joints received added impetus.

For many years the Connecticut Company has standardized for new work on three rail sections for its 805 miles of track owned and operated, and its 33 miles of track in and around carhouses. These standards are: The A.E.R.A. standard 5-in. 80-lb. A.S.C.E. tee, the 6-in. 100-lb. A.R.A. type "A" tee, and the A.E.R.A. 9-in. 134-lb. grooved girder. In the old track of the company, however, there are still to be found many varieties of rail sections, amounting to 150 in number. An account will be given of some of the improvements in the carbon arc welded rail joints adopted by the Connecticut Company, which it is thought will prove of interest.

Joint Plates and Base Plates

For the old rolled joint plates, there have been substituted machined plates with a lower carbon content. This change has resulted not only in a vastly improved fit between the plate and rail, but in greatly improving the conditions for joint welding. This change was a big step in the improvement of the joint and weld.



Standard Base Plate, on Left, and Tie Plate, on Right, Used Under Tee Rail by the Connecticut Company. These Plates Fit a Large Number of Rail Sections

The adoption at each joint in tee rail construction, of which the company has a large amount in paved street, of the base plate illustrated in the first drawing has also proved a definite step in increasing the strength of joint. The base of the rail in paved construction is seam-welded to this base plate. The tilted feature, which cants the rail inward to an inclination of 1 in 20, to increase the area of wheel contact on the rail and transmit the load symmetrically and directly over the center line of the web has been followed on the Connecticut company's lines for some years. Between joints the inclination of the rail is carried through by the use of intermediate tie plates of the same cross-section as the joint base plate, as shown in the drawing on this page. A feature of each of these plates is the staggered notching of the spike holes. This permits these plates to be used with twenty-three different rail sections, and the arrangement of the holes obviate the necessity for rights and lefts being kept in stock.

In the case of the 9-in. grooved rail, laid on steel ties, the steel tie becomes the base plate, and the rail is welded to it in the same way as to the base plate,

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just described. As the steel tie is also welded to the opposite rail, the track is cross-bonded, rail to rail, at every joint, thus greatly improving the track return.

Bolts in Girder Joint Reduced to Two

In the 9-in. girder section illustrated, the number of holes required by the old bolted channel bars was twelve, in addition to four holes necessary for two concealed bonds. This made sixteen holes in all in each joint. In the new joint one hole in each rail has been found sufficient, provided two high-tension bolts are used and if the plate is of sufficient stiffness to overcome any chance of bending.

The welded seam furnishes the bond. In this big reduction in the number of holes, it is felt that another great improvement in the strength of the rail end has been made. The increased thickness of the plate provides a welding shelf for the top seam and also admits of a shorter plate without any reduction in the area in contact between plate and rail.

In the 5-in. and 6-in. tee rails, of which the greater mileage will be constructed, the company's standard joint drilling has been retained to permit the use of this type of joint in existing track if necessary. The size and shape of the holes in the plates, however, have been changed. The old slotted hole inherited from steam road practice, while necessary in open track to provide for considerable expansion and contraction, has been discarded in favor of the round hole where the track is to be embedded in pavement and so not subjected to a great range of temperature fluctuation.

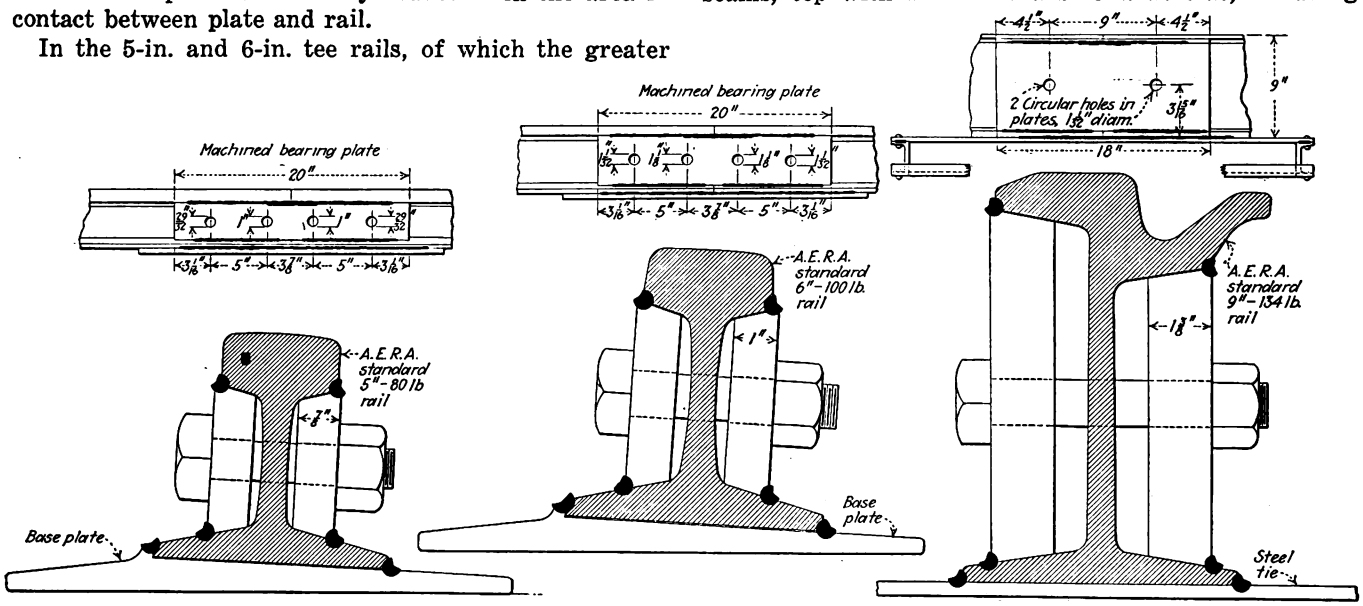
The object sought in the welded joint is to arrest entirely any longitudinal motion in the individual rails. When these joints are bolted up, the two outer bolts are first installed, requiring the rail ends to be tightly butted together. Machine bolts $\frac{1}{32}$ in. smaller than the hole are used. This size has been found to give a good tight fit in actual practice. In fact, in some cases, it has been necessary to ream the hole to get the bolt in. The two inner holes are made $\frac{1}{8}$ in. greater in diameter than the bolt to admit of easy entrance and to speed up the work.

Method Followed in Welding

Before a start is made to weld the seams, it has been found desirable to look first over the alignment of the joint in the track. This is particularly important on curves, since the order in which the seams are made can improve or upset the alignment. The first seam made has a tendency to push the rail away from the operator and change the alignment.

Of equal importance is the grade or vertical elevation of the joint, which should be checked up with a 3-ft. straight-edge before being welded. In the manufacture of rail there is a tendency for the rail end to drop, so that if this is found to be the case, the welding of the base seam first will have a beneficial effect in tending to raise the end of the rail slightly.

The location of the first seam to be welded is then preheated by passing a long carbon arc for a few seconds over it. The seams are then made with the carbon arc, using the "hand-fed" steel method, which has now supplanted the "laid in" method. The depth of the seam is such that it is at its deepest at the middle of the seam, tapering off at the ends to avoid undesirable craters. Close attention is also given to staggering all seams, top with bottom and side with side, including those on the base plates. This tapering and staggering and the other methods mentioned later are important factors in eliminating entirely broken rails due to crater notches. It is the practice on the Connecticut Company also to weld a second time for a few inches in the middle of the top seams, and correspondingly to break off for a few inches in the middle of the bottom plate seam. The completion of each seam weld is followed by post-heating with the long carbon arc, in the same manner as in preheating.



The Three Standard Rails of the Connecticut Company, Showing Location of Joint Welding Seams

How Contraction Strains Are Avoided

For some time it has been recognized that the welding of rail joints sets up a considerable contraction strain in the track as a whole, due to the work being done in warm weather. When the rail is at its maximum expansion, if the contraction strains are not guarded against and there is a drop in temperature on construction work which includes special trackwork within its limits, damage to the special trackwork is apt to occur if the welded joints and rail prove to be the stronger. To guard against this contingency, it is the practice of the Connecticut Company to leave the joint unwelded and the bolts tight in one end of the plate only where the welded track meets special work, even though it is to be paved up. Then this open joint is filled in

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and welded in midwinter when the welded track is at maximum contraction.

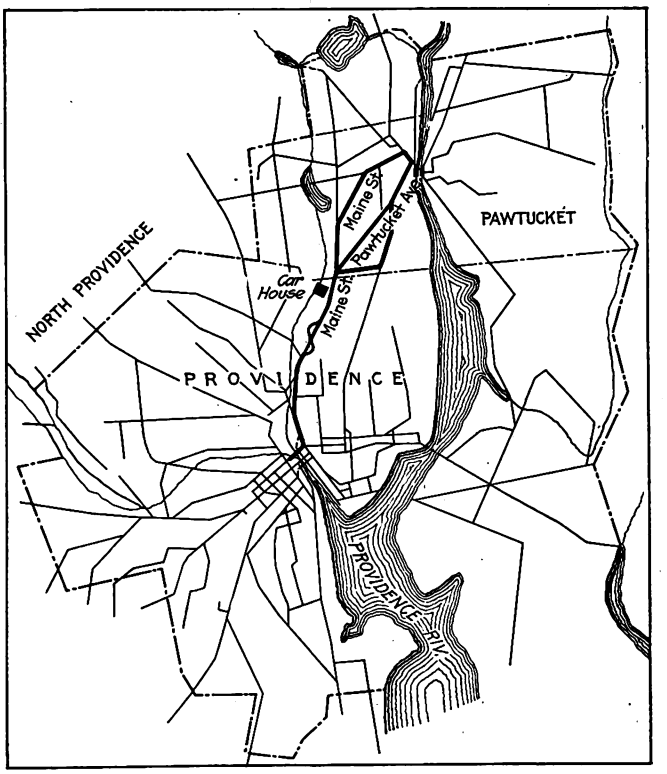
It would be possible to elaborate on many of the details that enter into the materials and labor involved in making these joints, such as the plates, bolts, welding steel and their chemical properties, carbon electrodes, fluxes, etc., as well as on the cleaning and setting up of the joints, the amount of current, speed of welding, etc. All of these are important factors in securing good results, but as the practice of the company in these details probably does not differ greatly from that of other companies, the mere mention of them must suffice at this time.

It is believed that these joints, which are economical in first cost, will prove in service that to all intents and purposes the process has produced a continuous rail in which joints are conspicuous only by their absence.

It is but fair to say that much of the credit for research work along this line can be attributed to the manufacturer. The instances of the co-operation between the engineer and the manufacturer, which have obtained during recent years in connection with welded rail joints, must be most gratifying to all concerned.

This work is under the immediate supervision of the three division engineers of the Connecticut Company maintenance of way department, M. M. Johnston, A. L. Donnelly and H. J. Tippet, who have developed several of the features in connection therewith.

This department reports directly to the vice-president and general manager, J. K. Punderford.



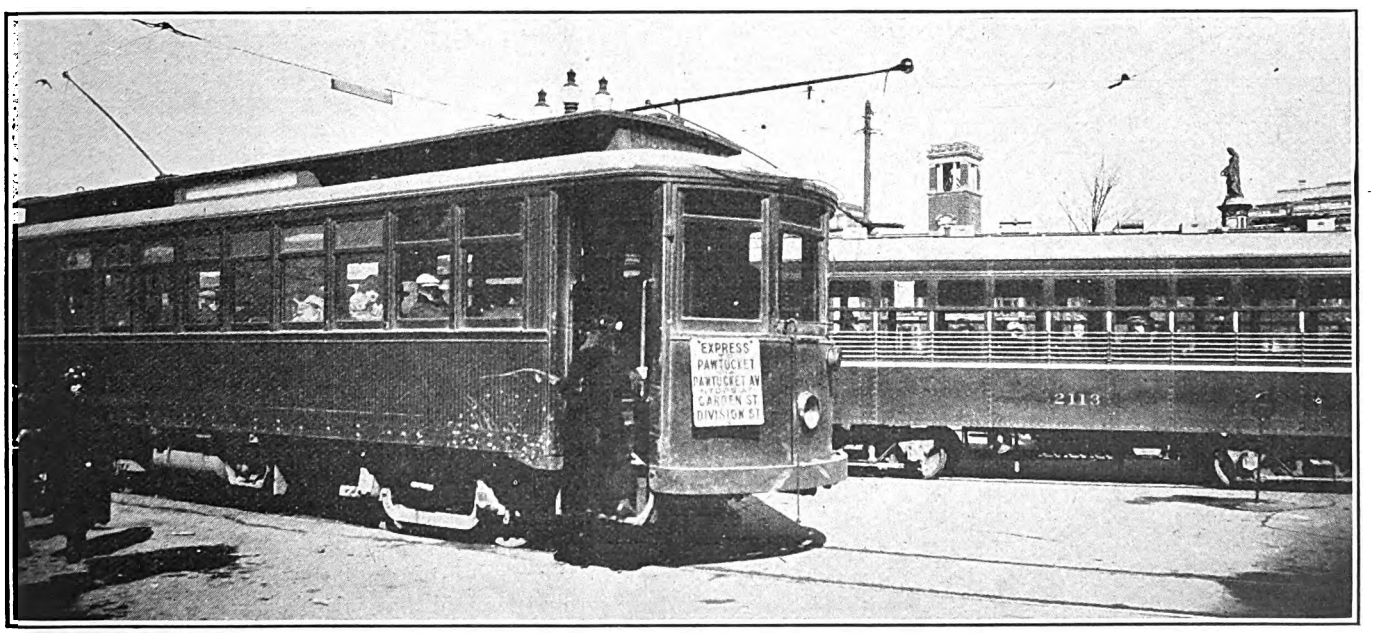
Special Turnouts Enable Express Cars to Pass Locals Between Providence and Pawtucket

Third Track Turnouts Save Nine Minutes Running Time

The United Electric Railways, Providence, R. I., Operates Express Service to Pawtucket on a Five-Minute Headway Over the Same Route as Local Service

ONE of the most heavily traveled routes of the United Electric Railways is from Providence to Pawtucket, a city of about 50,000 people lying immediately adjacent to the larger community. Inasmuch as a large part of the travel is through-riding from one city direct to the other, it was thought desirable to install express service. This was done in the latter part of last year by building passing tracks alongside the existing double tracks.

The route from Providence to Pawtucket follows North Main Street for about two-thirds of the distance. Just inside the city limits of Pawtucket, however, the service divides three ways. Some cars operate via Pawtucket Avenue directly to the heart of that city. Others branch off to the west and go in via Main Street, while still others follow a route to the east of Pawtucket Avenue. The greater part of the service follows Main Street and it was therefore quite feasible to operate the express service via Pawtucket Avenue provided some



Exchange Place Loop, Where Pawtucket Express and Local Cars Start

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way could be found to enable the express cars to reach the junction immediately ahead of a local Pawtucket Avenue car rather than close behind one.

To do this it was decided to build a pair of passing sidings on North Main Street, about one-third of the way to Pawtucket. The passing tracks are staggered, that for inbound cars being just beyond that for outbound cars. On account of the moderate width of the street it was thought undesirable to have the four parallel tracks all together. The carhouse, which is just south of the junction and the Pawtucket city line, provides another place where the express cars can pass the locals. The relative position of these points is shown on the accompanying map.

Express service is operated on a ten-minute headway during the day and on a five-minute headway during the rush hours. Local service is on a five-minute headway throughout the day and the rush hours. In order to take care of the peak extra cars are double-headed with the ordinary local cars. In the afternoon rush hours express cars and locals start simultaneously from Providence with the express car leading. This car should then catch the local car which started five minutes ahead, either at the passing siding or at the carhouse. Shortly after passing these points the express car reaches Pawtucket Avenue and has practically a clear right-of-way from there into the center of Pawtucket.

The location of these three possible passing points, the recently built sidings, the carhouse and the junction, lying as they do comparatively close together, makes it unnecessary to designate any hard and fast passing point where the express car gets ahead of the local. The procedure is simply for the express to run as rapidly as possible without stops and to pass the local at the first available point. By this means the running time has been reduced from twenty-seven minutes, the present schedule for local cars, to eighteen minutes for the express. Riding between Providence and Pawtucket has increased considerably since the inauguration of express service. Apparently this has been accomplished with no loss whatever to the local traffic. The gain being derived entirely from new riders.

Trackless Trolley Experience on Staten Island

THE trackless trolleys have given satisfactory service on Staten Island, according to Grover A. Whalen, Commissioner of Plant and Structures, New York City, writing in the *American City Magazine*. The original lines installed by the city of New York from Meiers Corner to Linoleumville and Meiers Corner to Seaview Hospital, opened to the public in October, 1921, were equipped with the Atlas trackless trolley, arranged to seat thirty-two passengers and to carry a maximum of seventy. The motors are series wound and of 25 hp. each, connected together mechanically by means of a propeller shaft which extends to a worm gear to drive the rear wheels. The wheels of the car are 36 in. diameter of the cushioned rim, cushion tire type. This installation was described in ELECTRIC RAILWAY JOURNAL, Oct. 15, 1921, page 67.

These initial lines, according to Mr. Whalen, passed through the severe winter of 1921-22 without an interruption of traffic, even though the other means of transportation on the island were frequently interrupted on account of snow or sleet. In fact, service was so satisfactory that when the residents of Tottenville, at the southwesterly tip of Staten Island, expressed a desire for a cheap method of travel to the ferry at St. George, by means of which connection is made with Manhattan, it was decided to extend the St. George-Richmond division of the Midland line (city operated) to Tottenville by means of a trackless trolley. The distance from Richmond to Tottenville is approximately 10 miles.

The new line, opened Nov. 4, 1922, was described in ELECTRIC RAILWAY JOURNAL, Nov. 11, 1922, page 293. The overhead construction is the same type as that employed in the earlier trackless trolley systems on the island.

The first trackless trolley purchased by the city had unnecessarily high road clearances and too narrow wheel treads, says Mr. Whalen, and were somewhat uncomfortable on account of a side-swinging motion. The engineers of the Department of Plant and Structures studied the problem and evolved a trackless trolley bus which has a much smaller road clearance, so that only one step is needed for car entrance. It has a much wider wheel tread, eliminating side motion, and a long wheel-base, giving greater comfort in riding and an improved appearance. The vehicle power plant and general means for operation were not altered, as these proved very satisfactory in the original cars. The new type vehicles were built by the Brockway Motor Corporation and have given satisfaction.

Regarding cost of operation, Mr. Whalen states that it costs 25.6 cents per mile to operate the trackless trolley over the roads in Staten Island, and it costs about 33 cents per bus-mile to operate a gasoline bus of the same capacity over the same roads. These costs include every item, such as interest on first cost of the entire investment, depreciation and maintenance, power for operation, labor for operation, administration, etc.

An advantage of the trackless trolley, he says, is the psychological effect. The general public has learned that while a bus line may be operating to feed some real estate development, there is no assurance that it will continue after the property of the development scheme has been sold; in fact, the public has learned the contrary. The trackless trolley, employing a relatively expensive overhead construction, conveys the assurance that this transportation is of a permanent nature. The advantage over the ordinary trolley system is that the trackless trolley requires no expensive track construction, which at the present time for the ordinary trolley, Mr. Whalen states, may vary from $40,000 to $200,000 per mile, depending upon the territory through which the system is to operate and the type of track construction required. The absence of this track construction naturally reduces the first cost of installation very markedly, and therefore the fixed charges.

Special Sign Painted on Dash

ON THE passenger cars of the Harrisburg Railways the word "special" is painted directly on the dashboard under the right-hand platform window. Ordinarily a route sign hangs over this word, concealing it from public view. In an emergency when it is desired to operate some car "special" it is necessary only to remove the route sign and the proper designation then appears. It is said that this plan has proved very useful in emergencies by insuring the presence of a special sign on every car.

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Association News & Discussions

Optimism Features Illinois Utility Meeting

Improvement in Spirit Attributed to Co-operative Effort—New Speaker's Bureau to Tell Utility Story in Local Talks Throughout the State—Railway Men Discuss Publicity, New Cars, Bus Operation and Track Construction

IN CONTRAST with similar meetings of only a very few years ago, the joint meeting of the Illinois gas, electric and electric railway associations, held at the Hotel Sherman in Chicago on March 26 and 27, was marked by a very obvious spirit of optimism. A record attendance at all of the meetings, a full program of timely and constructive papers, accompanied by animated discussions and favorable reports of relations with the public in various locations, were some of the outward evidences of the present spirit.

B. J. Mullaney, chairman at the dinner on Wednesday evening, called attention to the change which has occurred in the utility viewpoint during the past five years. "The atmosphere of this meeting," he said, "is marked by a total absence of that tendency to cry about our troubles which tinged some of our comparatively recent past meetings." Contrasting the present conditions with those of only five years ago, he attributed the improvement to the birth of a new spirit of co-operation among the utilities themselves and to a determination on their part to face their difficulties with a united, constructive effort. Success in telling the utility story to the public, he named as one of the primary reasons for the improved conditions.

Reports from the chairmen of each of the ten pulbic service speaker's bureau districts into which the state has been divided indicated considerable progress in the work of organizing the utility men in each district and in the compilation of lists of schools, civic, business and social organizations to be addressed by speakers working under the direction of the bureau. As outlined by the various district chairmen, this new activity has been given a favorable reception in those instances where talks have been given. It was reported that the people of the state seem to be genuinely interested in the information which the utilities have to impart.

Selection and development of employees to make simple talks outlining facts about utility business was considered an important part of the local committee activity. Posting all employees on such facts relative to their business as would enable them to answer questions in their daily contact with friends and customers was also held to be an important phase of the work.

Mr. Mullaney pointed out the importance of co-ordinating this new local activity with the work of the Illinois Committee on Public Utility Information, and explained that the publicity work of that committee as carried on through the newspapers and schools is of very material importance in arousing public interest in utility affairs and in making local audiences receptive and ready to hear the story told by the speaker's bureau representatives.

Railway Meetings in Afternoon

Both morning sessions were joint sessions, devoted to the general interests of the three associations. In the afternoons each association met separately for the presentation and discussion of technical papers.

The Wednesday afternoon session of the Railway Association was taken up by the presentation and discussion of papers on "Educating the Public," by Luke Grant, and on "Education of the Employees of the North Shore Line," by C. G. Goodsell. These two papers are abstracted elsewhere in this issue, along with a written discussion by W. H. Sawyer, which in the absence of Mr. Sawyer was read by Mr. Mitchell, East St. Louis, Ill.

J. R. Blackhall, general manager Chicago & Joliet Electric Railway, commended the publicity and educational work of the North Shore Line and stated that the industry owed a debt of gratitude to the management for the outstanding example which this property has furnished of the results which can be accomplished through properly planned and directed work of this kind. Mr. Blackhall was in entire accord with the idea of giving service first and then following with proper publicity. The resources of the small property do not allow the degree of specialization which can be carried out in the organization of the larger properties, and for that reason, according to Mr. Blackhall, the duties incident to publicity and educational work must be shouldered by the officers on the small property.

From the standpoint of the results which can be accomplished, he said that this difficulty is more than offset by the close contact between the management and its men on the one hand and between the management and the community served on the other. He maintained that the most important requirement for success is a proper appreciation by the small property manager of the results which can be accomplished by proper cultivation of the right kind of contact with both the community and the men of the property.

Prompt attention to complaints, which generally require only small expenditures for removal of the cause, were cited as a method of obtaining big returns in the form of a friendly public attitude. Settlement of damage claims whenever this is possible, in place of litigation, was mentioned as another effective method of inspiring good will.

Mr. Blackhall indorsed the speaker's bureau work and stated that in his opinion the majority of the public is essentially fair, and if the local utility has done its part in rendering the best service possible under given conditions the public is willing to listen to the utility side of the story. He said that the proper kind of publicity, particularly that prepared by the committee on public utility information, has helped a great deal in obtaining increased rates and in pointing out to the public the effects of automobile competition on railway service. He showed how proper activity by utility managers has put this industry among the leading industries of the community, fast resulting in utility men being given a leading place and taking a leading part in the activities of community civic organizations—Kiwanis, Rotary and similar clubs.

Executives Have Required Educating

F. E. Fisher indorsed Mr. Sawyer's views that it has frequently been the railway executives who required the educating as much if not more so than the public.

D. E. Parsons stated that personal contact with complainants was a successful method of making friends. He said that by getting in touch with the author of a complaint, either in the company's office or through a personal call, a friendly spirit of co-operation can be engendered which in most cases makes a booster for the company.

W. S. Vivian discussed the employee educational work which is being carried on by the Midwest Utilities Company, and also cited examples of previous work which he had done in training inexperienced employees to speak before large audiences. Not only does this kind of work accomplish very satisfactory results from the standpoint of "getting the story over," according to Mr. Vivian, but it soon receives the very enthusiastic support of the employees themselves, who become keenly interested.

To illustrate the extent to which public utility managements have become educated on the need for proper contact with their public, Mr. Grant cited examples from his experience in newspaper work. He said that in some cases he had had difficulty in getting an audience with a utility executive to obtain a confirmation on a commendatory story which had come to a newspaper's attention.

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Mr. Bosenbury advocated the Golden Rule as a safe policy in dealing with the public, and T. C. Roderick cited the value of frank statements through paid newspaper space in obtaining sanction of one-man operation in the tri-cities.

At the request of J. P. Barnes, chairman of the committee on co-operation with state and sectional associations, G. W. Welsh discussed briefly the activities of the new committees on city and interurban operation.

Motor Bus Operation

A paper by G. T. Seely on motor bus operation, which is abstracted elsewhere, opened the Thursday afternoon session. In the general discussion which ensued motor buses were held to have a place in the field of passenger transportation and to be particularly valuable for handling feeder service and for furnishing extensions to existing lines without the heavy investment required for additional railway construction.

Mr. Parsons advised close watch by railway men of the trucking activities which have followed the completion of hard roads, and stated that co-operation with the truck men would frequently result in inducing them to act as feeders to the railway lines. Mr. Roderick stated that two buses which are now in operation as feeders on the Tri-City property obviated the construction of an extension. These buses, he said, are being charged off on a depreciation basis of 250,000 miles, which at 50,000 miles per year will give an estimated life of five years. Charging the buses with a proportion of the railway overhead, on the basis of mileage, he estimates a total cost per mile of 18 cents.

In reply to a question, Mr. Seely stated that he favored buses of large seating capacity for city service, pointing out that the operating costs are not much greater than for smaller capacity vehicles, and the larger peak load capacity is very desirable.

Light-Weight Car Construction

H. H. Adams presented a paper on light-weight car construction, which is abstracted elsewhere. This was illustrated by lantern slides. Mr. Adams amplified his paper by a brief discussion on the automatic doors planned for use on the new Chicago cars. In relieving both the motorman and conductor of the duty of watching out for alighting passengers, these doors, he said, would give the trainmen more time for attention to their other duties and would thus lead to greater accuracy in the collection of fares and increased safety of operation. In addition, he said, the public would be given a favorable impression of improvement and progress by the use of these doors on the new cars.

J. M. Bosenbury pointed out that the problem of a great many interurban properties was to obtain light-weight equipment which would allow a more frequent service and increased speed. For smaller communities he held that the small single-truck type of one-man city car gave satisfactory results.

S. Clay Baker, engineer maintenance of way East St. Louis & Suburban Railway, East St. Louis, Ill., read a paper outlining some problems involved in the construction and maintenance of electric railway track. He said that to his mind "there are many problems confronting the way engineer of the future. With the scarcity and rapidly advancing prices of wooden ties, it seems to point to the use of a substitute which will require the use of concrete to obtain the necessary bearing value. Many properties are realizing the importance of this and are experimenting with the designs now available. Another argument in favor of the solid concrete type is the fact that the surface pavement has a very definite foundation that will withstand the excessive wheel loads of vehicular traffic. To develop the track of the future the principle of the resilient track structure cannot be lost sight of for past experience has led us to believe that this is the important factor in street railway track design.

"Another problem, and one which you now hear discussed by many engineers, is the subject of noise and vibration due to passing cars on a railway track. This is a growing demand of the future, and while it may be alleviated by the type of track structure in use, it may also be influenced by the design of the paving. The various block pavements previously laid with cement grout filler are now being installed with a bitulithic filler with noticeable results. This is especially true on ballasted type of construction where wood ties are used. The reduction of noise and vibration, to my mind, is a refinement of the future and will be taken into consideration in the track designs.

"I also believe it is well to call attention to the progress that has been made during the last few years in the standardization of track materials and the setting forth of recommended practice, thereby eliminating many problems confronting an engineer in determining the most suitable material or design to meet a given condition. This has been especially noticeable in bringing about co-operation with the manufacturers of track and equipment materials. Standard special work layouts may be purchased to meet all traffic conditions. Standard switch pieces, mates, frogs, etc., may be purchased for less than formerly due to the fact that the handling of shop details have been cut to a minimum. In the recommended standard rails there is a section designed to meet any traffic condition and the engineer adopting any one of them will find the particular design entirely suitable to meet his requirements. You can easily see that the way engineers of the future will find it an excellent policy to proceed along lines of recommended practices and thus be able to solve his own problems by the advice and experience of others in the industry perhaps more experienced than himself."

J. B. Tinnon, Joliet, Ill., said that it is frequently a serious problem to find the money with which to take care of needed reconstruction and maintenance of track, but it is most important that a way be found to keep the track in the best possible condition. In each case, he said, the construction adopted is a compromise between the requirements of vehicular and car traffic, and the car design plays a very large part in the results obtained from any type of track. He held that improvements in car design which will remove a part of the present large unsprung loads will do a great deal toward allowing the use of a type of track construction which will give good riding, reduction of vibration and long life.

Mr. Tinnon emphasized the advantages of utilizing standard materials and parts. He also stated that the practice of contracting construction work under proper inspection and supervision would merit serious consideration on many smaller properties where expensive hand labor was being used for such construction due to lack of proper machine equipment.

New Officers Elected

The report of the nominating committee was read by D. E. Parsons and resulted in the election of the following officers and executive committee for the ensuing year:

President, R. A. Moore, general manager Aurora, Plainfield & Joliet Railroad; first vice-president, J. F. Egolf, Aurora; second vice-president, C. F. Handshy, Springfield. Directors: W. C. Sparks, Rockford; F. J. McClure, Aurora; D. E. Parsons, East St. Louis; W. A. Baehr, Chicago; A. D. Mackie, Springfield; B. I. Budd, Chicago; J. R. Blackhall, Joliet; W. L. Arnold, Chicago.

At the dinner on Wednesday evening Floyd W. Parsons named customer ownership and consistent advertising as the two most important factors essential to the continued success of the public utilities. He pointed out the close dependence of the prosperity of industry in general on the utilities and painted a mental picture of the outstanding industrial progress which may be expected in the future.

Slotted Head Screws Standardized

A PAMPHLET giving tentative standard sizes of slotted heads for machine and wood screws has just been published by sub-committee No. 3 of the sectional committee on the standardization of bolt, nut and rivet proportions organized under the procedure of the American Engineering Standards Committee. The committee is anxious to have criticisms of these proposed standards before final drafts are submitted for approval. Copies may be obtained gratis by addressing C. B. Le Page, assistant secretary of standards, American Society of Mechanical Engineers, 20 West Thirty-ninth Street, New York, N. Y.

Philadelphia Section, A.I.E.E., to Discuss Electrification

RAILROAD electrification will be the subject of the April 14 meeting of the Philadelphia Section, A.I.E.E. The speaker scheduled is H. Van Buren Duer, electrical engineer of the Pennsylvania System. The Philadelphia Section, in anticipation of the large attendance, has engaged the ballroom of the Bellevue-Stratford Hotel for the meeting.

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Light-Weight Double-Truck Car Design*

By H. H. Adams
Superintendent Shops and Equipment Chicago Surface Lines

IN TREATING the subject of light-weight double-truck cars the writer is taking advantage of some recent work along this line upon the Chicago Surface Lines and will confine himself largely to a discussion of the problems considered in developing the design of this group of cars that are about to be built. He desires it understood, however, that in the treatment of the light-weight car he is dealing with conservative design, in which strength has not been sacrificed at any point for the question of weight, and in some cases, where the comfort of passengers is involved, additional weight has been put into the car. Furthermore, in the design an effort has been made to produce a pleasing car, having good lines, which presents an attractive appearance inside and out, as it is believed that such a car is a real asset. This last result in the Chicago Surface Lines car has been accomplished without adding to the weight.

The proposed cars are to be of the double-truck, two-motor, plain arch-roof type, without bulkheads, and provided with pneumatically operated doors on each side of each platform, and so arranged that they may be operated as single units or in trains of two or possibly more cars. On one side of each platform an automatic exit door is provided.

The dimensions of these proposed new cars follow:

Length over bumpers	48 ft. 11 in.
Length over corner posts	32 ft. 9 in.
Length of platform	8 ft. 1 in.
Width over drip rails	8 ft. 6 in.
Width over side girders	8 ft. 4 11-32 in.
Height from rail to top of trolley boards	11 ft. 6 in.
Truck centers	22 ft.
Seating capacity (car body)	48
Seating capacity (platform)	6
Total seating capacity (single unit)	54
Estimated weight, completely equipped	38,000 lb.

In operating these cars in trains of two it is believed that a great advantage will be obtained by the proposed arrangement for loading passengers at the center of the train, so that the boarding passengers may enter at one general location, rather than to split up the loading points, as would be necessary in other types of cars. This decision as to the method of loading was arrived at after studying various loading problems in connection with surface car train operation, and it has been demonstrated that a more equal distribution of the passenger load is obtained by this method.

In considering the weight of a car in relation to the entrance and exit facilities, it is not believed that too much consideration should be given to the use of but one step between the car floor and the street level, as it has been found that where steps are reasonably low and comfortable and a landing platform (or what is termed in some cases reservoir capacity) of sufficient size is provided, the movement of passengers is accelerated, even though another step is imposed in the form of a riser, from the platform to the car body, or from a well in the center of the car to the car body.

Wheel diameters affect this question, and in some cases where 26-in. wheels are used it is possible to get a low step, and at the same time, by means of ramps, so to design the entrance and exit passageways that one step only is required between the street level and the main floor of the car. In the writer's opinion, however, this practice does not tend to produce as good design as that of the drop platform or the well depression in the center of the car.

The side girder construction of this car consists of plates of No. 12 sheet steel, 30 in. wide, reinforced at the top and bottom, to which are riveted U-shape steel posts. These posts are riveted at the top to a sheet steel letterboard. The whole side of the car from the bottom angle to the top plate forms the girder for the car body.

The side posts are made of No. 16 gage steel, formed into a U-shape, with the closed end riveted to the side girder sheet. The wood filler is inserted in the open end of this U and is 1¼ in. deep. The parting strips and pilasters are screwed to this wooden strip. This type of post was used in a lot of 45 double-truck, one-man cars that were built and placed in service about a year ago, and satisfactory results have been obtained from them up to the present time. (See ELECTRIC RAILWAY JOURNAL, issue of Jan. 14, 1922. A number of them have been damaged by collisions, but it has been found that repairs can be readily made, with little or no more expense than in the case of wooden posts. This U-shape post is lighter and stronger than any other type of metal post we have been able to design. It is 27 per cent lighter than the 1½-in. x 1½-in. T-post which is being used somewhat generally in car construction at the present time. Tests have shown that the U-shape post, in comparison with the T-post, has 12 per cent less deflection, figured in 1,000 in.-lb., of bending moment when applied in the transverse direction of the car body. When the bending moment is applied in the longitudinal direction of the car body the U-shape post has a deflection which is 76 per cent less than that of the T-shaped post. The figures for both weight and deflection are for complete posts, with wood fillers or covering.

The wood filler for the U-shaped post has been so designed as to be readily removed to permit painting of the posts on the inside.

Plywood, ¼ in., is to be used for the roof. This is screwed to the wooden carlines and made in three sections, with butt joints. This plywood roof, shaped to form, we find to be very stiff and lighter than the ⅝-in. roof made with poplar boards, and while the cost is approximately 90 per cent in excess of the cost of the ⅝-in. poplar finished roof board (material only), the labor of installing the plywood roof is less than that of installing the poplar. The total cost of the plywood roof installed exceeds that of the poplar roof by about $30 per car, but as there is a saving of approximately 200 lb. per roof, we believe that we are warranted in making the increased expenditure, hoping that with a more general use of plywood for this purpose the cost will be reduced.

By the use of plywood, which gives a stiffer roof construction, we are enabled to use a lighter steel carline, the dimensions of which are 1½ in. x ¼ in. This compares with a steel carline 1½ in. x ⅝ in. used with the poplar roof construction. This reduction in weight of the steel carline is included in the 200 lb. saving in roof construction weight.

Experience has shown that the roof covering of a car is something that needs special attention, and that the ordinary procedure of covering a roof with cotton duck laid in white lead and painted with roof paint does not necessarily make a tight roof covering. It has been found necessary to use either prepared roofing materials or to treat the canvas with a waterproof treatment, which permits the canvas to remain in a flexible, soft condition throughout its life. The use of white lead and the usual roof paints, when applied upon the untreated cotton duck, generally results in the cracking of the paint. This permits rainwater to work through the cracks and the seeping action seems to extend clear through the canvas. By the proper treatment of the duck, or the use of treated canvas, this difficulty is avoided.

Cast steel bolsters of I-beam section 10 in. deep in the center are used. The average weight of these bolsters is 520 lb. These bolsters are tested with a center load of 22 tons, with bolster supported at side sill supports.

The length of the platform used upon the Chicago cars is much longer than that of the average city car, extending 8 ft. 1 in. from the end sill to the outside bumper. The outside platform knees are formed of 8-in., 13.75-lb. channels, reinforced top and bottom with 2-in. x 2-in. x ⅜-in. angles. In addition, the web is reinforced at the point of support with a 7-in. x ½-in. x 32⅝-in. plate.

It is desirable to keep the fiber stresses in the platform knees low, and it is the practice in Chicago to keep the stresses below 10,500 lb. per square inch. The point of maximum stress occurs at the end sill. The platform framing is designed for the use of radial couplers and ample cross bracing is provided.

Chicago's climatic conditions necessitate the use of a double floor for warmth, and in order to obtain this with as light a construction as possible the practice has been as follows. The lower floor is ⅝-in. thick fir, then a layer of 1/16-in. thick building felt, on top of which is laid a ⅝-in. maple floor. In the aisles the ⅝-in. maple floor is grooved to form the aisle mats. This makes a total thickness of floor of 1⅜ in., and while the weight is in excess of a single 1⅜-in. floor, it is necessary, as previously stated, for the local conditions, and illustrates a condition where weight is added to the car to provide for the comfort of passengers.

This design of car calls for two trap-door openings over each motor, with a space of about 8 in. of flooring between

*Abstract of paper presented before Illinois Electric Railways Association, at Chicago, March 26-27, 1924.

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the trapdoors, which is built in solid between two tees. This 8-in. strip is built in so as to form a solid fastening for the motor cables and motor junction boxes, which are installed at this location.

The posts are spaced 29½ in. center to center, and the lower and upper sash are designed so as to permit the use of standard size glass, thus eliminating the necessity of glass cutting. The lower sash takes a glass 24 in. x 26 in. and the upper sash 14 in. x 26 in. In this connection, the writer desires to point out that these dimensions correspond with the recommendations of the committee on unification of car design, as presented to the American Electric Railway Engineering Association, in convention, October, 1922, which recommendations, it is understood, are to be reaffirmed this year, and he desires to show that this represents good practice in car construction, the Chicago Surface Lines having used them upon the last four groups of cars designed totaling 445 cars.

Each platform is provided with three sets of doors on each side, pneumatically operated and controlled in the following manner:

All doors swing outward. On the left hand side of the platform No. 1 end the three sets of doors are to be operated in unison from one door engine and are to be controlled from the conductor's door control valve, located in a conductor's door control stand. The corresponding doors on the right hand side of the No. 2 end of the car are to be operated in the same manner. On the right hand side No. 1 end the two sets of doors nearest the vestibule corner post are to be operated in unison from one door engine controlled by either the motorman's brake valve or the conductor's door control valve. The one set of doors nearest the body corner post are to be automatically operated by another door engine, by means of a treadle, and are put in operating position either by the motorman's brake valve or the conductor's door control valve. The corresponding doors on the left hand side of the No. 2 end are to be similarly operated. The piping is to be so arranged that three sets of doors on the right hand side No. 2 end may be controlled from the conductor's position at No. 1 end, and the corresponding doors on No. 1 end are to be controlled from the conductor's position at No. 2 end. This permits the remote control of these doors at terminals, or for use in the future at subway stations. In addition, the last-mentioned sets of doors on each platform are to be arranged with a street collector's valve, for operation from a position in the street, at congested points on lines or at terminals. The decision to install automatic doors on these cars was arrived at after careful study and a thorough trial on a group of 45 cars, which have been in successful service for a year or more. It was decided that automatic doors would facilitate the exit of passengers, both when the cars operate as single units or in trains of two or more cars.

The type of electrical equipment to be used; that is, whether four-motor or two-motor, affects the problem of weight, even though the total horsepower of the motors is practically the same. In other words, a car that is designed to operate at good motor efficiency equipped with two 60-hp. motors will weigh about 1,000 lb. less than if four 35-hp. motors are used. (This would be the size of the motors that would have to be selected as being the nearest in equivalent horsepower to the two 60 hp. motors). The four 35-hp. motors would, of course, give a surplus of 20 hp., or an increase of 16⅔ per cent. In addition to the saving in weight there will be a substantial saving in the initial cost of the electrical equipment by using two 60-hp. motors.

In analyzing some of the weights per horsepower, based upon the manufacturer's rating of the motors, and the light weight of cars, it is found that with four-motor equipments that were placed in service about 1907-08 the weight ran about 265 lb. per hp. This was with motors of the non-ventilated type that had armature speeds of approximately 635 r.p.m. at 600 volts. An analysis of recent four-motor equipments installed in Brooklyn, St. Louis and Boston shows 285 lb. per hp., or an increase of 7.55 per cent. These last cars are equipped with motors having, in the case of Brooklyn and St. Louis, armature speeds of approximately 1,125 r.p.m., and in Boston 1,236 r.p.m. at 600 volts.

In the two-motor equipments, it is found that some of the light-weight equipments designed and put in service in 1912-13 averaged around 300 lb. per hp., and at the present time, we find that an analysis of the two-motor equipment of the latest Philadelphia Rapid Transit Company's double-end car runs about 314 lb. per horsepower. The proposed Chicago Surface Lines car will run about 316 lb. This gives an average of 315 lb. per horsepower, which is a 5 per cent increase over and above the 1912-13 average. The latest design of two-motor equipments has armature speeds of from 725 to 770 r.p.m. at 600 volts.

The above illustrates that there has been a gradual tendency to increase the weight per horsepower based upon the light weight of the car. This has been brought about by the lighter weight, higher speed, ventilated type of motor.

From tests recently made with modern two-motor equipments upon a car weighing light 38,000 lb., in service where the schedule speeds have run as high as 12.5 m.p.h., with stops of approximately six per mile and of six seconds duration, it has been found that on these modern two-motor equipments the average temperature rise has run very close to 55 deg. C., showing that from the standpoint of heating the motors are capable of taking care of a load of at least 315 lb. per horsepower, without excessive temperatures. The above figures are based upon tests made in Chicago upon one of the fastest crosstown lines. The average passenger load during the tests was 37.

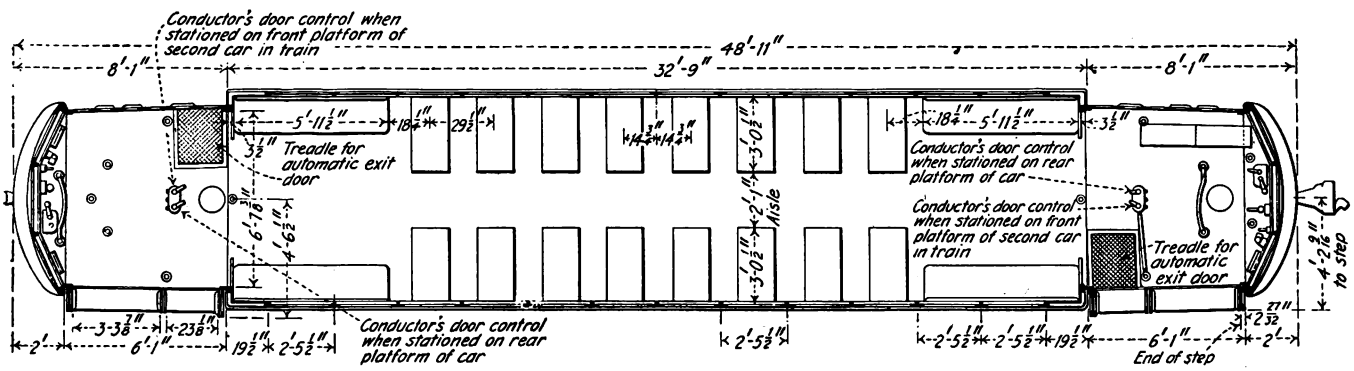
It is believed that in the selection of an equipment for light-weight city service cars serious consideration should be given to the use of the two-motor equipment, for the following reasons:

1. A two-motor equipment is lighter than the corresponding four-motor equipment of the same, or approximately the same horsepower.
2. The first cost is less per equipment.
3. Lower armature speeds.
4. The use of two large units instead of four smaller units.
5. Lower maintenance.

In considering the use of a two-motor equipment, due allowance has to be made for local conditions, as it is recognized that while these equipments may be operated in territory where grades as high as 5 per cent or even greater are encountered, for grades in excess of this a four-motor equipment would probably be desirable. A careful analysis should be made covering each condition before a final decision is reached.

The control equipment under consideration for use on these cars is the light-weight multiple-unit type.

We have specified on this group of cars a 10-in. x 12-in. brake cylinder, with an idea of equipping our cars so as to give a braking ratio not to exceed 1 to 10, in order to get the best possible results from the standpoint of a liberal range in the brake adjustments. This, we believe, will reflect itself in our



Floor Plan of Proposed One-Man, Two-Man, Multiple-Unit Cars for Chicago, for Use in Trains

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power consumption, by permitting our brakes to be adjusted freer and, at the same time, operated with adequate safety.

The heating equipment to be installed in these cars consists of 22 heaters of 400-watt capacity at 500 volts, and two platform heaters of 1,200 watts each, making a total of 11.2-kw. capacity for the heaters. All heaters in the car body are under thermostatic control. The platform heaters are to be wired in series, under independent switch control. This gives a heating capacity of 4.6 watts per cubic-foot of contents.

In deciding upon the seats to be used in these cars, it has been determined to use spring cushion backs as well as spring cushions, in order to give added comfort. This is another item where weight has been added for the comfort of the passengers.

The trucks will be of the maximum traction type, with 63 per cent of the weight on the drivers. The diameter of the driver wheels is 28 in. and the pilot wheels 21 in. By using a maximum traction truck instead of the usual type for four-motor equipments, a considerable saving in weight is made.

The cars are to be provided with automatic car and air couplers. This equipment usually runs slightly less than 1,000 lb. per car. Electric jumpers will be provided between cars for carrying train line and bus line circuits.

The total weight of the car, completely equipped, is estimated at 38,000 lb., subdivided as follows:

	Weight in Pounds	Per Cent of Total
Bare car body	14,500	38.2
Trucks, complete with wheels and axles, but without motors and gears	10,200	26.85
Total electrical equipment	6,590	17.33
(Motors, lb. 5,000 13.10%)		
(Control equipment, lb. 1,590 4.18%)		
Air brake and piping	1,765	4.63
Hand brake, seats, heaters, registers, thermostats, conduit and fittings, destination signs and miscellaneous	3,965	10.41
Couplers	980	2.58
	38,000	100.00
Weight per foot, over all	776	

How the Motor Coach Can Be Utilized in the Transportation System*

By G. T. Seely
General Sales Manager Yellow Coach Manufacturing Company

SMOOTH, hard surfaced roads are essential to successful motor coach operation. Little progress was made from 1902 until the last few years, when the number of coaches has increased at a rapid rate because of the more rapid improvement in road conditions.

Quantity production has placed the private automobile within the reach of every one. The yearly production of passenger automobiles and trucks in this country increased from 485,000 in 1915 to 4,012,856 in 1923, or more than eight times. At the end of 1923 there were registered in the United States 15,223,658 automobiles and trucks, or on the average of one for every 7.2 persons.

With this rapid increase in the use of motor vehicles, there came a corresponding improvement in the condition and mileage of hard surfaced roads. While the advantages of good roads have always been apparent, the urge toward improvement and extension of hard roads became greater as the number of persons owning automobiles increased.

Owners desire paving in front of their homes to provide the opportunity to drive their own automobiles to and fro, irrespective of weather or time of year. They cheerfully pay license fees for the maintenance of roads and pavements. Practically all fire apparatus is now motor driven. In cities and villages, deliveries of nearly all such necessities as coal, ice, foods, building materials, etc., are made by motor trucks, made possible by good pavements. In 1923 there were registered in the United States a total of 1,767,515 motor trucks of all kinds, engaged in business enterprises or private hauling.

In the January, 1924, issue of *Bus Transportation* it was estimated that there were between 40,000 and 60,000 motor coaches of all types in service at the end of 1923 in the United States. At the same time there were 83,000 railway passenger cars in operation in this country. These figures show that in a comparatively few years the motor coach has become a most important factor in transportation, even though the number of vehicles thus used amount to approximately only three-tenths of 1 per cent of the total motor-driven vehicles in this country, or 3.4 per cent of the number of trucks in operation.

The essential difference between electric street car or interurban car operation and motor coach operation is that in cities electric cars require an expensive roadbed laid in paved street, or ballast, ties and rails constructed on a private right-of-way for interurban lines; while motor coaches require only a hard surfaced road, used in common by private individuals and the very large number of industrial and commercial vehicles daily engaged in business enterprises.

Motor coaches can make on the average schedule speed as high as or higher than the average street car or interurban line. They have a range in seating capacity from a small 12-passenger vehicle up to a double-deck coach, seating 67 passengers.

There are many electric railways that have miles of tracks that now need or soon will need rebuilding. In many cases these are single-track lines with passing tracks. The growth in traffic due to the growth of the city since the tracks were built makes double-track construction necessary, either now or long before new track would be worn out. In a situation like this the railway manager is faced with an expenditure of from $100,000 to $125,000 per mile of line for new track, a sum practically four times the original cost of one track, due to double track instead of single track, higher standard of costs and more substantial character of present-day track construction. In some cases a street is too narrow to permit double-track construction. A motor coach line has all the operating advantages of a double-track street car line and the only expenditure necessary is that for coaches and a garage.

As a city develops and expands, it has been necessary for the electric railway to extend its lines in very thinly-settled districts.

With such a useful tool as the motor coach, the railway company can agree to furnish service when pavements are built. Because of the universal use of the automobile and delivery trucks, hard surfaced pavements in a new subdivision are much more of an essential than formerly. The railway operator can logically refuse to put $50,000 to $60,000 per mile of single track in subsurface construction on a line that will not pay for years.

In many cities the standard distance between street car lines is from 2,000 ft. to 2,640 ft., this spacing being selected to minimize the expense of constructing the permanent roadway. This arrangement requires a long walk for persons living midway between lines. Wherever such lines require rebuilding, the transportation company may install motor coach service with routes much closer together, reducing the number of vehicles on any given street and reducing materially the average walking distance to and from the transportation line. This will reduce the time required for the journey between the origin and destination of the passenger. This added convenience will materially increase the number of passengers using the transportation lines and induce many to use a public vehicle rather than their own car, thus materially reducing street congestion.

It is possible to install motor coach service on residential streets where it would be impossible to secure the right to construct new street car tracks, because of the absence of objectionable noise from operation.

Electric railway companies may utilize motor coaches also to increase the schedule speeds of their service. One company operated a section of track several miles long from which several radiating lines branched off. Complaints had been received as to the low speed on these lines and the long time required for the trip to and from the center of the city. Motor coaches were employed to handle the local traffic on this section of the line, only a few stops being made by the street cars. Four to five minutes were saved by each street car, enabling a number of cars to be diverted to other uses. The savings more than paid for the addition of the motor coach service and all the patrons of the line were pleased.

In cases where an extension of an existing line is required, motor coaches can be employed to serve the new territory, also serving the outer portion of

*Abstract of a paper presented before joint convention of the Illinois Gas Association, Illinois State Electrical Association and the Illinois Electric Railways Association, Chicago, March 26 and 27.

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the existing car line, and then running express with limited stops to the business center, saving time for the longer riders and, by relieving the street cars, either permit the removal of one or more cars, or provide additional seats for an increase in traffic.

Limited stop service with motor coaches can be employed in any section of a city served by a long car line with heavy traffic. This service can be routed on adjacent streets, relieving congestion on the car line and, by the faster speed, and reduced walking distance, increase riding. Service of this character performed with double-deck coaches presents the possibility in large cities of deferring the construction of subways or elevated railroads in territory outside of the business section, except perhaps in the very largest cities.

Years ago riding on electric cars purely for pleasure in the summer was an established practice. With the advent of the automobile this class of traffic practically disappeared. The motor coach offers the transportation company a new way of securing this pleasure riding, especially if double-deck coaches are used. In many cities, where private automobiles that have been laid up during the winter are put in service in the spring, there is a noticeable drop in street car revenue. The upper deck of a double-deck coach provides a means of pleasure riding that is fully taken advantage of on warm evenings, Sundays and holidays, by those who do not own automobiles and by those who do.

It has been generally considered that the double-deck coach has a field only in the larger cities, but I am confident that it will be demonstrated that double-deck coaches will be found to be a real means of selling transportation in cities with from 30,000 to 50,000 inhabitants. They will be of especial value where there is a lake, park, or place of amusement some distance from the center of the city.

Some electric railway officials feel that motor coach operation is something entirely different from their previous experience. As a matter of fact, practically the same transportation principles govern as in electric railway operation, and there are less operating difficulties because of the flexibility of the gasoline-driven vehicle.

Educating the Public*

BY LUKE GRANT
Manager Publicity Department, Chicago, North Shore & Milwaukee Railroad

EDUCATION of the public is the most important phase of electric railway operation. Without the good will and co-operation of the public no electric railway, or other public service company, can be entirely successful. The truth of that statement is axiomatic. How to educate the public, however, is a real problem. No formula can be given for general application. Each community has its own peculiar problems and its interest is only passive, if it has any interest, in the problems of other communities.

In this brief discussion of the subject I mean to confine myself largely to one phase of the problem. I think it the most important phase. The objective I have in mind is to "personalize" a company. I use the term "personalize" because it seems the most appropriate to express the idea I have in mind.

Since the corporation first was formed to carry on business on a larger scale than was possible for the individual firm or partnership, it has been referred to as "soulless." Without the corporation, modern business could not be carried on, yet it is still spoken of as being "soulless," although less so than was the case a few years ago. Public sentiment is gradually changing, due to the better understanding of the fact that the corporation has developed a soul, or a spirit. In the case of the public utility, at least, it is a spirit of service. If a corporation does not wish to be referred to as "soulless" it must prove by its actions that it is not.

The inspiration for this soul, this spirit of service, must spring from the head of the corporation. It must permeate every department and be infused into every employee from the highest to the lowest. That accomplished, the "personalizing" of the company to its customers—the public—will follow as a matter of course, through the co-operative effort of all the employees.

To the patron of the electric railway the employee with whom he comes in contact is the personification of the company. He is the one who expresses the spirit of service or the reverse. If each employee with whom the passenger has contact makes a favorable impression, the effect is cumulative. He has "personalized" that company to the customer and he extends the contact to others. To illustrate what I mean I will cite one or two typical instances.

TYPICAL INSTANCES QUOTED

A young mother, with a baby in her arms, is traveling on the North Shore Line from Chicago to Milwaukee. The baby is fretful and crying. The trainman approaches the mother in a sympathetic way, plainly indicating by his manner that he would like to be helpful if the mother could tell him how. She says the baby is hungry, but she has no way of warming its feeding bottle. "I believe I can have it warmed up," said the trainman. He went to the dining car, returning in a short time carrying the baby's bottle on a tray wrapped in a table napkin and handed it to the mother. The mother was grateful and offered the trainman a dollar bill. He declined the gift with thanks. "That is part of the service of the North Shore Line," he said simply, as he returned to his station on the platform of the car.

A significant point to that story is that it was neither the conductor nor the young mother who reported the incident. It was another woman passenger, a stranger to the mother and to the conductor, who wrote a letter to the editor of our company publication relating the story substantially as I have told it. She was so impressed that she felt she ought to commend the act of courtesy.

What has that story to do with the subject of this paper, "Educating the Public"? It has everything to do with it. The passenger who wrote that letter was given a more favorable impression of the company in five minutes than she would have obtained from reading newspaper advertisements every day for a year.

A traveling salesman boarded a train recently to go from Chicago to Milwaukee. It was early in the morning. He handed the conductor a mileage book and headed for the dining car. He ordered breakfast and when about to pay his check discovered that in his haste he had left his home without any money. He explained his position to the waiter. "That's all right, sir," said the waiter. "I'll pay the check and you can pay me on your next trip." The traveler did not wait for his next trip to pay that debt. He sent the amount—with something added—to that waiter immediately he reached home. The waiter proudly exhibited the letter he received. What impression did the traveler get of the company? It is safe to say that it was favorable and that he has told others about the incident.

One more incident and I am through with the human interest stories. A young man who works in Chicago and whose parents live in Milwaukee had spent the week-end with his folks. Returning, he had to take a train leaving at 5 o'clock in the morning. When about to purchase his ticket he discovered he did not have enough money in his pocket to pay the fare. He had friends in Milwaukee who would readily have cashed his check, but they were still abed. He bought a ticket to Racine, intending to get off there, get a check cashed and wait for a later train. He told the conductor of his dilemma. "I am not supposed to accept checks from strangers," said the conductor, "but I'll take a chance." The young man was very grateful. On reaching Chicago he wrote a letter to the editor of our company publication giving the details of the incident.

The thought may occur to you that these are isolated incidents and that the effect they have on the education of the public is infinitesimal, because the thousands of passengers daily carried on a railroad cannot be won over by such personal attention. The effect, however, is much greater than might be supposed at first glance, because it is cumulative. It is not alone the passenger receiving the attention that is favorably impressed. Others in the same car notice these things, they speak of them after leaving the car. When such incidents occur day after day, when they come to be recognized as a fixed policy of a company, such a company has traveled a long distance on the road to the education of the public.

I have dealt with only one phase of the education of the public; that is, "personalizing" a company through its employees. There are other phases on

*Abstract of paper presented before the Illinois Electric Railways Association, Chicago, March 26-27, 1924.

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which my time does not permit discussion. I wish, however, to make one more point before concluding.

Under public regulation the electric railway, or other utility company, has no secrets. Its cards are always on the table, face upward. Educational work should be directed toward driving home that fact. Where there is secrecy, there is sure to be more or less suspicion, and suspicion grows into distrust. Nothing is gained by withholding information about a public service company from its customers. I do not mean that it is necessary for a company to broadcast every intimate detail of its business. The public has no interest in such details. But the public is interested in a general way in the operation of a company that is supplying it with an essential service, and the more information of that character given the better it is for the company.

Every utility company wishes to have the confidence of its customers. It must therefore take its customers into its confidence, and by its fair and square dealing with them convince them that it really has a soul, a spirit of service.

Educating the Management*

By W. H. Sawyer
President East St. Louis & Suburban Railway

THE word "education" is a most misused word. We not only misuse the word itself but we use it in a sense which is detrimental to ourselves, to our associates, and to our business. I have heard many tell how we must educate the public, how we must educate our associates—wrong, all wrong. Who are we who are on such a high plane that we can educate all others? Education is all right, but education begins at home, begins with ourselves. It is not our business to educate others. We have no right to seek to educate others.

The only basis on which we have any right to educate others is in the sense that we have a right and a duty to impart information to others. But to teach them, train them, discipline them, tell them what they can do, what they must do, is not within our province. It would be far better to discuss the education of executives, of engineers, of transportation men, of publicity men. If properly educated ourselves we may then be able to impart knowledge to others which will be helpful to us and to them. The problem, therefore, is how best to educate ourselves, not how best to educate the public or our employees.

Due to lack of education we ourselves have been to blame for a large portion of the ills which have befallen the electric railway industry in the past. The electric railway man's duty is, first, to give service, efficient, satisfying service; second, to give the public, our customers, facts, all the facts regarding our business. The executive who is not following this plan today displays his lack of education, and is the one who needs to be educated.

In order that you will not misjudge my remarks I want to say now that the electric railway executive of 1924 has already acquired a considerable education and appreciates the fact that his education is not complete and that he must acquire a better education so that he may be better able to conduct his business. The great big majority of electric railway executives today are not trying to educate their public, because this is not their duty nor their right. What we are doing today, and doing far better than was ever done before, far better than any one even five years ago thought it was possible to do, is to give real service and real facts.

Doing these things as we are now doing them has brought about a most favorable reaction. Electric railways are as a result giving better service, carrying more people, and what is of most importance, our electric railways are in better repute, less criticised, and less open to criticism than ever before. Never before have we received the co-operation from the public that we are now receiving. We have a right to be proud of what has been accomplished. But what has brought about this result? Not the education of the public, but our own acquisition of education.

Our customers are entitled to the facts concerning our business. The best way to give these facts is through publicity in the advertising columns of the newspapers. If we follow this general plan we need not worry about the education of the public. All we need do is to follow along the trail blazed by Britton I. Budd, and then we will not have to meet and talk about the education of the public.

Now, just a word along similar lines regarding the education of our employees, our associates. All that I have said regarding the necessity of educating ourselves instead of the public applies equally well to the so-called education of our employees. We must meet our employees also from a 1924 standpoint. We must recognize that our employees, our associates, must have a pride in what they are doing and in what we are doing. We must recognize that they are our associates and part of our business. We need their co-operation, but we need not go out educating them. We, ourselves, must perform in such a way that we merit their confidence, and so that they appreciate that our interests are mutual, then we will receive their co-operation. They do not need education, but will fall into line when we conduct ourselves so it is easily recognized that it is to their interest to co-operate with us. We must be human, we must be fair, and we must recognize the part they play in this big industry of ours.

None of us have reached the point in our own education that we are in the best position to do all the things that we should do for our associates. It does us good to gather together like this and talk over the things which have been accomplished toward bringing about co-operation from our associates.

There is one little thing we have done down our way that has been very helpful in bringing about co-operation. Some years ago we had street cars that were swept at times and washed at times. We had motormen and conductors that were at times courteous and helpful to our customers, but a lot of the time things were not as they might have been. But those men were not to blame that their customers were not always treated courteously, because in the past we executives and operators were satisfied to give this kind of service. I did not try to educate these men but I tried to gain their co-operation, and I believe I am succeeding. I did not go out and damn them because the cars were not clean. I did not go out and damn them because they were not courteous and helpful to their customers (we never even called them customers in the old days, they were just people that rode street cars, rode street cars because they had to ride them).

Our first step was to get a true picture of just what we were doing. In order to do this I hired, so to speak, half a dozen people, whose work required their riding the cars a considerable portion of the time, to report to me what they saw when they rode our cars. I explained to these people what we were trying to do and then asked them to tell me if we were doing it. I asked them to pay particular attention and give me detailed information concerning those men who did something better than the average. If they saw a conductor or motorman do an especially courteous act I wanted them to be sure and tell me about it and give me all the details. Whenever I received a report of an especially courteous or helpful act I immediately wrote the conductor or motorman a personal letter, telling him of the report I had received and "as a slight token of my appreciation of his helpful attitude" I inclosed a $5 bill. The $5 did not buy that man; my writing him a commendatory letter did not change him from black to white, but it did do this—it let that man know I wanted to co-operate with him to give satisfying service, and it also let him know that I appreciated he was part of our big industry.

As time went along I kept telling the public about these courteous acts and about how these men were trying to be courteous, and about the pride I had in them for being courteous. We got to the point that I asked the public, invited the public, begged the public to tell me what they saw on the street cars. I told them I wanted criticisms if they had any, but I particularly wanted them to tell me whenever they saw any of our men doing something especially helpful. In the course of time I received a real response from our customers. I got to the point that I did not have to pay people to tell me of helpful acts; our customers did it voluntarily. Why? Because we were performing; because we were doing the things that bring about satisfying service, and because we were going to our

*Abstract of a paper presented before the Illinois Electric Railways Association, Chicago, March 26-27, 1924.

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public, our customers, and talking to them through newspaper advertisements telling them what we were doing, and what we were trying to do. That is why we got a response from them. They knew what we wanted to do; they knew that what we wanted to do was mutually helpful and were willing to co-operate with us.

About the same time that we started what some people would call a courtesy "campaign"—I never call any of them "campaigns," a campaign means something that you do for a short time—a whirlwind affair; we also took another hold of ourselves in regard to clean cars. We doubled the force in the car-washing shop; we washed our cars twice as often; we washed windows in between car washings, so we washed windows four times as often. We then put a broom on each car and asked the conductor or motorman to sweep the car at the end of the run. Of course they did not all do it right off; they were not used to sweeping out cars—some of them said they were not porters. We did not damn them if they did not do it, but whenever we found an especially clean car I wrote the man a letter and sent him a $5 bill. They commenced to have a pride in keeping their cars clean; they commenced to want to keep their cars clean. Of course, they do not now all keep their cars as clean as we would like to have them, but a lot of them do. One thing is sure—they are practically all doing a better job than they used to do.

Now these are two things, two small things, that we have done down our way to bring about better public relations and better employee relations. We have tried to more nearly satisfy our customers by cleaner cars and more courteous and more helpful platform men, and at the same time have materially increased the co-operation from our associates. This was brought about by the education of ourselves. There are many other little things that we have done down our way in which we have a real pride. Do not misunderstand me, we down our way are not educated; we still have a lot to learn, but until we more nearly perfect our own education we are not going to complain of the lack of education on the part of our customers or our associates.

Education for the North Shore Line Employee*

By C. G. Goodsell
Educational Director Chicago, North Shore & Milwaukee Railroad

IN OUR educational program for employees of the Chicago, North Shore & Milwaukee Railroad we began with the laborer out on the right-of-way. This was in 1921, and as this work of teaching these men English, citizenship and trackwork began to attract attention the inquiry came from other employees as to why not educational work for them? A trainman inquired about an opportunity to learn to speak better English. Another wanted to know what he should study to be in readiness for some advancement. A merchandise dispatch agent asked about getting a better knowledge of freight traffic. In one department an official stated that not a foreman could make a rough shop drawing which would give one any conception of what he had in mind. Many other evidences indicated the need of a company-wide educational program.

It was about a year ago that the educational service of the road was finally extended to employees of all departments by the appointment of a new educational committee and the enlarging of the field of service of the educational director to cover the broader work. About this time a letter went out under the signature of Britton I. Budd, president of the road, encouraging the educational efforts of the employees and stating that the company would be glad to share the expense where any was incurred in pursuing courses which would better equip one for work with the road.

As a result of this indorsement of the educational movement by the management a great many employees began to think about the matter of education and many inquiries were received. In a few months 150 interviews had been held with the supervisory force and employees desiring more education and much valuable data relative to the needs of our employees was secured.

Immediately steps were taken to meet these needs through outside educational institutions or our own classes as the conditions warranted and as a result the following subjects have been studied by our employees during the year: Air brakes, arithmetic, acetylene welding, accounting, blue print reading, shop drawing, railway surveying, public speaking, English, electricity, freight traffic, freight car repair, foremanship, mechanical drawing, office management.

Short courses were conducted by the company in air brakes, blue print reading and shop drawing, English and public speaking. Private instruction has also been given in electricity, mathematics, sheet metal drafting and shop drawing. Arrangements were made last fall with the public evening schools in Milwaukee and Kenosha, Wis., for our employees to attend classes even though they were not residents of these cities. We also have students in evening classes at Northwestern University School of Commerce, Armour Institute and De Paul University in Chicago and a commercial business college at Waukegan, Ill. Home study courses are being taken by a few of our employees through the Railway Educational Bureau of Omaha, the Milwaukee School of Engineering, LaSalle Extension University and others. Over 200 employees have been enrolled in our own classes during the year and about seventy enrolled in outside institutions.

An experiment in educational clubs is being made which looks attractive. A track foreman's club, an office boys' club and a public speaking club have been tried so far. Some difficulties enter into the problem in the case of the boys' club, but the two others indicate that more educational clubs may prove a successful part of our program.

We hardly need say that the easiest part of this educational program is the enrollment of the students. The real work comes in keeping the man "at it" until he has completed something. As you know, over 90 per cent of those enrolling in correspondence school courses in this country never complete them and our crowded city evening schools usually find they have plenty of room for more students after a few weeks of hard work. This is no argument for abandoning the task, however; it simply means that the average man is naturally a "quitter" and that he needs help. It means that some one is needed on the job for the express purpose of helping the average man get the education he needs for the job he is holding or for the better one ahead.

Most of the programs laid out for the education of the man in industry are not attractive enough to hold him. The work is often not elementary enough for the average and usually the courses cover so long a period that he is discouraged before he starts. We have often heard officials say, "If the man hasn't the stuff in him to stick to a course of study and complete it, let him go. I stuck and I didn't have half the chance this fellow has had." Now, as a matter of fact, we have no business "letting him go." It's the average man that makes up the great army of our employees, and when we let him go we simply say we are going to cripple along with an inefficient, untrained force and a high labor turnover. Better say, "We'll find the difficulty and remedy it." Too little time and thought has been spent on this problem.

Some one has said, "Carter's Little Liver Pills never would have had half the sale if they had been Carter's Big Liver Pills." So it is with education. Small doses, and if necessary sugar-coated, will get results never secured from long courses offered in an unattractive form. But I hear some one say that a short course does not amount to shucks. I differ absolutely with that statement. A short course does amount to a great deal. In the first place even one hour a week for ten weeks may put a man on the road to bigger and better things if the right kind of a man is teaching him. It gets a man out of his rut. He begins to get a vision of the things beyond. He begins to feel the joy of mastering something. If the course is a practical one, as it usually should be, each lesson gives him something which he sees will come in handy on his present job or the job ahead. It often is the means of getting him interested enough to dig up the technical books he has stowed away at home and make them a live source of information. It literally takes that man out of the class of the "standstills" and puts him in the "go aheads."

There is another effect also which should not be overlooked. That man

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immediately begins to think a little more of himself, to stand a little straighter, to feel a little more as though life was worth living. You show me a bunch of men in your employ who are studying some practical subject together, no matter how simple or short the course may be, and I'll show you a bunch of men who are making for a better spirit; they'll be boosters rather than knockers.

We are now working on short courses to be offered on our property which will be so related to each other that a man may take a single short course in blue print reading, shop drawing, shop arithmetic, air brakes, principles of electricity, car wiring, electrical signals, motors, etc., or he may take a combination of several of these subjects, using two or three nights a week, so that he will in the course of time have a large amount of technical knowledge which will apply to conditions as they exist on our property.

This will be, we believe, training of a grade within the reach of the average man. The man with a very limited education and only ordinary perseverance but able to give good service may develop into a valuable man to the company and a better provider for his family.

New England Club Has Usual Rousing Annual

NEARLY five hundred attended the annual banquet of the New England Street Railway Club at the Copley Plaza Hotel, Boston, March 27. As is customary at this meeting, the only business transacted is the election of officers late in the afternoon. The evening banquet is given over entirely to prominent speakers from outside the railway field. This year the club was particularly favored. Those who accepted places on the program were the United States Senator from New Hampshire, the Governor of Massachusetts and the Mayor of Boston.

President Ralph D. Hood delivered a brief address on the activities of the club, which has had one of its most active years, then introduced former Massachusetts State Senator Robert M. Washburn, who acted as toastmaster and certainly made the most of his opportunities.

United States Senator George H. Moses spoke briefly on the spirit of suspicion and innuendo which obsesses Washington at the present time. As chairman of two investigating committees and a member of a third, he commented that he thought he could speak with authority on the low character of some of the testimony that has been taken in these investigations. Incidentally, the toastmaster made a good deal of humor at the expense of the Senator on the character of the testimony and the personnel of the investigating committees, which the Senator seemed thoroughly to enjoy.

The Senator spoke pointedly about the tax situation. He said that six states pay 62 per cent of the entire burden of the federal government, and that obviously all representatives of the less populous states vigorously oppose any measure that would tend

to bring about a more equitable distribution of the taxes. He said the dollar-for-dollar plan of building roads, whereby the federal government contributes a dollar for each dollar the state puts in, looks upon its face to be very meritorious. Actually, however, it means that the six heavily taxed states pay a large share in the road programs of other states. As he put it, it makes the progressive states pay for the backward ones. For example, New Hampshire pays a federal tax of $23 per capita, but on the dollar-for-dollar program it gets back 89 cents in federal money, and in order to get that it has to tax itself practically another 89 cents. Another state which draws $3.25 per capita of the federal funds pays $8,000,000 less than does New Hampshire, and another draws $1.86 and pays only one-half the federal tax that New Hampshire does.

Governor Channing H. Cox made a brief but stirring speech to the effect that our republic, with all its faults, is the most glorious success of any form of government that has ever been set up.

Mayor James M. Curley had to disappoint the convention at the last minute, but he was ably represented by Mark Sullivan, who extended the welcome of the city. The last speaker on the program was the Rev. William Porter Niles, essayist.

New Officers Elected

The following officers were elected for the ensuing year:

President, T. H. Kendrigan, superintendent and claim agent Manchester Street Railway, Manchester, N. H.

Vice-presidents: For Massachusetts, L. D. Pellissier, Holyoke; Connecticut, J. K. Punderford, New Haven; New Hampshire, L. E. Lynde, Dover; Vermont, T. B. Jones, Burlington; Maine, Fred R. Gordon, Portland; Rhode Island, Edward A. Brown, Newport.

Secretary: John W. Belling, Boston, Mass.

Treasurer: Fred F. Stockwell, Cambridge, Mass.

Executive Committee: Ralph D. Hood, Charles H. Wood, W. W. Field, Howard F. Fritch, George H. Martin, George H. McFee and H. M. Flanders.

Suggestion 2,396,453. A music box attached to the "coin catcher" to keep the cash customers contented.

Southwestern to Have Good Railway Program

THE Southwestern Public Service Association will hold its annual convention at New Orleans, La., on April 22-25, at the Roosevelt Hotel. The program this year contains an unusual number of papers and discussions of interest to electric railway men. The program also comprises sessions and subjects for the gas and electric men. Of particular interest to the railway men are the following items on the program:

Tuesday Morning

"Prone Pressure Method of Resuscitation," by Samuel H. Reid, Bureau of Safety, Chicago.

Wednesday Morning

"Why Street Car Rides Vary Widely in Cost in Different Cities," by J. W. Welsh, executive secretary American Electric Railway Association, New York.

"Proper Financial Structure of a Public Utility Company," by W. C. Lang, assistant comptroller Electric Bond & Share Company, New York.

Wednesday Afternoon

"The Relations of the American Electric Railway Association to the Regional Association," by J. W. Welsh, executive secretary American Electric Railway Association.

"Operation and Maintenance as Basis of Public Relations," by A. B. Paterson, vice-president New Orleans Public Service, Inc.

"Education and Development of Employees with Reference to an Understanding of the Fundamentals of the Railway Business," by G. H. Clifford, vice-president Northern Texas Traction Company, Fort Worth.

Thursday Morning

"The Street Railways and the Public," by W. H. Sawyer, president East St. Louis & Suburban Railway, East St. Louis, Ill.

"Employee Training for Better Public Relations," by S. M. Kennedy, vice-president Southern California Edison Company, Los Angeles.

"A Giant Awakened," by Alexander Forward, secretary-manager American Gas Association, New York.

Thursday Afternoon

Transportation Division

"Training of Inspectors," by W. W. Holden, superintendent of transportation San Antonio Public Service Company.

"Schedule Making and Organization of the Schedule Department," by T. H. Owens, Dallas Railway.

"The Relation of Types of Cars to Character of Service," by R. Meriwether, general manager Dallas Railway.

"Accident Prevention," by W. A. Robertson, superintendent of railways, Eastern Texas Electric Company.

Public Relations Division

"Railway Advertising," by C. J. Crampton, Dallas Railway.

"Participation in Public Activities," by W. E. Wood, manager Houston Electric Company.

Mechanical Division

"Use of Electric and Acetylene Welding in Shops," by Walter Silvus, Texas Electric Railway, Dallas.

"Shop Organization and Practice in Connection with Maintenance and Extension of

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Equipment," by V. W. Berry, general superintendent Northern Texas Traction Company, Fort Worth.

"Rapid Wear of Carbon Brushes on Ventilated Motors," by F. J. Bennett, Houston Electric Company.

Maintenance of Way Division

"Various Types of Track Construction with Reference to Costs of Paving," by R. G. Tabor, Northern Texas Traction Company, Fort Worth.

"Types of Joints and Methods of Installation," by G. W. Smith, San Antonio Public Service Company; R. B. Fehr, Rail Welding & Bonding Company, Cleveland, and others.

"Creosoting and Other Methods of Preserving Ties and Poles," by E. E. Boehme, International Creosote & Construction Company; J. P. Logan, National Lumber & Creosote Company, and others.

"Cast Steel and Alloy Steel vs. Manganese for Special Work," by E. B. Ledwisle, Lorain Steel Company; James H. Budd, Bethlehem Steel Company, and others.

"Crossings—Type, Paving and Foundation," by B. H. Taylor, Houston Electric Company.

Accounting Division

"Use of Machines in Accounting Work," by F. J. Gannon, assistant treasurer Northern Texas Traction Company, Fort Worth.

"Obtaining Car Mileage," by W. R. Burns, Dallas Railway.

"Transportation Pay Roll Accounting," by A. D. Dufour, New Orleans Public Service, Inc.

FRIDAY MORNING

"Building in the Public Mind the True Conception of Utilities," by E. F. Wickwire, vice-president Ohio Brass Company, Mansfield, Ohio.

"Relation of Bus Operation to Street Railways and the Outlook for the Future," by W. B. Tuttle, president San Antonio Public Service Company.

"Methods Employed for Elimination of Car Pull-Ins and Relation to Service," by R. M. O'Brien, New Orleans.

American Association News

Legislative Activities in Washington

American Association Committee on National Relations Busy Presenting Point of View of Electric Lines on Three New Bills—Suggestions Made for Guidance of I. C. C. on Application of Section 15a

THE committee on national relations of the American Electric Railway Association made an appearance at a hearing on March 29 before the Senate interstate commerce committee on the Howell railway labor bill, S. 2646. In a word, this bill provides that the present wages and present working conditions shall continue in effect. If a revision is desired, thirty days' notice must be given to one of the several boards that would be set up by the bill, and can be made only upon approval by this board. The electric railways are specifically included in the bill and its effect would be to bring adjustments under a national board. It might result in forcing electric railway employees into the steam railroad brotherhoods.

Charles L. Henry, chairman of the national relations committee; Frank Karr, Pacific Electric Company; R. R. Bradley, Chicago, North Shore & Milwaukee Railroad, and W. V. Hill, San Francisco, appeared for the electric railways. A short but specific statement setting forth the position of the electric railways with respect to such a proposal was presented by Mr. Karr. Just after he concluded, D. R. Richberg, counsel for the organized steam railroad employees, addressed the Senate committee and said that the proponents of this bill did not desire that the electric railways should be included, if such railways and their employees did not so desire; that in the light of former legislation they had concluded that it was proper to put the electric railways in, but the latter might be removed from the bill without any opposition on the part of those pressing this bill for passage.

HEARING ON STEEL CAR PROPOSAL

Representatives of the association made an appearance in Washington on March 20 before the Senate interstate commerce committee on the proposed Dennison bill, H. R. 4107. The Dennison bill is known as one "for the protection of persons employed on railway baggage cars and railway express cars." It has been substituted in the House for Senate bill S. 863. It provides that carriers, specifically including interurban and suburban railway companies irrespective of whether steam or electrically operated, shall use only baggage and express cars after July 1, 1926, which are constructed of steel or have a steel underframe, and that after this date all new cars must be constructed of steel, subject to the approval of the Interstate Commerce Commission.

The bill is designed primarily to apply to steam carriers, but the committee on national relations felt that the electric railways should appear and point out that the conditions it was sought to correct did not exist in the electric railway field. At the hearing Charles L. Henry made a short statement for the electric railways and introduced H. A. Mitchell, vice-president and general manager San Francisco-Sacramento Railroad, Oakland, Cal., who made a statement. Others in attendance representing electric railways were Frank Karr, San Francisco; E. H. Maggard, Petaluma, Cal., and W. V. Hill, San Francisco. The committee finally indicated that the proposition to require all steel cars in baggage and express service would be confined to Class A steam roads, and main line service in particular.

ANOTHER SIMILAR BILL INTRODUCED

While it appears that the House bill referred to above will not affect the electric lines, another bill, S. 1499, has been reported to the Senate without a hearing in committee, which involves the electric railways. This bill passed the Senate with but slight opposition on March 28. It prohibits the use of wooden cars. Senator Harris, its author, was asked by Senator King whether it would prohibit the operation of wooden cars on interurbans. Senator Harris replied that it would not, but in answer to another question he stated it would not permit electric lines to use wooden cars between steel cars. This would prohibit electric lines from operating a wooden car in the same train with a steel or a steel underframe car.

RULES SUGGESTED AS TO APPLICATION OF SECTION 15A

At the close of the hearing on March 19 before the Interstate Commerce Commission in Washington on whether Section 15a of the interstate commerce act should be applied to interurban railways (see ELECTRIC RAILWAY JOURNAL for March 29, page 511) Commissioner Potter requested J. V. Norman, counsel for the Interstate Public Service Company, to endeavor to obtain the approval of as large a number of the interested parties as possible to general rules which would automatically place many carriers without Section 15a. The idea was that such rules would relieve the commission from the individual consideration of many carriers. During the hearing Mr. Norman had proposed certain rules in his testimony. He stated that these rules were to be considered as general rules which would exclude from further consideration a large number of companies, but that it was not to be understood that companies not excluded thereby were inferentially within the act.

After the hearing was concluded, a meeting was held of all present and there was a long discussion of rules that might be proposed. All those present agreed on Rule 1, as stated below, as a proper one, but many of them were unwilling to subscribe to it as a proposal coming from the electric roads for fear that the commission might receive the impression that the companies not excluded by the application of the rule were inferentially within the provisions of the act.

No agreement whatever could be reached on a proposed second rule, as stated below, principally because the meeting could not agree on the phraseology, but also because such a rule might be so applied as to exclude from the operation of the act some companies which desired to come within its operation.

The two rules discussed were as follows:

Rule 1. No electric interurban railway is "engaged in the general transportation of freight" within the language of Section 15a unless it exchanges freight traffic with steam carriers under through routes and joint rates.

Rule 2. An electric interurban railway which interchanges freight traffic with steam carriers, as provided in Rule 1 above, is not within the provision of Section 15a unless it holds itself out to handle the same general classes of freight in the same general manner as steam carriers.

In view of the considerations already stated, the meeting decided not to propose any rules to the commission, but authorized Mr. Norman to convey to it the information that while all agreed that Rule 1 is a proper rule they were unwilling to propose it for the reasons stated above.

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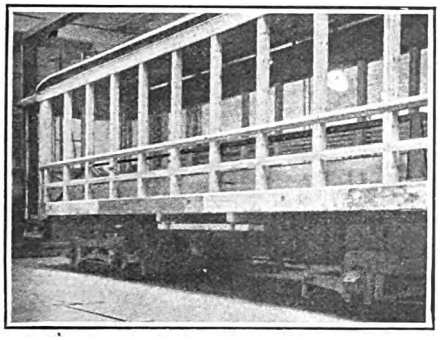
Maintenance of Equipment

Truss Braces Rebuilt Car

AN UNUSUAL method of bracing the car body has been adopted by the Holyoke Street Railway in rebuilding for passenger service a mail car which formerly operated between Northampton and Springfield. Two triangular iron castings are used on each side as vertical compression members of a truss, with a steel strip as the tension member. One casting is placed beside the second window post from each end of the car. A steel strip ⅜ in. thick and 1½ in. wide is fastened beneath the frame at the corner post and runs up over one triangular support, continues parallel to the floor of the car, then over a similar support at the opposite end, and down under the other platform floor. Two trusses of this sort are used in this reconstruction, one on each side of the car.



A Truss on Each Side of the Car Prevents Platforms Sagging

New Platforms Added to Old Cars

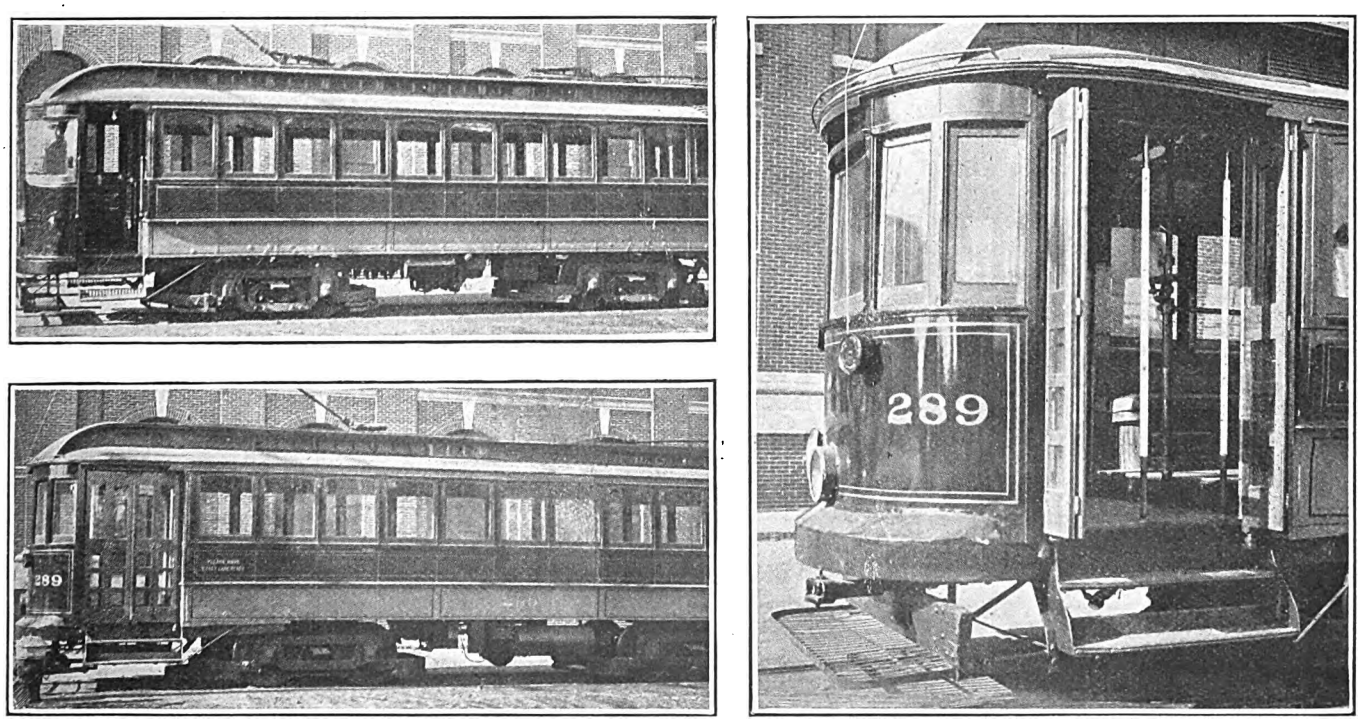
IN THE conversion of some of its older cars to the prepayment type the Union Street Railway, New Bedford, Mass., has extended the car platforms. This was done by making a clean transverse cut at the bulkhead and removing the platform. The old platform and dash were used again in the rebuilt car, an 18-in. section being inserted at the bulkhead. The platform knees on these cars are of wood, reinforced on either side by steel plates. Extensions to the plates were bolted on and an 18-in. wood block inserted to fill the hole.

The end bulkheads were taken out to facilitate the use of the prepayment plan on this type of car. Convenient grab handles were placed in the center of the double doorway and at both sides. These are located inside the folding doors so as to discourage passengers attempting to board the car after the doors have been closed. The doors are manually operated, but are interlocked with a line switch in the main motor circuit. Another safety feature which was introduced when the cars were rebuilt was the use of sloping steel hoods on the end bumpers.

The weight of these cars was slightly less than 19 tons before rebuilding. The reconstruction added only a small amount to the weight. A modern type car has been acquired at approximately 10 per cent of the sum that new cars would have cost.

Handy Method for Supporting Short Armatures

WHERE armature racks are constructed for supporting railway motor armatures, which are all of approximately the same length, difficulty is sometimes experienced in providing supports for short armatures such as those for compressor motors. The accompanying illustra-



An 18-In. Section Was Added to the Platform to Fit New Bedford Car for Use on the Prepayment Plan. At Right, Enameled Stanchions Placed to Aid Ingress and Egress and Divide Passenger Streams

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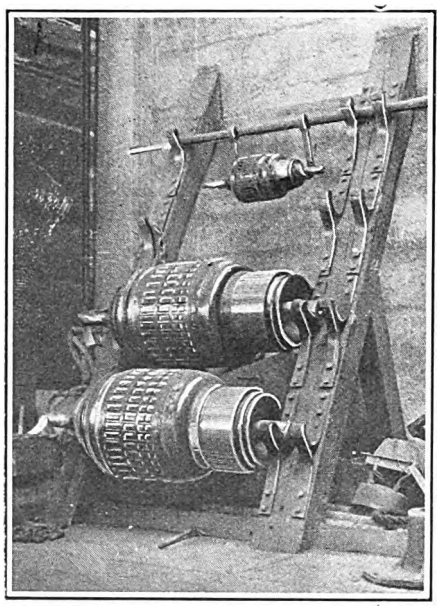
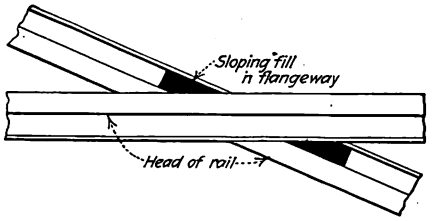


Built-In Armature Rack with Provisions for Supporting Short Armatures

tion shows an armature rack in the shops of the Philadelphia & Western Railway, Norristown, Pa. At the top is a short armature which is supported by hooks from a shaft extending over the supports ordinarily used for the longer armature shafts. By this method the short armatures can be stored in the rack where the larger type armatures from railway motors are placed.

Special Crossover Preserves Continuous Through-Rail

AN UNUSUAL type of crossover has been made by the Springfield Street Railway, Springfield, Mass., for use in front of its carhouse at Main and Carew Streets. It is frequently desired to cross cars over from one track to the other at this point, but there is also through service on a comparatively short headway and it was thought undesirable to break the through-rail. To meet this situation a special crossover was made by the track department. The main line rail was left continuous and the crossing rail was welded to it. Grooved rail was used in both cases and a sloping fill was welded into the flangeway of the broken rail in order to facilitate the passage of wheels over the continuous rail.



The Sloping Fill of Welding Metal Facilitates the Passage of Wheels Over the Continuous Rail of This Home-Made Frog

Painted Paths Promote Safety

IN THE shops of the Worcester Consolidated Street Railway, Worcester, Mass., an overhead monorail system equipped with chain hoists is used for transporting heavy material. This was described in the JOURNAL for March 22. The routes by which this material is moved are therefore definitely established, and have been marked out on the floor. A broad white stripe on each side indicates the limits of the passageway which must be kept clear for the movement of material. Nothing is permitted to be stored in this area. The passageway is also available for individuals walking from one place to another, movement of material in hand trucks, etc. The white lines are repainted about once every two weeks so that they are always distinct.

It has been found that the cost of thus marking the passageways has been more than repaid by reduction in the number of accidents due to persons, or material in transit, colliding with material stored on the floor.

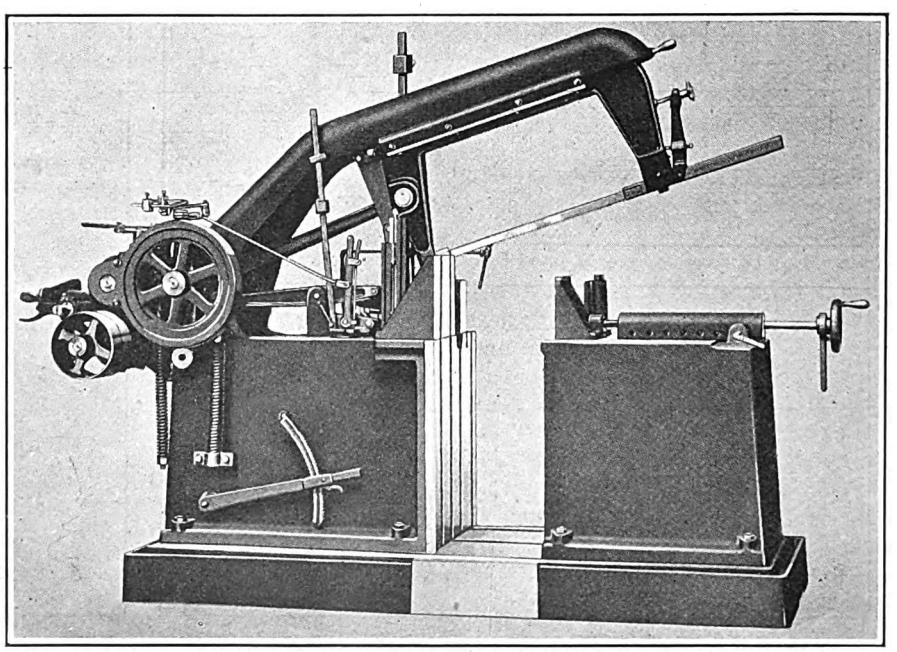
New Equipment Available

Power Hack Saw with Gap

A NEW type of power hack-saw, which the manufacturer calls a "Gap-Saw," has just been announced by the Peerless Machine Company, Racine, Wis. As in the case of a gap-lathe, when the gap is closed the saw can be used for ordinary purposes. When the gap is open, it has an excess work holding capacity of 24 in. in height and 16 in. in width.

The work can either be clamped to the finished vertical face on the bed, where four "T" slots are provided for clamping purposes, or the work can be clamped directly to the base, where three "T" slots will give ample clamping convenience. The base has a water-trough extending entirely around its perimeter, which carries the coolant back into a reservoir located in the rear of the base, from where a rotary geared pump circulates the coolant up into the distributing pipe. The finished pad which is opposite the gap and which is located on each side of the base is for the convenience of the operator when locating work which is clamped directly to the base. The left-hand edge of the bed is also finished for measuring convenience purposes.

A piece of steel 16 in. x 26 in. can be sawed in two by sawing through 13 in. and then meeting the cut by



Power Hack Saw with Gap Open

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GENERAL SPECIFICATIONS FOR POWER HACK SAW

Capacity of machine on ordinary work	13 in. x 16 in.
Capacity of gap-work	16 in. x 37 in.
Length of blade	14 in. to 24 in.
Length of machine	80 in.
Width of machine	30 in.
Weight of machine, approx.	3,000 lb.
Distance from floor to top of base	6 in.
Distance from floor to top of table	30 in.
Strokes per minute of saw frame	125

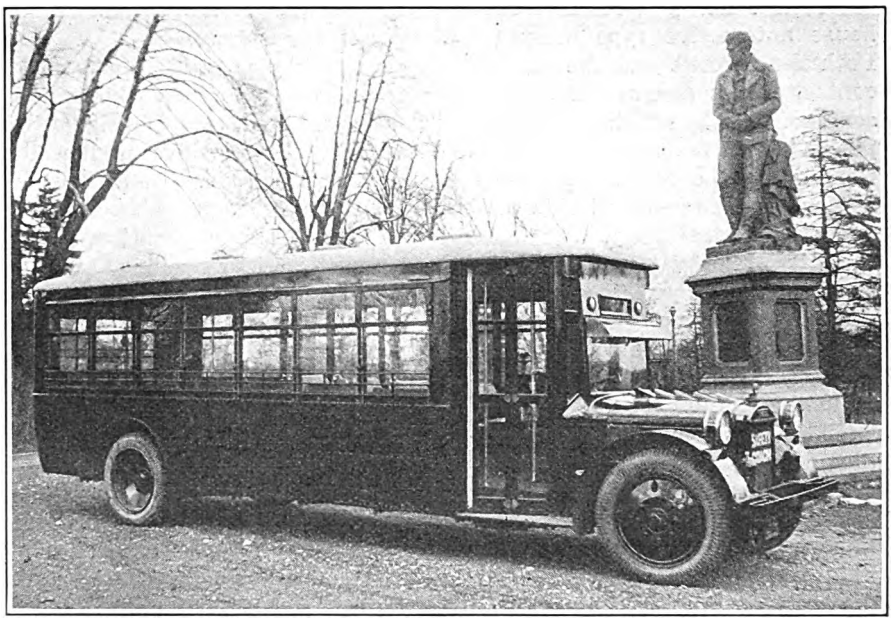
turning the piece half way over. This work is often encountered in the railroad shop, the drop-forge shop and the structural steel yards. Often hammered forgings such as are machined up into crank-shafts can be blocked out prior to the machining operations.

The head lifts up on each return stroke and when the blade comes to the bottom of the cut, the feed is automatically disengaged and the head lifted up to its uppermost position through balance springs. Blade pressure or feed can also be varied at will by raising or lowering the ratchet lever shown on the side of the head.

The machine shown in the cut is equipped with the standard six-speed stroke mechanism which is used on the Peerless high-speed saws when the materials require different cutting speeds. Either this attachment or the usual 2-hp. motor, or both, can be furnished with the machine. The machine can also be furnished without the six-speed gear box or motor and bracket.

Birney Safety Buses Exhibited at St. Louis

TWO buses designed particularly to meet the needs of electric railways were exhibited at the recent meeting of the American Electric Railway Association at St. Louis. Working on the principle that the safety devices which have been so successfully used on one-man street cars are even more desirable on a one-man bus which has to be maneuvered through vehicular traffic, and that any device which will relieve the operator of some of his duties will increase the safety of operation, an interesting arrangement of pneumatic safety devices and auxiliary apparatus has been developed. This work is the result of a study of bus operation by the bus committee of the Stone & Webster properties, of which C. O. Birney is designing engineer, working in co-operation with the Westinghouse Traction Brake Company, St. Louis Pneumatic Devices Company, American Car Company, St. Louis Car Company, Fageol Motors Company and the Yellow Coach Manufacturing Company.

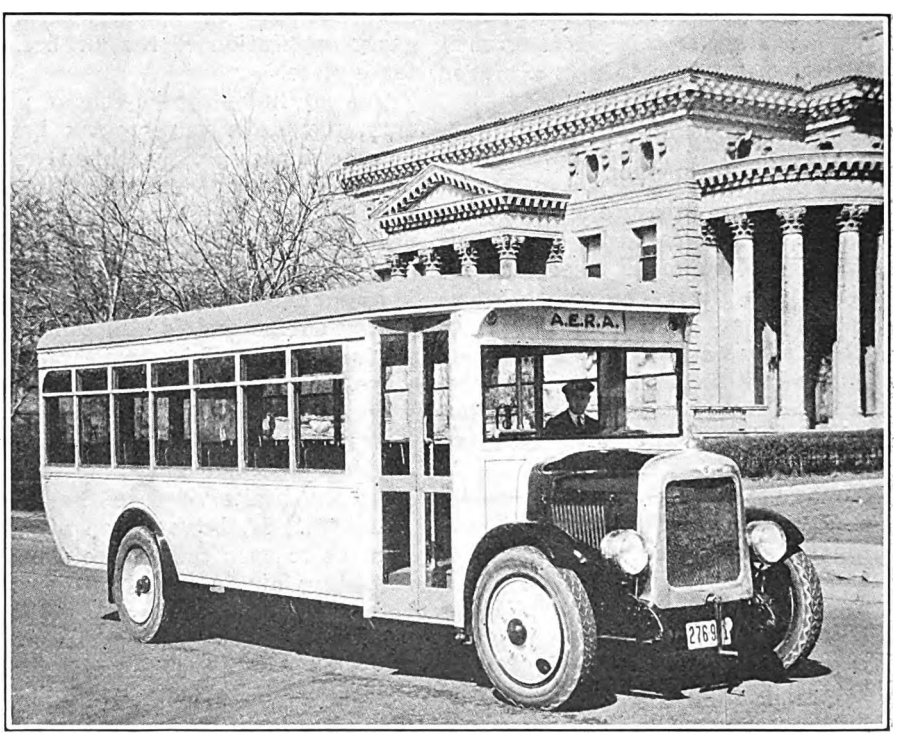


Birney Design Body Built by American Car Company on Fageol Chassis

One of the buses has a body constructed by the St. Louis Car Company, mounted on a Yellow Coach chassis, while the other has a body built by the American Car Company, mounted on a Fageol chassis. Low hung chassis and pleasing lines feature both vehicles. The low step heights, together with liberal aisle space, insure convenient and rapid interchange of passengers in city service. Each bus has a seating capacity of 29. The body constructed by the American Car Company has a combination of cross and longitudinal seats upholstered in leather, the longitudinal seats being used over the rear wheel housings adjacent to the service door at the front. In the St. Louis body the cross-seat arrangement is used throughout and the seats are upholstered in green frieze plush.

Combined Accelerator and Brake Control

Compressed air for the brake system and the pneumatic devices is



Birney Design Body Built by St. Louis Car Company on Yellow Coach Chassis

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obtained from a 3-cu.ft. Westinghouse automotive type compressor. Both the throttle and the air brake control valves are operated from a common pedal, which, when it is pushed down from the neutral position, opens the carburetor throttle, and when it is released tilts up beyond the neutral position to operate the air brake valve. The neutral position is clearly defined by a compound spring arrangement which is installed to facilitate the shifting of gears.

On the side of the foot pedal is a latch so that it can be depressed by the foot of the operator to engage a notch in the supporting casting and hold the pedal in full brake application position after this position has been reached. This latch controls the emergency or "deadman" feature of the device. If the pedal is released from any position less than full service brake application position, it immediately springs beyond the point where the latch will engage in its notch to a position in which not only a full service brake application is made, but also the engine throttle is closed to idling position and the air-operated service door is balanced so that it can be pushed open by hand.

Graduated control of the air brake is obtained by the use of an automatic lap valve with a reducing action which gives a predetermined brake application pressure for any given position of the brake valve. In any intermediate position, a constant brake chamber pressure is retained corresponding to this position, until the valve is moved to give a higher or lower pressure.

Arrangement of Pneumatic Control

A reservoir pressure of 75 lb. per square inch is carried. Two pipes lead from the main reservoir, one directly to the brake control valve and another to a reducing valve which allows a pressure of 50 lb. per square inch to the door control valve mounted on the steering wheel column. The brake valve controlled from the foot pedal allows air to flow to the brake chambers in graduated amounts as the pedal is allowed to tilt above the neutral position, and conversely, as the pedal is depressed from full brake application position, the brake chamber pressure is gradually reduced to zero. At the neutral position the brake chamber pressure is completely released, in which position the brake control valve connects the brake chamber pipe to atmosphere.

A center port in the upper portion of the brake valve body is connected directly to the door closing port of the door control valve on the steering wheel column. In all positions of the brake valve between neutral and full brake application position this port registers with a pipe leading directly to the door closing side of the door engine, allowing air to be transmitted through the reducing valve to the door control valve, thence to the center port of the brake valve and from there to the door closing side of the engine.

In the "deadman" or emergency position of the treadle the air connection through the brake valve is cut off and the door closing side of the door engine is vented directly to atmosphere, thus allowing the door to be pushed open by hand in the same way as is accomplished on the Birney safety car when an emergency application of the air brakes takes place.

The air in the brake control pipe from the brake valve to the brake chambers passes through an automatic three-way valve before it reaches the chambers. The door opening pipe leading from the door control valve on the steering column is connected to the door opening side of the engine and is also continued through a tee to this same three-way valve. A sliding check in the three-way valve, in its normal position, closes the port leading from the door opening pipe and allows air to flow from the brake valve to the brake chambers. If, however, an attempt is made to open the service door by admitting air to the door opening side of the engine before a full brake application is made, the pressure immediately forces over the slide in the three-way valve and allows air to flow directly to the brake chambers, thus applying the brakes.

An additional port is provided in the upper portion of the brake valve to which pressure is admitted in the emergency position. This port is available for operating any auxiliary pressure device on the vehicle which it may be desirable to bring into action when an emergency application occurs. If not required, this additional port can be plugged so as to be inoperative.

Pneumatically Operated Fare Box

Each bus is equipped with a Johnson fare box, which is mounted on the vertical stanchion immediately to the right of the driver. An extremely simple four-cylinder pneumatic engine, mounted in an aluminum case fastened to the bottom of the box, drives the registering mechanism by a light chain inclosed in an aluminum housing on the side of the box. This engine was developed by the St. Louis Pneumatic Devices Company and the arrangement is such that the entire box with its driving mechanism can readily be removed from the supporting stanchion. When this is done the air connections are automatically broken, and are likewise automatically remade when the box is replaced in its socket.

The design and construction of both bus bodies is very similar to that of the single-truck Birney type of one-man safety car. Continuous tee-posts are used for the side posts and roof supports, and many other features of the body structure are likewise similar to the construction used in the Birney car. In the American body wood lower side sash reinforced with brass wearing channels are used, while the St. Louis body is equipped with Curtain Supply Company's brass sash. The general dimensions of the two buses are shown in the accompanying tabulation.

GENERAL DIMENSIONS

Birney Safety Buses

Body	American	St. Louis
Chassis	Fageol	Yellow Coach "2"
Wheelbase	218 in.	193½ in.
Length over all	26 ft., 2 9/16 in.	25 ft., 1 in.
Length over body corner posts	18 ft., 10¼ in.	21 ft., 0 in.
Width at belt rail	7 ft., 6 in.	7 ft., 6 in.
Width at side sills	6 ft., 0½ in.	6 ft., 8 in.
Height from road over roof	9 ft., 0 in. (over ventilators	8 ft., 10 in.
Height from road to top of floor	1 ft., 10 in. at door 2 ft., 3 in. rear end	2 ft., 2½ in.
Height from floor to headlining in center		6 ft., 3⅜ in.
Height from floor to window sill	1 ft., 11½ in.	2 ft., 1½ in.
Seating capacity	29 passengers	29 passengers
Seat centers	2 ft., 5 in.	2 ft., 5 in.
Post centers	2 ft., 5 in.	2 ft., 5 in.
Aisle width at cushion	1 ft., 8 in.	1 ft., 8 in.
Service door opening in clear	1 ft., 11 in.	2 ft., 3½ in.
Height from road to step	1 ft., 3 in.	1 ft., 4 in.

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The News of the Industry

Everett Results Disappointing

$14,780 Deficit in 1923 There Under Five-Cent Fare with Bus Operation

Everett, Wash., a city of 30,000, in which the local railway, the Pacific Northwest Traction Company, substituted buses for street cars except for one 5-mile line, is going to lose its 5-cent fare. After a long conference between city officials and officers of the railway, the proposed discontinuance of transfers on the company's bus lines has been averted by an increase in fare from 5 cents to 6¼ cents.

Trouble Dates Back to 1917

Sentiment against abolition of transfers arose at a conference attended by representatives of various civic bodies and George Newell, local manager of the company at Everett, agreed to withdraw his application to the Department of Public Works for this permit. Mr. Newell explained that the company automatically reverts to the 6¼-cent fare on April 1, and that the 5-cent fare, which has prevailed for sixteen months, had been merely the result of an agreement between the old City Council and the traction company for an experimental period.

The trials of the railway at Everett date back to 1917. Cost really reached the highest point in June, 1920. The railway was obliged to raise the pay of employees and at the beginning of 1921 employees were receiving considerably above 100 per cent more wages than before the war.

But that is only part of the story. Early in 1922 the company was confronted with additional problems in the way of rebuilding tracks and paving streets, and with an expenditure of between $3,000,000 and $4,000,000 in the next five years. As it could see no way of raising this amount or of earning a return on it the company decided to take its problems up with the City Commissioners with a view to working out a system of city transportation that would be adequate and that it could finance. As a result the bus was substituted for the railway.

Five-Cent Fare an Experiment

During the negotiations with the City Commissioners for an amended franchise, the matter of fares was discussed and the commissioners were of the opinion that the company should try out a 5-cent fare with transfer privileges. The company agreed to give the 5-cent fare a fair trial in the hope that revenues might be sufficient to operate the system. That fare went into effect on Dec. 1, 1922.

The result was disappointing, however, for the company took in $6,450 less in 1923 with a 5-cent fare in effect than it did in 1922 when 6¼ cents was the rate for eleven months and 5 cents the rate for one month. On the other hand, expenses increased $19,020, not including depreciation on the buses. Including depreciation on the buses, expenses increased $34,573. When books were closed for the year the company lacked $3,180 of funds sufficient to pay operating expenses, depreciation on the buses and taxes, and money had to be borrowed with which to pay taxes. The deficit for the year 1923, including a reasonable depreciation on the remaining track and electric cars and other operating property in connection with the system, was $14,780.

Still further to aggravate this situation, gasoline took a sharp advance and city operators demanded higher pay. Finally an arbitration board granted the men a substantial increase in pay and recommended the company to the mercy of its citizens and car riders. This, however, placed the company in the position of having to carry out the award without sufficient funds to do so. The concern of the company was to pay legitimate expenses and give the stockholders, who have not received any dividends for the past nine years, some little return on the money invested.

Company Asks Only a Square Deal

About Jan. 20 there was filed with the department of public works at Olympia a temporary tariff extending the 5-cent fare until March 31 of this year. The company never withdrew regular tariff No. 6, under which it collected the 6¼-cent fare, but simply filed an experimental supplementary tariff every three months, keeping the 5-cent fare in effect. Due to the fact that it did not receive sufficient revenue last year with which to pay expenses and taxes, and anticipating increased expenditures in the way of higher wages this year, the company filed with the department of public works, to take effect April 1, an experimental tariff to run for three months eliminating transfer privileges except from the Lowell-Smelter line to the bayside cars.

The company, in turn, was informed by the department of public works that it would allow this to go into effect unless a protest was filed by the citizens of the community, in which case it would not allow it to go into effect, but would give the company and all concerned a hearing. There matters stand.

The company concedes the right of the people, who pay the fare and support the road, to have some voice in how these fares should be paid. All the company asks is that the fares shall be sufficient to allow it to pay the employees a living wage and to give the company something near a reasonable return.

Forty-two Buses for Akron

Northern Ohio Company Has Bought $300,000 of Vehicles for City and Interurban Service

The Northern Ohio Traction & Light Company, Akron, has purchased forty-two new buses, of which twenty-eight will be used in Akron city and the remaining fourteen will be used in the Akron-Cleveland interurban service. The buses represent an investment in excess of $300,000.

The interurban buses will be of the de luxe chair car type. They are White chassis with Bender bodies. Each seats 20 passengers. It is planned to maintain a fifteen-minute service between the two cities. During the last thirty days a 75-cent rate to Cleveland on Mondays, Wednesdays and Fridays has so increased travel that the regular thirty-minute service has proved inadequate.

For the city service ten Whites seating twenty-five each, six Macks seating twenty-five each, six Reos seating twenty each and six Masons seating twenty each have been purchased. Some of the bodies are being built by The G. C. Kuhlman Car Company. All bodies are steel and of the same type as the twenty-four buses now used by the company in its Akron city service.

The new routes to be served include extending the Akron crosstown line east to the Martha Avenue loop; Maple Street line west to Hawkins Avenue; new line from car line terminal on Wooster to West South Street; South Main from Steiner Avenue to Firestone Boulevard.

The buses will give service to sections of Akron which now have little or no transportation facilities.

Buses for Bridgeport in Coordination with Railway

The Connecticut Company believes it has made initial overtures to the community at Bridgeport in the matter of bus service upon routes not served. As a result it will await expressions from the community as to the desirability and acceptability of the proposed auxiliary service.

The chief factor in the consideration is one of finance. Less important is the matter of securing the bus equipment which it is conceded can be taken care of within a reasonable time. President Storrs has pointed out that the Connecticut Company is committed to a policy of extending bus service.

The commission has now before it the proposition of passing upon the petitions of local individuals and corporations for the operation of bus lines and at the same time the proposal of

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the Connecticut Company to start lines. Upon the decision of the commission will depend to a great extent the time within which the bus service will be established.

Mr. Storrs outlined what the Connecticut Company recognizes as needed routes in Bridgeport, as follows:

1. Iranistan Avenue as far as the bathing beach in summer and as far as the park in other periods of the year.
2. Through Howard Avenue and Spruce Street to serve the industries located in the West End as well as the industrial workers who have their homes in this territory.
3. Out Madison Avenue over routes as now served by jitneys and further beyond the jitney route on Madison Avenue itself if occasion requires.
4. From the industrial territory on the southerly side of the New York, New Haven & Hartford Railroad tracks in East Bridgeport across the railroad tracks and through the industrial settlement on the northerly side of the tracks as far as the General Electric plant.

Mr. Storrs holds to the opinion that it is only through such co-ordinated service that the city of Bridgeport can obtain a thoroughly efficient transportation medium operated for the benefit of all of the people of the city at the lowest possible charge.

Storm in East Hampers Traffic

Simultaneously with the preparation of spring and summer schedules for electric railways came on April 1 a wind, snow, sleet, thunder and lightning storm, the only real blizzard on the Atlantic Coast during this winter. Four deaths and many injuries were reported. Heavy traffic congestion, blocks, tie-ups, isolation of towns and a cost to New York City of $250,000 were the minor results. Eight inches of snow fell in New York City. In addition to the "L" and train service being generally hampered there were traffic delays on the Long Island road, the Brooklyn-Manhattan Transit lines, the New York & Queens County Railway and the municipal cars on Staten Island. A serious accident occurred when a B.-M. T. shuttle train and an Interborough elevated train crashed in Long Island City. In this collision one person was killed and thirteen injured.

Mr. Turner Retained at Pittsburgh

The Council of Pittsburgh has confirmed the appointment by the Mayor of Daniel L. Turner, New York, to be chief engineer of the survey to be made of transit and traffic conditions in Pittsburgh. An advisory committee consisting of Ralph S. Rainsford, chief engineer of the Pittsburgh Railways; L. W. Monteverde, representing the real estate board, Henry Tranter, the Civic Club and Allied Boards of Trade; George S. Davison, the Chamber of Commerce and planning commission and W. M. Jacoby the Retail Merchants' Association, was named and confirmed at the same time.

With this organization subway and other solutions of traffic problems is left for consummation of a plan. Funds amounting to $60,000 taken from the $6,000,000 authorization for the downtown subway will be made available for the study or survey.

Bus Operation in Prospect in Albany District

The United Traction Company, serving the cities of Albany, Rensselaer, Watervliet, Troy and Cohoes, N. Y., is planning to put trackless trolleys into operation in Cohoes and the city of Rensselaer on certain lines which act as feeders to the main arteries of travel.

In the city of Rensselaer, situated immediately opposite Albany on the east side of the Hudson River, application was made to the Common Council on April 1 for permission to substitute buses on one of its city lines. A public hearing is to be had on the application on April 15.

Plans to tear up the Cohoes belt line tracks and supplant the street cars with trackless trolleys, the work probably to be completed before summer is over, were disclosed last week by officials of the United Traction Company. It is expected, if the Cohoes plan proves a success, that other "feeder" lines in the Capitol district may be replaced by "pneumatic-tired trolleys."

The company must first obtain permission from the Public Service Commission to install the new cars and then must convince the Cohoes Common Council that the move will be a wise one. After arrangements with the city have been completed about three months will be necessary to make the change.

Trackage to be abandoned is about 2.3 miles long. It will cost the company about $74,000 to remove the tracks and repave the street, Ernest Murphy, general manager of the United Traction Company, told Mayor Cosgro of Cohoes.

Northern Ohio Is Rehabilitating Mahoning Valley Line

Through passenger service between Akron and Warren and Akron and Alliance every two hours was established by the Northern Ohio Traction & Light Company on April 1. Light-weight Peter Witt cars are being used. The old cars are to be rebuilt into freight cars and trailers.

At the same time the company began the work of completely rehabilitating the Cleveland, Alliance & Mahoning Valley Railroad from Ravenna to Warren and Ravenna to Alliance. This road the company recently took over under a purchase agreement with the bondholders. All curves are to be renewed at once and 45,000 new ties placed in the roadbed. New rail will be laid in many places where the old rail was badly worn.

Connection is made at Silver Lake Junction from Alliance, Newton Falls and Warren with limited trains to Cleveland, while freight trains operate direct from these cities to Cleveland, Detroit and other cities. Freight terminals are to be increased at all points in the immediate future. The C., A. & M. V. line offers excellent freight opportunities and these are to be embraced by the Northern Ohio Traction & Light Company.

Arrangements are being made to start a thirty-minute service between Newton Falls and Warren. Weekly passes will probably be sold for use on this line.

A. C. Blinn, vice-president and general manager of the Northern Ohio Traction & Light Company, is conducting a speaking tour through the towns and cities reached by the old C., A. & M. V. lines. He is asking the co-operation of the people in bringing the road out of the chaotic condition in which it has been for several years. His appeals are meeting with splendid response.

Ordinance Passed in Cleveland to Inquire Into City Purchase

The Council of Cleveland, Ohio, has passed an ordinance which calls for a committee of five, to work in conjunction with the street railway committee, to survey the feasibility of taking over the entire property of the Cleveland Railway, now operated under a service-at-cost arrangement. The survey is to include a report on the value of the property and recommend a means of financing the purchase.

$4,000,000 Long Island Electrification Authorized

The Long Island Railroad announced on April 3 that the largest improvement budget in its history had been authorized by its board of directors, and that instructions had been issued to carry out the work with the least possible delay.

The budget provides among other things for the electrification of the Montauk division from Jamaica to Babylon at a cost of $4,000,000.

The date set for completion of the electrification work is May, 1925, in time for the summer schedule. The completion of this work will improve the whole operation of the railroad system, greatly reduce the transfer of passengers at Jamaica, enable the railroad to operate more trains in the congested section between Amityville and Jamaica, lessen the running time of local trains and give service similar to other electrified branches of the system.

G. R. Van Namee Named for New York Commission

Governor Smith on March 31 transmitted to the New York State Senate the nomination of George Rivet Van Namee, Watertown, N. Y., as a member of the Public Service Commission to fill a vacancy caused by the resignation of James A. Parsons for the unexpired term of nine years.

Mr. Van Namee became a member of the Public Service Commission, Second District, upon which he served until the consolidation of the commissions under the Miller administration of 1921. He then returned to Albany as secretary to Governor Smith.

Higher Fare Sought.—The Indianapolis Street Railway, Indianapolis, Ind., has applied to the Public Service Commission for a 7-cent cash fare with a 6¼-cent ticket rate. A 1-cent transfer charge is also sought. The present fare is 5 cents cash and 2 cents for a transfer. Corporation Counsel Groninger recently stated that the city would insist on seventeen tickets for $1.

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Pittsburgh Men Ask Wage Conference

Business Agent John L. Nelson of Division No. 85, Amalgamated Association, representing the 3,000 motormen and conductors of the Pittsburgh Railways, has served notice that changes will be asked in the existing agreement between the company and the union. The notice is in accordance with the existing agreement, which expires at nidnight, April 30.

A note simply announcing that changes will be asked, and not going into any details on the nature of the changes—which, however, are understood to include a request for a wage increase—was handed to General Manager Fitzgerald of the railway along with a request that the changes be taken up in conference at an early date convenient to the company. This date will be fixed later.

New York State Men Present Wage Request

The Rochester, Syracuse and Utica divisions of the Amalgamated Association, in a proposal for a new contract effective May 1, submitted to James F. Hamilton, president of the New York State Railways, seek a 70-cent hourly wage and a six-day week. More than 3,000 workers make up the three city divisions, which are carrying on joint negotiations. Contracts, however, are made separately with the three unions.

The scale now in effect went into force last May. It provides as follows: 51 cents for the first three months, 53 cents for the next nine months and after one year 55 cents an hour. An increase of 5 cents an hour was granted last year. In the proposal just submitted, the men ask a scale of 66, 68 and 70 cents and a 10-cent increase over those amounts for operators of one-man cars.

Unusual Agreement Effected

An agreement has been made between A. K. Ellis, general manager of the Wisconsin Traction, Light, Heat & Power Company, and Olaf M. Lundquist, owner of the Inter-City Transportation Company, Inc., whereby the traction company will take over the motor bus business of this company, which has been furnishing competitive bus service parallel to the interurban line in Appleton, Menasha and Neenah. Mr. Lundquist, formerly owner of the Inter-City line, has been placed in charge of the new department due to his bus operating experience and close touch with local bus conditions.

Wages Advanced in Atlanta Three Cents an Hour

The arbitration board called to settle the wage dispute between the Georgia Railway & Power Company, Atlanta, Ga., and its railway employees has decided on an advance of 3 cents an hour. The company announced that the amount would be paid. Under the new schedule of wage rates, effective as of Jan. 1, 1924, employees paid by the week will receive a 10 per cent increase. Employees working by the hour who are not trainmen received an increase of 3 cents an hour and platform men's wages were raised 3 cents an hour for the first nine months, 8 cents an hour for the second nine months, and thereafter raised to 51 cents an hour.

The company estimates that the increase will add about $235,000 to the expenses for the year.

Wages in Memphis Will Be Arbitrated

Unable to reach an agreement on the new wage scale for the employees of the Memphis Street Railway, Memphis, Tenn., for the year beginning April 1, representatives of the company and the union have announced their decision to leave the settlement to arbitration. This is in accord with the agreement made by both sides last year. On March 1, thirty days before the year's contract expired, the union advised the company of its demand for an increase. The company responded with the demand for a 4-cent cut, which was refused by the employees. Then representatives were appointed to confer in an effort to reach an agreement. The wage scale in effect for the last year is 42 cents an hour for first year men, 47 cents for second year men and 52 cents for men in the service longer than three years.

Fare Readjustment Asked in Baltimore

The United Railways & Electric Company, Baltimore, has filed with the Maryland Public Service Commission a petition asking that rates and charges be fixed to yield the company an annual net income of $1,500,000. The request also is made that until this be done the present rates and charges be maintained. The present fare is 7 cents.

The petition is signed by C. D. Emmons, president, and William H. Maltbie and Joseph C. France, attorneys for the company. It is pointed out that $1,500,000 is the income which the commission itself had decided was reasonable, necessary and in the public interest. The minimum annual net income set by the commission was $1,000,000.

In its appeal to the commission the company says that the granting of the petition, which seeks to readjust fare zones, will reduce materially the gross income without decreasing the expense of operation. Although no request is made for a specific rate, the petition points out that the 7-cent fare is lower than that charged in many other cities.

In 1919, the petition states, the commission established rates and charges intended to yield a minimum surplus of $1,000,000 to the company and placed upon the latter the burden of increasing this amount to $1,500,000 through exercising economy and efficiency. Statements filed during the last four years show that from Jan. 1, 1920, to Dec. 31, 1923, the total net surplus is $3,454,365, or $2,545,635 less than the $6,000,000 which should have been collected at the rate of $1,500,000, the amount set forth by the commission as necessary in the interest of the public.

Rerouting Proposals in Toledo Approved

The City Council at Toledo has approved eleven of the individual proposals in the rerouting plan submitted some weeks ago by Commissioner W. E. Cann for extensions and betterments to the service supplied by the Community Traction Company. One which has been delayed is the elimination of the Indiana line. The most important item in the new legislation was the final approval of the trackless trolley cross-town line by way of the Fearing Street subway. The new route for the Long Belt line, which will be out Contan Street and Cherry to Central Avenue and providing for elimination of tracks on Collingwood Avenue between Delaware and Central, is another important move. The north arm of the Short Belt will be connected up with the southern arm of the Bancroft Belt. The new extension of Summit Street will be double-tracked. Track will be laid in Jackson Street for a new short interurban loop downtown. Extensions will be made on the East Broadway line and the Erie Street bus feeder will be eliminated. The Collingwood bus line, Ottawa Park line, elimination of the Michigan line and change in route for the Erie Street line will come up later for action by Council. In voting upon the separate issues the Council also approved a general rerouting of the cars in the business section.

Commissioner Cann told the members of Council that he had figured the deficit down to $48,000 a year under the new system and believed that additional business would make that up and add to the stabilizing fund.

He said in a letter to Councilman Dowd that the adoption of the plan would not result in increased fares, but would produce material increases in the balance of the stabilizing fund. His original estimated deficit was $102,857. He believed the new power rate offered by the Toledo Edison Company would mean a saving of $100,000 a year.

The officers of the Community Traction Company will have to go over the projects and give their views on probable costs and revenues before the improvements can be made. Then there will come the necessity for financing.

Bus Drivers Strike in Newburgh

Bus drivers employed by the Public Service Corporation of Newburgh, N. Y., went on strike March 18 and the city was without bus service until March 21. The strike was called in protest against the discharge of sixteen members of the bus drivers' union and the arrest of three others on complaint of the corporation on charges of larceny and alleged improper handling of collections.

When the members of the drivers' union became convinced that the company's action in discharging the sixteen employees was not an attack upon the union itself, the men returned to work. The sixteen discharged drivers were not reemployed, although charges against them are understood to have been dropped. Buses were installed to replace the local railway some time ago.

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Strike in Scranton

Inability to Agree on Questions of Wages and Rush-Hour Tripper Service Results in Walk-Out

Railway service was abandoned in Scranton, Pa., on April 1, when 600 employees of the Scranton Railway walked out following the inability of the company and the men to come to an agreement on wages and rush-hour tripper service. The trainmen are demanding an increase of 17 cents an hour. The company is willing to submit both the wage question and the rush-hour tripper service to arbitration, but the men are demanding that only the wage be arbitrated and that the question of tripper service be dropped.

A conference between representatives of the company and the striking employees was held on April 3, the participators being Mayor John Durkan, Bishop J. J. Hoban, the publishers of both daily newspapers and representatives of the United States Department of Labor. Neither side would recede from the position taken and the conference adjourned without any progress having been made. In order to meet the emergency caused by the strike the Public Service Commission has granted authority to the city of Scranton to issue ten-day permits to jitney operators provided satisfactory guarantee as to personal and property liability is given.

The wage contract expired on April 1. Prior to that date Division 168 of the Amalgamated presented a contract asking for an increase for all employees, amounting to 17 cents an hour. Along with this demand double time was sought for Sundays for trackmen, carhouse men and shopmen. A meeting was held on March 25, at which the men presented their demand for increased wages. When the increase was refused the men inquired what counter proposition the company had to offer. The company then submitted the contract the men are now working under, with a proviso for "spread runs," i.e., runs twenty or less to take care of morning and afternoon rush. Under them the men would work approximately eight hours in a spread of thirteen, similar to men in other cities. Following that meeting the employees' committee called a midnight meeting, took a strike vote and notified the management that the men would not arbitrate the questions involved.

The wages paid to the Scranton Railway employees have been advanced 26 per cent since January, 1920. At that time the wage was 50 cents an hour. The present scale is 63 cents an hour. With the demand of the men satisfied the scale would amount to 80 cents an hour, totaling an increase to the company of $300,000 a year.

In a statement to the public J. J. Coleman, general manager, said the net profit last year, after deducting operating expenses, taxes, bond interest and other fixed charges, was only $94,000. The company's earnings for the year were $85,000 short of what the State Public Service Commission fixed as the amount the company was entitled to earn. Of last year's net profit of $94,000, $80,000 was earned during the first three months. Wages were raised to their present level on April 1, and from that date to the close of the year, a period of nine months, only $14,000 was earned.

Weekly Pass in Victoria—Free Movie Admittance

Weekly passes were put in effect on the Saanich line of the British Columbia Electric Railway, Victoria, B. C., on March 29. This is an interurban line, 24 miles in length, traversing a rural district adjacent to Victoria. The basis will be less than the price of six round-trip tickets between two points. The purpose is to improve traffic, which has been cut down by motor and bus competition. The Saanich line has been operated with one-man cars for more than a year. Under the pass system, a passenger when boarding a car will show his pass and receive a "hat check," which he will deposit with the operator on leaving the car. In order to popularize the new passes the company has arranged to have passholders admitted to one of the moving picture theaters free on every Thursday in April. A supply of passes for four weeks may be bought at once.

Foreign News

Tramway and Bus Strike in London

A great strike of tramway and bus employees in London began on March 22, causing enormous inconvenience and loss of time to the public. All the tramway undertakings of the metropolis and the London General Omnibus Company were involved, but a comparatively small number of buses belonging to minor companies continued to run. These, however, were but a drop in the bucket. People had to use the steam and electric main lines, where these were available, or to walk, except in the case of those wealthy enough and fortunate enough to be able to use cabs. Both tramway men and busmen are now combined in one trade union called the Transport and General Workers Union. It was primarily a tramway men's strike, their demand being for an increase of wages of 8s. per week. The bus men had no particular grievance, but they came out "in sympathy" with the tramway men.

The wages ruling in the London district for tramway drivers and conductors at the time of the strike were 58s. per week, rising to 67s. after two years' service. The bus drivers began at 80s. 6d., rising to 86s. 6d., while the conductors got 73s. 6d., rising to 79s. 6d. It had always been contended that bus drivers' work requires more skill than tramcar drivers' work, and that this is the reason for the difference of pay.

It was computed that about 25,000 bus employees and 17,000 tramway employees were affected by the strike. The tramway undertakings involved were those of the London County Council and a number of smaller ones, some belonging to local authorities and some to companies in the outskirts of London.

The strike was preceded by negotiations between representatives of the parties, but these proved futile, and the government thereafter set up a court of inquiry to ascertain the facts.

For the last few years tramway men's wages in England generally have been regulated by a national agreement under which wages rise or fall 1s. per week for every five points rise or fall in the official index figure of the cost of living. By their demand and by their strike action the London men broke away from the agreement, and did so without giving the stipulated three months' notice. They averred that their wages were 5s. a week lower than in September, 1922, when the cost of living figure was the same as now. That did not appear to accord with the sliding scale agreement.

Before the negotiations collapsed, the tramway authorities, while declaring that the financial condition of their undertakings was such that they were unable to pay any higher wages, in some cases made compromise offers. The London County Council, West Ham, and Walthamston offered an increase of 5s. per week, while others offered 2s. and some offered nothing. An alternative proposal by the employers was that the whole dispute should be submitted to arbitration.

The main reason given by the employers for the bad financial position of the tramways was unrestricted bus competition. The trade union representatives rejected all the offers made by the employers.

It was when the National Council for the tramway industry found that it could not solve the difficulty that the individual offers were made by the employers. The London County Council issued a statement to the effect that its offer of 5s. a week would mean an increased expenditure of at least £100,000 a year, while the receipts for the present financial year now closing showed a decline of nearly £400,000 compared with the previous year.

The position of the tramway companies affected which are included in the underground railways "combine" was set out in a statement signed by Lord Ashfield, chairman of the group. In this it was stated that for the year 1923 the return on capital of the Metropolitan Electric Tramways, the London United Tramways Company and the South Metropolitan Electric Tramways, after providing a totally insufficient sum for renewals, was less than two-thirds of 1 per cent. In the first two months of this year the three companies were in a worse position and actually failed to meet their fixed charges by £6,393, and had no funds for renewals. The earnings lost to the tramways were not gained by the underground railways or the buses.

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Financial and Corporate

Birmingham Properties Sold

Local Railway and Light Units Pass at Foreclosure to National Power & Light Company

The properties of the Birmingham Railway, Light & Power Company were sold for $18,500,000 to the National Power & Light Company, New York, at noon March 31 in front of the courthouse door by J. S. Pevear, special master. The properties were bought in the name of the Birmingham Electric Company, organized a few days ago to purchase and operate the properties. Bidding was spirited. Starting at $13,000,000, the price gradually rose to $18,500,000.

Other companies which bid for the properties were the United Gas & Electric Engineering Company, New York, and the L. H. McHenry Company, Louisville, Ky. L. B. Hatch represented the purchasing company at the sale.

Sale of the property was made subject to outstanding debts and it is understood that the bid accepted will make the price of the properties approximately $30,000,000. There are outstanding about $9,500,000 of bonds, which it is stated are to be assumed, and about $2,000,000 receiver's obligations, which must be met.

Tidewater Sale Postponed

Sale of the so-called Tidewater line was called for 12:30 o'clock, but no bidders appeared. Mr. Pevear announced that the sale would be postponed until April 14, at noon, when this line will again be offered for sale. Should there be no bidders at that time, Mr. Pevear announced that the line will continue to operate in the hands of the receivers and efforts will be made to give as good service as its receipts will permit.

Confirmation of the sale of the Birmingham Railway, Light & Power Company property is expected following the return of Judge William I. Grubb of the United States District Court from New Orleans. Pending the confirmation of the sale and the formal transfer of the properties to the Birmingham Electric Company, the operation will continue under the direction of Lee C. Bradley and J. S. Pevear, co-receivers.

H. C. Abell, president of the National Power & Light Company, stated following the sale that his company, some two or more years ago, acquired the capital stock and some of the debt of Birmingham Railway, Light & Power Company, formerly owned by American Cities Company. He said that more than $10,000,000 of debts of the old company will be paid off in full, thus laying the basis for a sound program for future financing. Among the debts so to be paid will be the $781,000 of first mortgage 5 per cent bonds of Birmingham Railway & Electric Company which fall due on July 1, of this year. It is expected that arrangements will be made so that the holders of these bonds can get principal and accrued interest at any time on surrender.

In line with modern practice the Birmingham Electric Company will have non-par value stock, both preferred and common. No change is contemplated in the present executive management. The temporary board of directors of Birmingham Electric Company will continue to function for the time being, but it is expected that the permanent board of directors will be composed, for the most part, of residents of Birmingham.

A new modern serial mortgage will be created and bonds will be issued to pay a part of the debts of the old company. Between $4,000,000 and $5,000,000 of the present company's so-called senior securities will be shifted into common stock as a result of the reorganization.

Conference on St. Louis Reorganization Held in New York

F. O. Watts, president of the First National Bank, St. Louis, and one of the financial group most active in the reorganization plans for the United Railways, St. Louis, acted as chairman of the conference held in New York on April 2 to consider the affairs of the company. He is expected to be in St. Louis on April 7 and at that time will issue a statement. The meetings in New York have been under the auspices of the St. Louis Transit Company 5 per cent bondholders combined committee. Edwin M. Bulkely of Spencer, Trask & Company is chairman of this committee and William P. Gest of the Fidelity Trust Company, Philadelphia, vice-chairman. It is believed that this committee, working with the executive committee, will formulate the policies which will lift the receivership. Newman, Saunders & Company, New York, are mentioned as bankers for the reorganization committee.

New York State Railways Buys Bus Company

The New York State Railways has purchased a majority interest in the East Avenue Bus Company, Inc., operators of a 10-mile route from the heart of Rochester to Pittsford, according to J. J. Basrow, president of the bus company. Plans are under way for an extension and improvement of service. The East Avenue line will retain its separate identity. The bus line operates over East Avenue, Rochester's finest shopping and residential street, connecting the business and exclusive suburban districts. The railway operates trolley service between Rochester and Pittsford over a different route. No immediate change in either route is anticipated.

Investment Opportunities in Tractions Overlooked

There are neglected opportunities in the public utility field similar to those investment bargains which prevailed in railroad securities four years ago. This is the conclusion of H. M. Jacoby of the banking firm of H. M. Jacoby & Company, New York. He says that investors four years ago needed courage to buy railroad issues; to-day they need courage for investment in many utilities, notably tractions. Mr. Jacoby says the time of acquisition should be at the turning point and not after everything becomes bright and rosy again.

Remarking that his firm was not obligated to hold any briefs for electric railways, Mr. Jacoby pointed out that there were many bonds of such companies selling to yield 8 to 10 per cent, a condition due to the fact that the average investor had not noticed the changing position of the traction business. In a statement made to the ELECTRIC RAILWAY JOURNAL he continued:

> It so happens that in the nature of the case there will always be certain groups of securities which are at times unpopular with investors. This has, for instance, been the case with traction securities. This lack of popularity was certainly well deserved, considering that during the period of ultra-inflated operating costs—1919—receiverships of electric railways amounted to $634,174,000 par value of securities.
>
> However, is it not interesting to note that this figure of over half a billion was reduced to only $23,039,000 in 1923 and that this figure is the lowest and most favorable one in fifteen years?
>
> We have heard a good deal about bus and automobile competition. Yet car rides per capita have increased from 100 in 1912 to 109 in 1917 and to 117 in 1922. In other words, the growth of traffic has been just about as rapid during the past five years as it has been during the five preceding years. The truth of the matter is that notably in the larger cities the automobile reaches the saturation point at a given angle while bus competition can only be of a supplemental character.
>
> To cite two recent cases: When the street car franchise in Akron expired, on Feb. 1 of this year, the trolleys were ruled off the streets and a bus service was started. Only a few weeks later, a petition signed by 33,000 citizens forced the Mayor to reinstate the trolleys on an equitable fare basis, while the jitney competition was eliminated. In New Jersey, where the jitney competition is probably more keen than in any other part of the United States, 8,000,000 more passengers were riding on the lines of the Public Service Railway in December, 1923, than in December, 1922. Here are facts with no opinion involved.

Mr. Jacoby also referred to the recent decrease in cost of certain basic commodities used by the electric railways as factors making for lowered operating costs.

$1,027,238 Deficit in Buffalo

There was a deficit last year of $1,027,238 in the operation of the International Railway, Buffalo, N. Y. The passenger revenue during 1923 was $9,468,124 and revenue from other sources $327,061. The report states that the operating revenue was $926,093 less in 1923 than in 1921, the year before the last strike. The difference in the revenue is explained by the operation of jitneys and the practice of motor car owners in giving a lift to persons who would otherwise use the street cars.

President Tulley told the stock-

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holders that the Bailey Avenue bus line is being operated at a loss of $2,000 a month.

The International now awaits only the determination of its property value and the sanction of a higher fare, says the report, to complete the following program:

To render adequate service to the public; to promote among the employees efficiency and co-operation and a betterment of their conditions; to protect the owners' investment in the property and to assure the earning and payment of a reasonable return.

Mr. Tulley states that 99 per cent of the eligible employees of the I.R.C. are stockholders of the company. The wages of I.R.C. employees were raised 2½ cents an hour for 1924. They signed over the money, amounting to about $200,000, to the trustees of their association, who bought for them $1,000,000 par value I.R.C. stock for $100,000 and $200,000 par value I.R.C. bonds at 50 cents on the dollar. This investment will pay them 5 per cent.

A separate individual savings fund has also been started for the men.

New Jersey Company Making Progress

President McCarter Looks Hopefully Toward the Future—Reviews the Past Year's Work—Riding Is on Increase and Revenues Are Better

THE Public Service Corporation of New Jersey reports for the year ended Dec. 31, 1923, a net increase in surplus before the payment of common stock dividends of $3,737,179. The Public Service Railway, operating 893 miles of track and 2,420 cars, and its affiliated companies report deficit of $1,675,534 for the year.

In reviewing the affairs of the company, President T. N. McCarter, in speaking of the railway, says that the company has made considerable progress in perfecting its plan for co-ordinating street car and bus service and has been able to put into effect some important economies in operation, which permit the hope that, with public co-operation in the carrying out of the company's co-ordination scheme, the railway will, within a reasonable time, be operating on a satisfactory and stable basis. Mr. McCarter says that the new rates have not so far produced adequate revenue for the operation of the system, but that they have quite largely increased riding and that revenue is much more satisfactory than at first.

Operation of the railway for the first six months of 1923 showed a margin of some $202,000 after payment of operating expenses and fixed charges, but this amount and more was needed to meet the deficit accumulated since 1917. Trouble for the company was precipitated with the expiration on Aug. 1 of the wage agreement with the railway employees and their demand for an increase in pay amounting to 30 per cent.

The financial condition of the company was such that it was impossible to grant the men's demand. Every endeavor was made by the company to secure a renewal of the agreement with the men at the old pay and as a compromise the company offered to apply to wage increases the estimated suplus for the year, but without success. On Aug. 1 the trainmen quit work and for a period of fifty-one days no cars were operated. The decision of the company not to attempt operation with new employees was based on the impossibility of securing a sufficient number of competent men and upon its belief that any attempt to run cars would lead to disorder and the destruction of property.

After careful consideration, there was presented to the state and municipal authorities and to the public generally a "plan of settlement," providing for the co-ordination of both trolley and bus operation under the company's management. It was stipulated that the company would purchase competing buses, give employment to competent bus operators, grant a 20 per cent increase in wages to employees and put into effect a universal fare of 7 cents with transfers between trolleys and buses. The municipal and state authorities were asked to co-operate.

This plan indorsed by commercial organizations all over the state, was accepted by a number of municipalities and petitions favoring its acceptance were signed by nearly 400,000 citizens. Owing to the mixed jurisdiction of the state and the municipalities, however, the plan was not accepted. The stoppage of street car service and the inability of the buses adequately to supply the demand for transportation was in the meantime causing such loss and inconvenience to the public, and especially to business men, their employees and patrons, that the Governor of the state, acting through the Attorney-General, and on the plea that public interest required the immediate resumption of street car service, brought an action in equity before the Chancellor for an injunction to compel the company to resume service.

In granting the injunction, the Chancellor pointed out that the way was open for a just settlement of the transportation difficulty, saying as to the effect of the court's action: "I think . . . that the effect will be to stimulate negotiations to settle the many difficulties with which the company is confronted."

The injunction was accepted without appeal by the company, which granted a 20 per cent increase in wages and resumed operation on Sept. 21.

Mr. McCarter explains that shortly afterward the company adopted, at the suggestion of the Board of Public Utility Commissioners, for a trial period of four months beginning Oct. 1, a rate schedule which provided within the limits of the larger cities served a 5-cent fare with an additional 5-cent charge in the suburbs, no transfers. The rate of 8 cents, four tokens for 30 cents, 1 cent transfer, in effect before the strike, was continued in all other parts of the territory. This schedule as applied to the traffic of the railway is substantially equivalent to the fare in effect before the cessation of service.

With respect to the railway's rate case Mr. McCarter says that on June 9, 1923, former Judge Thomas G. Haight, the special master appointed by the United States District Court to take evidence in the proceedings instituted by the Public Service Railway in 1921, handed down a report fixing the value of the company's property used and useful in the operation of the company at $110,000,000 and continuing the rate of 8 cents, four tokens for 30 cents, 1 cent transfer.

To this report the company filed exceptions on the ground that several items had been improperly omitted which if included would have given the property an increased value, while the defendants excepted on the grounds that the value was too high. The exceptions have been argued before the District Court, which reserved decision. On Oct. 1 the fare schedule now in effect was applied for at the suggestion of the Board of Public Utilities Commissioners and was accepted by the United States District Court, without prejudice to the proceedings before that court.

During the year the railway charged to fixed capital installed during the year $2,651,089, less $603,359 of property written off, leaving the net in-

INCOME ACCOUNT OF PUBLIC SERVICE RAILWAY AND AFFILIATED COMPANIES FOR THE TWELVE MONTHS ENDED DEC. 31, 1923

	Public Service Railway	Public Service Railroad	Affiliated Companies	Total
Operating revenues	$21,524,601	$265,533	$1,314,868	$23,105,003
Operating expenses and taxes	17,407,259	212,534	977,829	18,597,623
Amortization charges	945,553	.....	137,200	1,082,753
Operating revenue deductions	18,352,812	212,534	1,115,029	19,680,376
Operating income	3,171,788	52,999	199,839	3,424,627
Non-operating income (exclusive of dividends of affiliated companies)	93,375	808	26,126	120,308
Gross income	3,265,163	53,807	225,965	3,544,936
Income deductions (bond interest, rentals and miscellaneous interest charges)	5,244,217	114,576	52,715	5,411,510
Net income or loss	*1,979,054	*60,769	173,249	*1,866,574
Profit and loss accounts (excluding dividends)	†176,697	†3,688	†10,829	†191,215
Surplus—(before dividends)	*1,802,357	*57,080	184,079	*1,675,358
Intercompany dividends	†284,624	.....	284,624	.....
	*1,517,733	*57,080	*100,544	*1,675,358
Dividends paid unaffiliated interests (directors)	.....	.....	176	176
Net increase or decrease in surplus	*$1,517,733	*$57,080	*$100,720	*$1,675,534

* Deficit. † Credit.

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TRAFFIC STATISTICS OF THE PUBLIC SERVICE RAILWAY FOR LAST TEN YEARS

Year	Revenue Passengers	Transfers and Passes	Total Passengers	Percentage of Passengers Using Transfers	Average Fare per Passenger, Cents	Car-Mileage	Car-Hours	Passengers per Day	Passenger Receipts per Car-Mile, Cents	Passenger Receipts per Car-Hour
1914	310,308,660	96,969,254	407,277,914	21.2	3.83	50,792,889	5,665,119	1,115,830	30.72	2.75
1915	313,923,363	100,498,677	414,422,040	21.5	3.82	51,873,660	5,573,670	1,135,403	30.49	2.84
1916	342,205,993	109,492,019	451,698,012	21.8	3.82	54,964,708	5,911,131	1,234,147	31.37	2.92
1917	361,187,782	115,787,201	476,974,983	21.9	3.82	56,087,403	6,021,225	1,306,781	32.44	3.02
1918	352,190,897*	98,029,909	451,220,806	20.0	4.31	54,039,150	5,698,089	1,236,221	36.00	3.41
1919†	327,619,606*	69,069,628	396,689,234	15.4	5.71	57,644,927	6,039,453	1,086,820	39.29	3.75
1920	363,757,587*	89,777,107	453,534,694	17.7	5.79	60,798,743	6,539,207	1,239,166	43.21	4.02
1921	348,284,212*	87,395,589	435,679,801	17.3	5.90	58,309,883	6,212,276	1,193,643	44.11	4.14
1922	325,265,180*	84,947,634	410,212,814	17.6	6.27	56,419,982	5,983,122	1,123,871	45.59	4.30
1923	300,319,928*	53,875,005	354,194,933	12.4	5.95	49,272,078	5,206,092	970,397	42.75	4.05

* Excluding revenue transfer passengers. † Mile zone system in effect from Sept. 14 to Dec. 7.

crease in the fixed capital $2,047,729. The railway also retired $388,000 of equipment trust certificate of series "D," "E" and "F" in accordance with the equipment trust agreements.

The report contains as a frontispiece a reproduction of a half-tone showing types of cars, buses and operators for use in co-ordinated service.

Issue of Stock for Acquisition Purposes Completed

The Charleston Interurban Railroad, Charleston, W. Va., has completed plans to issue $500,000 of cumulative participating preferred stock of the par value of $100. The company proposes to use the proceeds from the sale of 4,250 shares of the preferred stock to acquire all the capital stock of the Kanawha Valley Traction Company and the Charleston-Dunbar Traction Company and to use the proceeds from the sale of 750 shares of the preferred stock to defray the cost of certain improvements. The rest of the money from the sale of stock is to be used for other corporate purposes.

Fare Advance in Cincinnati Explained

Exact figures on the operation of the Cincinnati Traction Company, Cincinnati, Ohio, for February and on which the fare advanced on April 1 from 8½ to 9 cents have been announced by W. J. Kuertz, Director of Street Railroads. The deficiency for February was $24,826, and the total loss for two years—1922 and 1923—is $574,786. This includes deficiency for city tax since Oct. 1, 1923. For three months in 1923, October, November and December, the city tax amounted to $89,000. For the two months in 1924, January and February, it amounted to $57,677. The deficiency for return on capital in 1922 amounted to $163,278 and in 1923 to $264,830.

There was a daily decline in the number of revenue passengers for February, 1924, as compared with 1923, although the aggregate for February this year is greater, due to having twenty-nine days. The revenue passengers in February, 1924, brought $8,549,249 and in February, 1923, the revenue was $8,343,104.

Although detailed figures are unavailable the number of daily passengers during March is 10,000 below that of March a year ago. Unemployment, the use of the radio in the homes and bad weather are some of the explanations offered, as well as the increase in fare, it being 1 cent more this year.

Purchase of Boston "L" by State Urged

An order has been filed in the Massachusetts Legislature calling for the appointment of a special commission to consider the advisability of the state acquiring the property of the Boston Elevated Railway. Representative Coyne contends that under the present law the State has the right to purchase the properties by paying the amount of the outstanding stock, approximately $52,000,000. He said purchase by the state would save $4,000,000 in dividends annually and that it would eventually result in a reduction of fare.

Indiana Road Purchased from Bondholders

Purchase of practically all bonds of the Goshen and Peru divisions of the Winona Interurban Railway, Warsaw, Ind., by Harry Reid and James P. Goodrich, Indianapolis, and Theodore Frazer, Warsaw, has been announced.

The plan of the new holders of the bonds, according to Pierre Goodrich of Mote & Goodrich, is to foreclose the mortgages on the property, sell the railway and terminate the receivership.

More than $2,000,000 in bonds are outstanding, $1,593,700 on the Peru division and $750,000 on the Goshen division.

Plans of the new owners include through traction service from Indianapolis to South Bend, both for passenger and freight service.

Mr. Reid, one of the purchasers, is president of the Interstate Public Service Company, but it is said that that company is not interested in the purchase as a company although the lines bought will be tied in with those of that property for through operating purposes. In fact, the Winona property, extending from Peru to Goshen through Warsaw and Winona Lake, is the connecting link in a through interurban route from Louisville through Indianapolis to South Bend and Chicago.

The likelihood of this purchase being made was referred to in the ELECTRIC RAILWAY JOURNAL for Feb. 2, page 195.

Arrears in Dividends Being Paid in Worcester

The directors of the Worcester Consolidated Street Railway, Worcester, Mass., have declared an extra dividend of $2.50 a share to apply on dividends in arrears on the 5 per cent cumulative preferred stock. The dividend was paid by the company on April 1 to stock of record March 20.

On April 1, 1922, the accumulated and unpaid dividends amounted to $20. At that time a $2.50 extra was paid and this has continued semi-annually. The dividend paid on April 1 this year makes the fifth extra and cuts the amount in arrears from $20 to $7.50.

Operation Abandoned Between Greenfield and Northampton

The towns on the 20-mile stretch between Greenfield and Northampton, Mass., which for twenty years have been served by the Connecticut Valley Street Railway, are without service. The operation of the line ceased March 31 at midnight. The receiver will delay application to the courts to dismantle the road pending possible purchase of it by the towns themselves for municipal operation. Nine miles of the Greenfield to Northampton division have already been thus purchased with the intention of reopening the road. The portion sold runs from Greenfield through Deerfield and South Deerfield. Traffic between Greenfield and South Deerfield is now being handled by a bus service.

Rochester Valuation May Be Reduced

Unofficial reports say that a settlement of the litigation instituted by the city of Rochester to reappraise the Rochester lines of the New York State Railways under the service-at-cost contract is in prospect. Conferences looking toward a settlement have been held and it is said to be not unlikely that an amicable adjustment of the entire matter will be had to the best interests of the company and also to the public.

The plan for settlement is said to comprehend a reduction in the valuation, principally by the elimination of certain items in the appraisal, which the company will consent to as a matter of compromise. Such a readjustment, possibly by the elimination of certain real estate, will bring a reduction in the valuation and with it will go the possibility of the public of the city of Rochester obtaining a lower fare.

James F. Hamilton, president of the New York State Railways, is confident that the present appraisal is justified by any method of appraising that may be used, and maintains the actual book value of the property used and useful, under methods of appraisal approved by the United States Supreme Court,

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can result only in a higher valuation than that now existing.

In commenting on the matter one of the Rochester papers says:

> The attitude of the company has been to welcome the trial of the litigation so as to settle once and for all the valuation matter, but Mr. Hamilton has expressed a willingness to compromise the proposition by eliminating certain factors, so that the earnings of the company, under the contract, will be based largely on the property actually in use in the conveyance of passengers. This is looked upon by the city officials as a broad concession and one that will reflect to the benefit of the public.

Capital Structure to Be Rearranged at Portland

Stockholders of the Portland Railway, Light & Power Company, Portland, Ore., have been requested to meet and approve plans for the issue of $7,500,000 of 6 per cent first preferred stock. The company plans to rearrange its capital structure and to change the name to Portland Electric Power Company.

Auction Sales in New York.—At the public auction rooms of A. H. Muller & Sons there were no sales of electric railway securities this week.

Seeks to Abandon Service. — The Pacific Electric Railway, Los Angeles, Cal., has applied to the Railroad Commission for permission to abandon passenger service on the Santa Monica air line from Colorado Street, Santa Monica, to the end of the line.

Discontinuance of New Jersey Line Approved.—The Board of Public Utility Commissioners of New Jersey on April 1 approved the application of the Public Service Railway to abandon service on the Fairview extension located between Broadway and Warren Streets, Gloucester, and Collings and Mount Ephriam Avenue, Camden. No opposition was offered by local authorities. The company is required to remove appurtenances. The road yielded $4,000 a year and operation costs totaled $20,950. It is said that the company is prepared to increase the present bus service over the route.

Thrift Being Encouraged at Buffalo. —In co-operation with the Bank of Buffalo branch of the Marine Trust Company, Buffalo, the International Railway Co-operative Association has started a savings plan in addition to the co-operative wage fund for the benefit of employees of the company. The co-operative wage fund provides for impounding the wage increase granted on Jan. 1, and diverting the fund thus accumulated to purchase bonds and stock of the railway. The thrift and savings plan is a separate and distinct movement fostered to encourage regular weekly savings by employees.

Mortgage Gold Bonds Offered. — A syndicate including E. H. Rollins & Sons, New York, is offering at 98½ and accrued interest to yield about 6.10 per cent $5,000,000 of the Illinois Power & Light Corporation first and refunding mortgage gold bonds known as Series "A," 6 per cent, thirty years. The bonds are dated April 2, 1923, and are due April 1, 1953. They are secured by direct mortgage or collateral lien on properties appraised at a value very substantially in excess of the total debt and are a direct first mortgage on some of the most important power and light properties of the system.

Want to Abandon Passenger Service. —The Pacific Electric Railway, Los Angeles, Cal., has applied to the commission for authority to abandon passenger service on its line between Fifth Street (San Pedro district) and the Outer Harbor.

Revaluation of Kansas City Properties Asked.—The reorganization committee of the Kansas City Railways on March 31 at Jefferson City, Mo., filed with the Missouri Public Service Commission an application for a revaluation of the railway. The application was made with the consent and approval of Judge Kimbrough Stone, and of the receivers for the company.

Net Income Shows Increase.—The Department of Street Railways, City of Detroit, Mich., reported a revenue from transportation of $1,906,121 during February, 1924. In February, 1923, this item was $1,528,539. The total operating revenue for February, 1924, was $1,946,727, against $1,619,266 for February a year ago. Total operating expenses increased from $1,185,779 in February, 1923, to $1,418,595 in February of the present year. The net income showed an increase, being $40,834 in February, 1923, and $99,258 in February of the present year. There was an increase in total passengers carried. The number in February, 1923, was 37,707,665 and in February, 1924, 40,970,792.

Private Sale of Property. — The Greenfield & Turners Falls, division of the Connecticut Valley Street Railway is to be offered at a private sale by receiver D. P. Abercrombie of Greenfield, Mass. People of Turners Falls and Greenfield are united in their desire to maintain trolley service between the two towns, and arrangements with this point in view are being made.

Bus Line to Be Sold to Pacific Electric.—The Compton Transportation Company has been authorized by the Railroad Commission to sell to the Pacific Electric Railway, Los Angeles, Cal., its auto stage rights and property for a line operated between Long Beach, Huntington Park and intermediate points.

Accumulated Surplus $1,000,000.— The Los Angeles Railway Corporation, Los Angeles, Cal., reports to the Railroad Commission for the year 1923 that its operating revenue was $12,645,436 and operating expenses $8,915,490, giving a net operating revenue of $3,729,946. Miscellaneous non-operating revenue amounted to $113,820. Interest, rent, taxes and other deductions totaled $2,306,095. The net corporate income for the year was $1,537,670. The deficit at the beginning of the year amounted to $13,017. Miscellaneous additions to surplus for 1923 amounted to $7,497 and miscellaneous deductions were $251,874, leaving an accumulated surplus at the end of the year of $1,280,276.

Another Preferred Dividend at Louisville.—There is a strong probability that the back dividends of the Louisville Railway on its preferred stock will be cleaned up by Jan. 1, 1925, or not later than April 1, if business continues active. Directors at a meeting on March 20 declared a 2½ per cent dividend on the preferred stock, payable on April 4. This left 2½ per cent due from 1922, 5 per cent from 1923 and 1¼ per cent for the first quarter of 1924.

Market Street Ready to Redeem Bonds.—Notice has gone out to holders of the first consolidated mortgage gold bonds of the Market Street Railway, San Francisco, maturing on Sept. 1, that there has been deposited money sufficient to pay these bonds at par and accrued interest. Holders are accordingly advised to present their bonds for payment at any time prior to Sept. 1 at the office of the trustee at San Francisco or at the office of Ladenburg, Thalman & Company, New York. The bonds maturing on Sept. 1 were authorized in the amount of $17,500,000 on Sept. 1, 1894. The amount outstanding on Jan. 31, 1923, was $9,527,000.

$400,000 Issue Quickly Oversold Locally.—The Houston Electric Company has, in five and one-half selling days, just oversold an issue of $400,000 of the Galveston-Houston Electric Company 7 per cent bond-secured gold coupon notes. This money will be used to make part of the improvements to the Houston Electric Company's system under the agreement recently entered into between the company and the city provided jitneys are abolished in accordance with the ordinance voted upon Jan. 19.

$1,000,000 of Stock Offered.—Tucker, Anthony & Company, New York, head a syndicate which is offering for subscription at 93½ and accrued dividend, to yield about 7.50 per cent $1,000,000 of 7 per cent cumulative preferred stock of the Consolidated Power & Light Company. The company, directly or through subsidiaries, owns and operates the electric power and light and electric railway business in Huntington, W. Va.; Roanoke and Lynchburg, Va., and in Ironton, Ohio, Ashland and Catlettsburg, Ky., and the surrounding communities, as well as the gas business in Lynchburg. The proceeds of the issue are to be used for additions and improvements which will further expand the revenue producing facilities of the system.

Increase in Net Income.—The net income of the East Penn Electric Company and its predecessors for the year ended Dec. 31, 1923, was $603,482, against $399,991 for the same period ended Dec. 31, 1922. This fact was disclosed in the first annual report of the company, which was incorporated in July, 1922, under the laws of Pennsylvania to acquire control of the Eastern Pennsylvania Railways and to provide increased power generating facilities for the territories served by that company. During the year 1923 the consolidations were completed. The East Penn Electric Company is under the management of the J. G. White Management Corporation, New York.

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Personal Items

Pittsburgh Personnel Changes

Young Men, All Especially Resourceful, Appointed to New Posts with Pittsburgh Railways

F. W. Cogswell, J. B. Donley, C. C. Gillette and J. E. Davis, all recently appointed to new offices with the Pittsburgh Railways, are especially qualified by technical training and by temperament for the positions to which they have been assigned. As noted previously in the ELECTRIC RAILWAY JOURNAL Mr. Cogswell has been made director of traffic promotion, Mr. Donley director of public relations, Mr. Gillette traffic agent and Mr. Davis special investigator.

Few men have a more detailed knowledge of the traffic habits of Greater Pittsburgh than has Mr. Cogswell. Mention any spot in the iron, steel or smoky city (it goes by all these names) and Fred Cogswell will rattle off the routes that pass by in the day and the night like the well-known hail from a machine gun. Before his appointment to the position of director of traffic promotion, Mr. Cogswell was traffic agent for the receivers of the Pittsburgh Railways, from August, 1917, to May, 1919. He served during the war as first lieutenant and later as captain and adjutant of the 53d U. S. Infantry. Before that he was assistant to the electrical engineer and traffic agent of the Pittsburgh Railways. He entered the service of the Pittsburgh Railways as load dispatcher in December, 1910. He was graduated at Carnegie Institute of Technology in electrical engineering in June, 1912. Mr. Cogswell was born in 1881.

In his new post with the company Mr. Donley looks after the newspapers, public neighborhood meetings held for the discussion of local service problems and explains matters to visiting complainants. It is no reflection on the Pittsburgh Railways to say that this is a difficult job to handle, for no matter how hard a company strives to be 100 per cent perfect different people have different ideas of perfection, so that the need exists for a peculiar combination of talent in the man assigned to handle the duties of an office of this kind. These Mr. Donley has. His resourcefulness has never failed him. He handles all the matters of a controversial nature that come before him with all the Celtic charm of a born diplomat. Mr. Donley was formerly employment agent and statistician for the mechanical department of the Pittsburgh Railways. He entered the service of the company as a shop clerk in 1902. In 1904 he was appointed chief clerk of the mechanical department, and in September, 1913, was appointed publicity agent in charge of exhibits. In June, 1915, he was appointed special investigator of the traffic department. Mr. Donley was graduated from high school and took a special course in economics at Duquesne University and a business course in the Iron City College. He was born Jan. 8, 1883.

Mr. Gillette will now apply his intimate knowledge of schedule construction to the commercial side of more miles for more revenue rather than the older purely operating viewpoint of fewer miles for less expense. Mr. Gillette was acting traffic agent of the company from May 1, 1923, to March 1, 1924. He entered the employ of the Pittsburgh Railways on Sept. 1, 1921, as a special investigator. Before that he was with the Westinghouse Electric & Mfg. Company. With that company he took the graduate students' apprentice course and special engineering course under B. G. Lamme. He also worked one year in the railway project section of the general engineering department. He entered the military service in May, 1917, and served with the Fourth Infantry, Third Division as a first lieutenant and captain from September, 1917, to December, 1919. He entered Bucknell University in 1913 and was graduated in electrical engineering in June, 1917. He was born on Sept. 1, 1895.

Mr. Davis was formerly chief clerk in the traffic department of the Pittsburgh Railways. He served in this capacity from April, 1921, to Feb. 20, 1923. He entered the service of the company in November, 1920, as a traffic observer. Before that for two years he had been timekeeper and paymaster for a mining company. He was graduated from high school in 1914 and from Geneva College in 1918, receiving the A.B. degree. In 1918 and 1919 he was principal of a high school. He was born on March 9, 1898, at Darlington, Pa.

F. W. Cogswell

J. B. Donley

C. C. Gillette

J. E. Davis

Key Route Changes Made

Announcement Affects Messrs. Drum, Harris and Allen—Mr. Harris Becomes Chief Engineer

New duties have been assumed by present officials of the Key System Transit in Oakland, Cal., and one new appointment has been made.

John S. Drum has been made chairman of the reorganized executive committee; George H. Harris, formerly assistant to Vice-President and General Manager W. R. Alberger, has been appointed chief engineer of the entire system, and Ben Allen, to whom reference has been made previously in the ELECTRIC RAILWAY JOURNAL, has been named as the head of the new public relations department.

In the promotion of Mr. Harris, Mr. Alberger, for the time being at least, is left without an assistant. Hereafter Mr. Harris will devote his entire time to engineering matters, including supervision of all the physical properties of the company. He has been in the business for thirty years. Mr. Harris has been with the Key System since 1914, being originally general superintendent. Before that he was connected with electric railways in Georgia and Alabama. Two years ago he was made assistant to the general manager of the San Francisco-Oakland Terminal Railways, a position from which he has just been promoted.

Mr. Drum was chairman of the exec-

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utive committee of the former San Francisco-Oakland Terminal Railways and has been re-elected in the process of reorganization. He is well known in Pacific Coast banking circles. Mr. Drum was born in Oakland and was graduated in 1894 from Hastings Law College attached to the University of California. He practiced law until 1903 and then went into banking, becoming president of the Savings Union Bank & Trust Company in 1910. He is a director of the Pacific Gas & Electric Company, the East Bay Water Company and the Yosemite Valley Railroad.

Mr. Allen gained fame in the late war by acting as publicity director for Herbert Hoover in his food saving campaigns. He succeeds R. H. Brockhagen, press agent.

Now that a survey of Oakland's traffic needs is under way many suggestions are already beginning to pour in. Previously there was no department to handle this mass of detail. Most of it went to Mr. Alberger and his assistant. The bureau of public relations will fill this gap.

Thomas J. Lynch Will Resign

Thomas J. Lynch, assistant general manager and later general manager of the Schenectady Railway, Schenectady, N. Y., since July, 1923, has tendered his resignation, to take effect on May 1. Mr. Lynch came to the company from the United Traction Company, Troy division, living then, as he does now, in Albany. At the time of the reorganization of the company last October Mr. Lynch was requested to remain and did so, though at some sacrifices to his personal interests. For the present Mr. Lynch is devoting his time to personal interests which he has in his home city and will later announce plans which he now has under consideration.

Mr. Danforth Resigns

R. E. Danforth has resigned as vice-president and general manager of the Public Service Railway, Newark, N. J. Mr. Danforth has been spending the winter in South Carolina and expects to take an extended vacation before engaging again in active business. During Mr. Danforth's absence M. R. Boylan has been acting general manager of the Public Service Railway.

Frank Hampshire has been appointed master mechanic of the Binghamton Railway, Binghamton, N. Y. In that capacity he succeeds H. M. Rhoda, who left the company on March 1 to take up duties under Charles S. Banghart, vice-president of the Richmond Light & Railroad Company, Staten Island, N. Y. Mr. Hampshire was first employed by the Binghamton Railway in November, 1907, as a night car cleaner. He was promoted to the day force as a car repairer during the spring of the following year, and in August, 1916, became night carhouse foreman. He resumed repair work within a couple of months and became assistant master mechanic to Mr. Rhoda in February, 1917. He remained in that capacity until Mr. Rhoda resigned March 1. Mr. Hampshire is an Englishman by birth.

H. H. Couzens to Brazil

General Manager of Toronto Transportation Commission Appointed to Canadian Holding Company

H. H. Couzens, general manager of the Toronto Transportation Commission, operating the civic railway lines in Toronto, and the Toronto Hydro, is to become vice-president of the subsidiary companies of Brazilian Traction, Light & Power Company, controlled by Canadian interests. He will make his headquarters at Rio de Janeiro.

Since Mr. Couzens assumed the duties of his present position, Sept. 1, 1921, Toronto's transportation system has been almost entirely rehabilitated. When the city took over the lines of the Toronto Railway the system was in exceedingly bad physical shape due to neglect during the purchase negotiations. Under the leadership of Mr. Couzens the Transportation Commission at once began the work of rehabilitation.

H. H. Couzens

Born in England in 1877, Mr. Couzens received his education at the Independent College at Taunton, England, after which he served as a pupil in mechanical and electrical engineering with Allen & Sons, Taunton, and the Taunton Corporation Electrical Works. After holding a number of engineering positions he became manager and engineer of the West Ham Corporation Electric Supplies in 1909, and three years later accepted a similar position with the Hampstead Borough Council. He held the latter position only one year, resigning at the end of 1912 to become general manager of the Toronto Hydro-Electric system, with which he took up his duties early in 1913. He continued in the latter position until the Toronto Transportation Commission took over the local street railway, when he assumed his present work.

At the concluding meeting of the Canadian Electric Railway Association, held on June 30, 1923, at Toronto, Mr. Couzens was elected president of the association.

Sir Alex. Mackenzie is president of Brazilian Traction, Light & Power Company and Messrs. E. R. Wood, R. C. Brown and Miller Nash of Toronto are among the vice-presidents. Sir Henry Pellatt and Sir Thomas White are among the directors. The company was formed to link the São Paulo Tramway, Light & Power Company, Rio de Janeiro Tramway, Light & Power Company, and São Paulo Electric Company. It also controls the Brazilian Telephone Company.

Personnel Changes at Knoxville

The Knoxville Power & Light Company, Knoxville, Tenn., has promoted two of its officers and has transferred the office of the treasurer of the company to New York City. H. C. Ray, formerly assistant treasurer, has been elected treasurer, due to the resignation of C. J. Pleming, who will engage in private business. Mr. Ray will conduct the affairs of the office of treasurer in New York.

Chester A. Briggs, present auditor of the company, has been elected secretary and in addition to the duties of his new office will retain his old position.

Jesse W. Bye, Jr., was elected to the position of assistant treasurer. He has formerly been cashier of the company and will continue to remain in Knoxville.

H. U. Wallace, formerly assistant general manager of the Arkansas Central Power Company, Little Rock, Ark., has been appointed assistant general manager.

Frank J. Jones, formerly engineer way and structures, has been appointed chief engineer to succeed James Link, who has been transferred and appointed superintendent of the electric department.

H. M. Rhoda, formerly master mechanic of the Binghamton Railway, Binghamton, N. Y., resigned from that property on March 1 to take up duties under Charles S. Banghart, vice-president of the Richmond Light & Railroad Company, Staten Island, N. Y. At one time Mr. Rhoda was master mechanic of the Long Island Electric Railway, Jamaica, L. I. and prior to that served in the capacity of assistant master mechanic of the Reading Transit Company, Reading, Pa. He was also at one time identified with the Trenton & Mercer County Traction Corporation.

Obituary

John W. Boyle

John W. Boyle, Utica, N. Y., a pioneer operator of electric railway properties in central New York, died suddenly on March 27 in Los Angeles. It was in 1886 that Mr. Boyle first became interested in street railroad management when he filled the position of attorney for the Utica Belt Line, then just organized. Later when the Thomson-Houston Company secured control in 1889 he was made vice-president and general attorney. In 1894, upon the reorganization of the line, which he brought about, he was made president. Mr. Boyle disposed of his interests in the Utica Belt Line Street Railroad in 1901 and retired from the company. He first practiced law in Utica with Waterman & Hunt, but later followed his profession without a partner. He was born in Scotland in 1851.

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Manufactures and the Markets

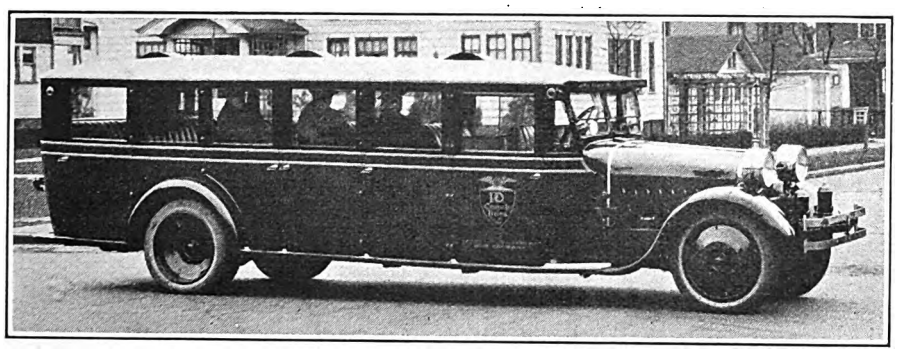
News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Bus Market Active

Forty-two Vehicles for Akron—Railway Bus Purchases Approximating $2,000,000 Are Indicated

Contracts just placed by the Northern Ohio Traction & Light Company, Akron, Ohio, for $300,000 of automotive equipment again focus attention on the constantly increasing use of the bus by the electric railways. As noted elsewhere in this issue that order includes forty-two vehicles. In it are included Whites, Macks, Reos and Masons. Moreover, part of the equipment is intended to be used in city service and part in interurban.

This in itself is more significant, perhaps, than would at first appear, although so far as the Northern Ohio Company is concerned it does not mark a new departure in its practices. That order properly is regarded as mighty significant. It is. But after all, it stands apart as news largely because it bulks big as a single order. It is only one of many noted recently in the ELECTRIC RAILWAY JOURNAL. That record is not complete. It does not pretend to be. But it is a pretty fair criterion. Moreover, the trend which it indicates toward the constantly growing use of the bus by the railways is substantiated by the reports from the manufacturers themselves with respect to inquiries for buses.



Duplicate of Cleveland Automobile Show Job Just Delivered to the Pennsylvania-Ohio Electric Company

Among the large prospective orders is one in connection with the Philadelphia Rapid Transit Company bus development. It is understood in this connection that the company is likely to buy about 120 vehicles. It is understood that the Trenton, Bristol & Philadelphia Street Railway is considering the purchase of five or ten vehicles. The Washington, Baltimore & Annapolis is understood to be considering the purchase of buses. Another company in the East reported likely to be in the market is the Atlantic Coast Electric Railway, now included in the system of the Eastern New Jersey Power Company. The Third Avenue Railway, New York, is also understood to contemplate the purchase of five buses. The New Bedford Street Railway has recently purchased two Whites and one Mack and is reported to be in the market for additional vehicles.

Among orders reported placed are five Garfords and one Yellow Coach for the Springfield Street Railway, Springfield, Mass.; ten Fageols for the Trenton & Mercer County Traction Corporation in addition to three already delivered; five Garfords for the Chicago, South Bend & Northern Indiana Railway; six Fageols for the Indiana, Columbus & Eastern Traction Company and six Yellow Coaches for the Houston Electric Company.

This last is among the jobs already delivered. The Houston buses will seat twenty-nine passengers. They will be used in service put in operation to replace jitneys under the terms of the recent settlement ordinance there.

As for other orders completed the White company reports a brand new DeLuxe job just delivered to the Pennsylvania-Ohio Electric Company at Youngstown. This is a duplicate of "Miss Rosalie," the White bus displayed in the Cleveland Automobile Show. The body was built by Bender. The White company also reports having just delivered nine new jobs to the P-O—the DeLuxe coach just mentioned, and eight city pay-enter type that will go into the service of the Youngstown Municipal Railway. The P-O also has ten city pay-enter White buses on order. The White company also figured in the Akron order to the extent of ten model 50-A buses with Kuhlman bodies. These buses will go into service in Akron, making a total of 34 White buses being operated by the N.O.T.L. in the city of Akron and a grand total of 54 Whites in the service of that railway company.

There is no need to repeat at this time the figures of the JOURNAL with respect to its recent automotive survey for 1923. Significant as was that record of the trend of events with respect to the increased use of the bus by the railways, it appears to have been very conservative in the face of the development so far this year of which there is definite knowledge.

G. E. Has Good Year

Sales for 1923 Increased Nearly $30,000,000—Unfilled Orders at End of 1923 $87,112,000

Orders received by the General Electric Company during the year 1923 were $304,199,746, compared with $242,739,527 in the year 1922, an increase of 25 per cent. The profit available for dividends for 1923 was $33,525,118 and the surplus after cash dividends $18,579,423. The surplus as of Dec. 31, 1923, was $82,762,095. The surplus in 1922 in excess of cash dividends was $12,157,391. Unfilled orders at the end of 1923 were $87,112,000, compared with $76,220,000 in 1922.

EXPORT BUSINESS GOOD

The export business is conducted by the International General Electric Company, Inc. The total of all orders received by the International Company during the year was $21,743,000, compared with $21,536,000 during 1922. The net sales billed were $22,371,526 during 1923. The International Company's business was conducted at a profit available for dividends of $2,469,463, compared with $2,265,477 in 1922. Dividends of $700,000 were paid during 1923, of which the General Electric Company received $669,372.

During the year distinct notable improvements were made in internal rearrangement and production processes and methods, which, notwithstanding increased cost of labor and material, have resulted in lower costs, and these have been reflected from time to time in reduced selling prices.

One of the most important new investments of the year was the purchase of a majority of the common stock of the Canadian General Electric Company, Limited. It is the intention to preserve essentially the Canadian character of this company.

IMPORTANT MECHANICAL ADVANCES MADE

Inventories in factories and warehouses and on consignment have been valued at cost or market, whichever was lower. After deducting adequate reserves, they are carried at $83,746,031 compared with $75,334,561 at the end of 1922.

Notes and accounts receivable are carried at $37,987,339, compared with $35,154,419 at the end of 1922. Collections were good and credit losses very small.

The cash balance, including temporary investments in short term obligations of the United States Government, was $91,205,620 at Dec. 31, as compared with $85,341,538 at the close of the previous year. The company has no notes payable, or any obligations bearing its indorsement outstanding.

In carrying out the provisions of the Charles A. Coffin Foundation various awards were made. Thus in October, 1923, the committee of the American Electric Railway Association awarded the Charles A. Coffin medal to the Chicago, North Shore & Milwaukee Railroad and $1,000 to the Employees Mutual Benefit Association of that company. In this connection the company

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expresses the hope that the awards of the Charles A. Coffin Foundation for achievements on the part of companies and individuals will serve as appreciation and recognition of meritorious and distinguished service to the electrical industry.

The company reports important progress during the year from the work of the engineering department and research laboratory. In addition to the improvement of existing designs many new designs have been developed and placed on the market. These include standard lines of induction motors, steam turbines up to 60,000 kw. capacity, designed for steam pressure of 600 pounds, superheated to a temperature of 750 degrees F., and special turbines for 1,200 pounds steam pressure.

The Emmet mercury vapor process has been installed and is in successful operation at the power house of the Hartford Electric Light Company. This system is regarded to represent an important improvement in prime mover efficiency over present standard steam boiler and turbine practice.

Rolling Stock

Pacific Electric Railway, Los Angeles, Cal., has purchased 1,350 additional freight cars for $3,000,000, with delivery specified at the rate of 150 cars average per week. The first lot of the new freight cars will probably be received early in April. This order is a little more than twice the size of a contract for freight equipment made during the past year. The final delivery of this 650-car order has just been completed. The total expenditure for freight equipment by the company the past year was $4,950,000.

East St. Louis Company Improving Shop

As part of a general program for modernizing its shop equipment, the East St. Louis & Suburban Railway, East St. Louis, Ill., has made a number of improvements to existing facilities and added a number of new machine tools. Individual motor drive is being gradually installed to replace line shafts and belt equipment. It is expected that by the end of the current year practically all of the machinery in the Win Stanley shop will be individually motor driven.

A new 48-in. swing, double-head wheel lathe has been added for turning steel wheels. In the machine shop a motor-driven hacksaw which was recently installed has proved to be particularly useful. A molding machine has been added in the wood mill and a new electric welder has been added for reclaiming broken or worn parts.

In addition, a survey of the pipe work which is required in the routine maintenance of equipment has led to the installation of a new motor-driven pipe cutting and threading machine. It is expected that the addition of this machine will save not only a large part of the time and labor incident to threading the large amount of pipe used for maintenance work, but will also make a considerable saving.

Track and Line

Madison Railways, Madison, Wis., has completed preparations for the double tracking of nearly the entire length of its Wingra Park-Fair Oaks Street line. Soon double tracking and paving work will start from Regent Street on Breeze Terrace to University Avenue, thence down University Avenue to Chester Street. On University Avenue the tracks will be lowered to conform with the present grade.

Wisconsin Valley Electric Company, Wausau, Wis., has been petitioned by property owners on the northwest and east side sections of the city to construct a loop north of Clarke Street.

Fresno Interurban Railway, Fresno, Cal., has received permission from the commission to construct its track at grade across Academy, Madsen, Newmark, Zediker and Riverbend Avenues in the County of Fresno.

Pacific Electric Railway and **Southern Pacific Railroad, Los Angeles, Cal.,** have announced that plans have been completed for a proposed expenditure of $1,750,000 to construct a huge joint freight classification and distribution yards at Watson Station on the Los Angeles-San Pedro Line.

Trade Notes

Charles Longenecker, formerly sales engineer with the Bonniot Company at Canton, Ohio, has become associated with the Combustion Engineering Corporation, 43 Broad Street, New York. Mr. Longenecker was one of the first men to specialize in pulverized fuel and he has been active in this field for many years past. His efforts have been directed particularly along the line of industrial application to both boilers and furnaces. In this new connection he will be identified with the recently created industrial department of the Combustion Engineering Corporation. This department, in charge of H. D. Savage, will specialize in the application of pulverized fuel to industrial work of all kinds.

William Arthur has arranged with J. M. Pneuman to represent in the Midwest territory the Arthur Power-Saving Company, of which he is general manager. As reported in the March 29 issue of ELECTRIC RAILWAY JOURNAL, J. M. Pneuman has entered the commercial field as manufacturers' agent for electric railway supplies and equipment, operating from Berea, Ohio, near Cleveland. The Arthur Power-Saving Recorder Company is at New Haven, Conn. More than 12,000 of the Arthur power-saving recorders are now in use. Recent improvements in the apparatus have made them dust-proof and tamper-proof. Further, all hand winding of the clock mechanism has been eliminated, as the process is now entirely automatic.

New Advertising Literature

The Johns-Pratt Company, Hartford, Conn., has issued a circular called "Going Underground?" It states that more than 1,200 different kinds of Noark underground boxes have been produced.

James H. Channon Manufacturing Company, Chicago, Ill., has issued a pamphlet on Sherardizing "the most modern and thorough method of rust-proofing in use today."

ELECTRIC RAILWAY MATERIAL PRICES—APRIL 1, 1924

Metals—New York

Copper, electrolytic, cents per lb.	13.562
Lead, cents per lb.	8.975
Nickel, cents per lb.	26.00
Zinc, cents per lb.	6.50
Tin, Straits, cents per lb.	50.25
Aluminum, 98 to 99 per cent, cents per lb.	27.50
Babbitt metal, warehouse, cents per lb.:	
Fair grade	60.00
Commercial	28.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$4.20
Somerset mine run, Boston	2.125
Pittsburgh mine run, Pittsburgh	2.125
Franklin, Ill., screenings, Chicago	2.075
Central, Ill., screenings, Chicago	1.675
Kansas screenings, Kansas City	2.50

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$43.00
Standard open hearth rails, gross ton	43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	3.00
Tie plates (flat type), cents per lb.	2.60
Angle bars, cents per lb.	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.125
Steel bars, cents per lb.	2.30
Ties, white oak, Chicago, 6 in.x8 in.x8½ ft.	$1.70

Hardware—Pittsburgh

Wire nails, base per keg	3.00
Sheet iron (28 gage), cents per lb.	3.75
Sheet iron, galvanized (28 gage), cents per lb.	4.90
Galvanized barbed wire, cents per lb.	3.80
Galvanized wire, ordinary, cents per lb.	2.75

Waste—New York

Waste, wool, cents per lb.	.15
Waste, cotton (100 lb. bale), cents per lb.:	
White	12–18
Colored	9–14

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), per gal.	$0.93
White lead (100 lb. keg), cents per lb.	12.25
Turpentine (bbl. lots), per gal.	$1.01
Car window glass, (single strength), first three brackets, A quality, discount*	84.0%
Car window glass, (single strength), first three brackets, B quality, discount*	86.0%
Car window glass, (double strength) all sizes, A quality, discount*	85.0%
Putty, 100 lb. tins, cents per lb.	4–6

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb.	16.00
Rubber-covered wire, No. 14, per 1,000 ft.	$6 75
Weatherproof wire base, cents per lb.	18.00

Paving Materials

Paving stone, granite, 4x8x4, f.o.b. Chicago, dressed, per sq.yd.	$3.60
Common, per sq.yd.	2.95
Wood block paving 3½, 16 treatment, N. Y., per sq.yd.	2.56
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots	54.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.85
Cement, Chicago consumers' net prices, without bags	2.20
Gravel, ¾-in., cu.yd., f. o. b. N. Y.	2.00
Sand, cu.yd., N. Y.	1.25

Old Metals—New York and Chicago

Heavy copper, cents per lb.	10.75
Light copper, cents per lb.	9.25
Heavy brass, cents per lb.	6.75
Zinc, old scrap, cents per lb.	4.00
Yellow brass, cents per lb. (heavy)	6.00
Lead, cents per lb (heavy)	7.25
Steel car axles, Chicago, net ton	$18.25
Cast iron car wheels, Chicago, gross ton	17.25
Rails (short), Chicago, gross ton	18.75
Rails, (relaying), Chicago, gross ton	26.50
Machine turnings, Chicago, gross ton	8.75

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New York, April 12, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 63
Number 15

Rehabilitation of Property Increases Patronage

COMPARATIVE figures for the same months of this year and last year show an increase of $14,000 in revenue for the city lines of Aurora and Elgin. These lines are part of the recently rehabilitated and reorganized Aurora, Elgin & Fox River Electric Company, the work of reconstruction having been started during last year. It is safe to say that the increase in patronage was due in large part to this work. While the public may appreciate a change in policy or management, changes with which they come in direct contact in their use of the lines, such as new cars and improved running time, are what cause people to talk favorably about the company and bring increased riding. Promises and publicity and advertising cannot produce results comparable with those that come from notably improved transportation.

In the case of the Aurora, Elgin & Fox River Electric Company, the people not only reciprocated with unprecedented patronage but in addition granted unusual franchises which relieved the company of unpaid past and future paving obligations. These two manifestations on the part of the riding public serve to indicate that the inhabitants of the Fox River Valley want, and will pay for, good electric railway transportation. Faith in this is evidenced by the fact that a power company purchased the property through the bankruptcy court.

Incidentally, 98 per cent of the stockholders of the holding company live in the territory served by the railway, which also, no doubt, is an important factor in the interest shown by the public in giving the railway a fair chance to serve. So reorganization of this property will probably shortly place it on a firm earning basis.

City Officials Should Take Unto Themselves Some of the Shortcomings of Car Service

A FAVORITE sport of city officials in many places is to criticise bitterly the quantity and quality of service supplied by the local street railway. In so doing they no doubt imagine that they strike a popular chord. Perhaps they do sometimes, for every one has experienced at one time or another vexatious delays waiting for cars and tedious trips through congested traffic after boarding cars. A fact which the city officials are likely to overlook, however, is that they are often largely responsible for such shortcomings of the transportation service.

The two major causes of public displeasure are gaps in the headway and slow speed of operation. As long as the railway service is regular and fast the public will be satisfied. Of course, attractive and commodious cars are preferred, and the passengers dislike to be too closely crowded. There is, therefore, occasional clamor for better cars and more of them. But the fact is that scheduled headways are nearly always sufficiently short to handle the traffic properly if they are maintained. If delays and interruptions to service are largely eliminated criticism of the railway will die out.

Unfortunately the power to accomplish this end does not lie entirely in the hands of the railway. More delays are caused by conditions for which city officials are responsible than are caused by conditions for which the traction company is responsible. The number of delays resulting from such causes as vehicles traveling in the tracks, vehicles parked so that street cars cannot pass, vehicles becoming stalled on the track, slow or careless traffic officers, are more numerous than delays caused by mechanical or electrical failures of the railway equipment.

Moreover, railway operation is slowed down perhaps as much by the failure of public officials to abolish parking or to enforce existing parking regulations, and by the necessity to make unnecessary stops, as by passenger interchange. City officials would accomplish more by co-operation with the railway to eliminate delays and speed up the service than they do by criticism for public effect.

Express Service with Bus Locals May Increase Earning Power

IN THESE days of intensive use of facilities it is necessary to do everything possible to increase the productivity of the electric railway plant. If the cars can be speeded up the track is released that much more quickly for other cars, and the carrying capacity is increased accordingly. The greater speed naturally enhances the value of the service to the rider, so that more business can be looked for, provided, of course, the service is good in other respects.

How to get the increased speed is one of the most difficult problems with which a management has to contend. Nowadays every element seems to be working against speed, rather than for it. Only those who have tried to inaugurate modernization programs involving faster schedules know how difficult it is to get the cars moving and to keep them moving at a satisfactory rate.

Express service is one answer that is proposed frequently as a means of obtaining better schedules. Ordinarily its introduction necessitates that an entire street be given over to the express cars, as few systems have any means of passing one car around another. In a few cases local cars can be turned out at a junction to let the express cars by, but this is a wasteful procedure, and all the advantage gained by the fast car may easily be lost by the slow one that has to turn out.

A plan that obviates these difficulties and really gives

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fast express service is that inaugurated in Providence, R. I., using electric cars for the express line and a motor bus line paralleling them on the same street for the local traffic. This method, which was described in ELECTRIC RAILWAY JOURNAL for March 15, page 511, has worked out to the satisfaction of the company and of the public. Where the greater part of the business is carried on the express line, and the local service demanded is relatively small, the method has advantages that indicate it may be applicable to other localities. The car, which is the more economical unit to operate, has the right of way and can travel at a comparatively high speed, reducing operating costs. Stops are relatively infrequent, so that a more comfortable service can be provided and the schedule more readily adhered to.

The bus, on the other hand, can draw up to the curb to stop for passengers, so that the advantages of this factor are obtained for the short rider who otherwise might not patronize the transportation system. On account of the smaller vehicle capacity, frequent service can be given to attract business. Co-ordinated in this manner, each class of vehicle is doing its best as a part of a system.

The advantages of such a plan are so obvious that it will be well if operators will look into it closely where there is a demand for both fast express service and frequent local service. As a feature of the modernization program it certainly is worthy of attention, if nothing more. And incidentally, this bus service in Providence is paying, and so is the railway line.

Company Publications Perform a Real Service to the Industry

INDIVIDUAL managements that are sponsors for employee magazines know the benefits that accrue to them through these publications. If this were not so the number of such publications would not have grown so rapidly as it has in the past few years.

There is another side to the matter, however. It is the industry side. In this connection an important work is being done by these publications in assisting the employees to realize the part they can play in helping to build for the company and the industry the good will of the citizens. They learn that in furthering the affairs of the companies they are strengthening their own positions, for the well-being of the industry, of the company and the employees are closely linked.

The measure of merit of these company publications does not vary greatly. It would indeed be difficult for a jury of competent judges to say which, if any, is the best. It is frequently a source of wonder, however, whether managements and men fully realize the amount of work that goes into the making of these publications. They show up unobtrusively but regularly, filled with accounts of matters that are for the most part of greater interest than we realize in the lives of the men and women of the company. It is only human to take casually things that pass before one day by day. As a result, sight is often lost of the measure of merit behind performances seemingly routine, but costly in the amount of thought, effort and time put into them.

For the benefit of managements that have recently established publications of their own, it might be well to say that of the older employee magazines, those that are performing their functions best are the ones that are edited by men who have the sympathetic support and the inspirational direction of their executives. However capable the man may be to whom is intrusted the job of getting out a company publication, the work is only just begun with the hiring of the man who is to do the editing. He cannot make the magazine do what is desired of it unless the executive makes it a point to give him the background for executive decisions and to lead him in putting the spirit of the management into the publication so that it may permeate the more quickly through the entire organization.

The Paris Convention Would Interest Americans

IT IS fortunate for electric railways that so much of their practice is the same all over the world. This is due largely to the fact that the industry is quite a modern one. The first commercial railways were put in operation only a little more than thirty years ago. Their engineering development has followed along much the same lines in its major aspects. Partial standardization of equipment has also come about through the fact that the larger manufacturing companies in this country are also well established in Europe and have supplied much of the apparatus used on European electric railways. The same broad economic trends have affected the earnings of European tramways in the same manner as American electric railways. So it is not surprising that many of the problems with which American electric railway companies have to contend are faced also by the European companies. No doubt much can be learned by a free exchange of information such as comes with personal conference.

The forthcoming convention of the International Electric Railway Association, to be held in Paris June 16-22, affords an opportunity for such discussion, and its program, as published in the issues of this paper for Jan. 6 and March 29, indicates that many topics of interest to railway men in this country will be considered. Letters of invitation from the international association to President Budd and Secretary Welsh of the American Association show that American railway men will be welcomed at the Paris meeting.

It might be said that the international association, officially known as Union Internationale de Tramways, de Chemins de Fer d'Intérêt Local et de Transports Publics Automobiles, has a very long and honorable record as well as name. It was established in 1885, or only three years after the American Association. It has held annual (or more recently biennial) sessions ever since, in different countries in Europe, except between 1914 and 1920. The international character of the association is shown by the fact that its executive committee includes representatives from France, Belgium, Spain, Italy, Switzerland, Holland, Denmark, Poland and Norway.

The association possesses a somewhat more official character than the association in this country, owing probably to the closer governmental connections with street and interurban electric railways in most European countries than in the United States. In consequence, at each of the conventions, delegates officially representing the different governments are in attendance.

This short explanation is given for the benefit of those American railway managers who may be in Paris in June. Railway men often take trips abroad, and if those who go this summer can arrange to include attendance at the Paris meeting, they will find it eminently worth while.

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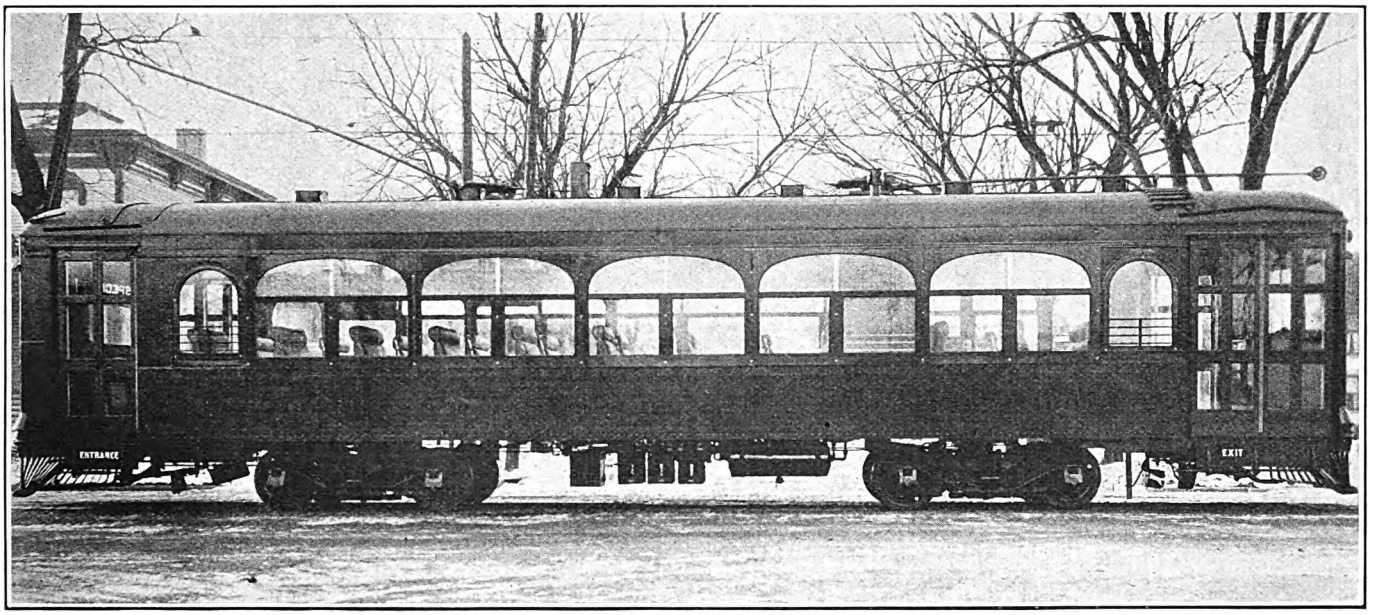


New Light-Weight, Low-Floor, One-Man, Two-Man Interurban Cars Purchased to Operate Between Aurora and Elgin

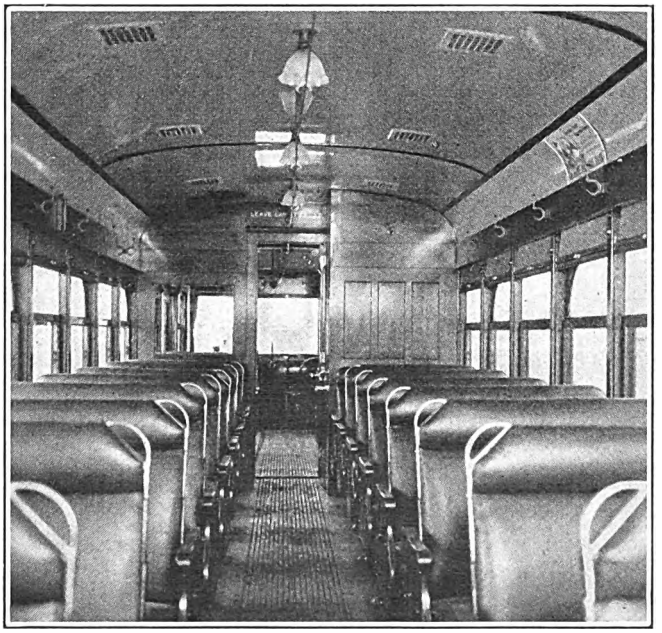
Rehabilitated Property Attracts Increased Patronage

Aurora, Elgin & Fox River Electric Company Lines Re-equipped as to Cars and Power Facilities—Part of Aurora, Elgin & Chicago Railroad Released from Receivership Through Purchase by Local Power Company—New Franchises Relieve Company of Paving Burden

EXTENSIVE rehabilitation, accomplished in five months' time, has transformed the bankrupt Aurora, Elgin & Chicago, Fox River division, into a modern electric railway property. So complete has been the change that even the name was lost during the transition, and the Aurora, Elgin & Fox River Electric Company has little else other than the track to remind it of the days of the receivership.

The system is now owned and controlled by the Western United Corporation, a holding company of Aurora, of which Col. I. C. Copley is president. New cars, new substations, and new management have served to sell rides to the people of Elgin and Aurora and the Fox River Valley, who are supplying an unprecedented patronage.

This property, and the third-rail division of the Aurora, Elgin & Chicago Railroad, were operated jointly, as previously, under the same receivership from Aug. 9, 1919, to March 1, 1922. On this latter date the bondholders of the Fox River division, comprising the city lines in Aurora, the city lines in Elgin, and the interurban connecting the two towns, petitioned and obtained a separate receivership. Oscar Nelson was named receiver, B. P. Alshuler was appointed attorney for the receiver, and J. F. Egolf, general manager. It was during this receivership, which terminated on Jan. 1, 1924, with the purchase of the property by the present owners, that these improvements were made.



Arched Headlining, Shaded Lamps, Fabrikoid Seats in New Interurban Cars

Old equipment and unreliable operation had caused most of the dissatisfaction and misunderstanding between the public and the company. Certain obligations and promises had not been kept, with the result that the new management's first task was to re-establish confidence with the public. The trainmen were brought together at suppers and entertainments so that their co-operation might be enlisted in carrying out the new policies of the management. A voluntary reduction in fares, both on the

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city lines and on the interurban line, was put into effect. The old city fare of 10 cents cash and six tokens for 50 cents was changed to 10 cents cash and seven tokens for 50 cents. A 50-cent monthly card entitling bearer to ride for 5 cents, and a school children's rate of 30 rides for 90 cents, further reduced the average rate of fare. The interurban fare was reduced by offering a 25-ride coupon book between any two towns at a 2½-cent per mile rate. A 10 per cent reduction on round-trip tickets was also inaugurated.

These various measures helped to re-establish confidence between the company and the public, and within a year favorable consideration was given to the new franchises required in several cities.

Nature of New Franchises

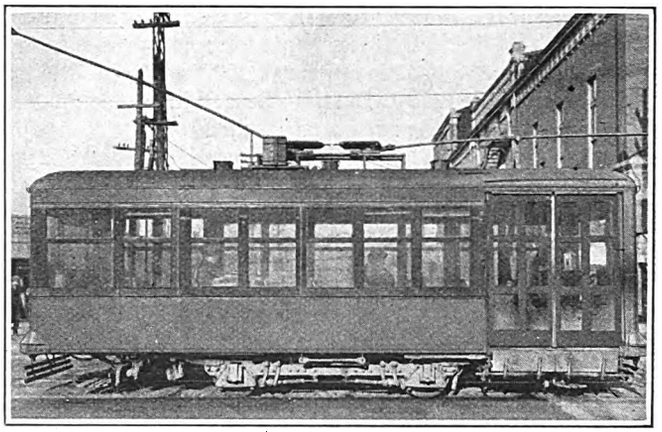
Because so many operating franchises had expired, the management found it advisable, when getting new franchises, also to revise other franchises having several years yet to run. At Aurora, a new franchise was drawn which frees the company from all future paving obligations. Similar franchises were adopted in Batavia and St. Charles, two small towns between Aurora and Elgin.

In Elgin, a different form of franchise was adopted. After meeting past paving obligations, the company is relieved of all paving and assessments for a period of five years. If at the end of this period the books of the company do not show an average of 6 per cent net return on the investment, the company is again relieved for a period of five years, and so on, throughout the duration of the 20-year franchise. If 6 per cent is made in one five-year period, assessment is to be made for the future five-year period and not for the past. In the meantime the city carries on the normal paving program.

At the time franchises were presented to the Councils or committeemen of these municipalities, Mr. Egolf explained that it was impossible to continue operations under the conditions stipulated in the old franchises. He told of the company's plan to purchase new equipment and to improve the property in general. The councilmen were thus given the opportunity of indorsing the new franchise and obtaining improved service or the alternative of rejecting it, thereby losing the advantages of electric railway transportation.

New Safety Cars

New equipment was purchased after the conditions of operation had been settled. For city operation 40 single-truck, double-door, double-end, one-man safety cars were purchased from the St. Louis Car Company. These cars weigh 18,000 lb., seat 30, including four folding seats on the rear platform. The seats are of springless rattan construction, framed in cherry. The cars are mounted on St. Louis No. 7 light-weight trucks, equipped with 26-in. wheels and two G.E. 264, 25-hp. motors controlled by K-63-M double-end control. The two doors may be opened independently or together, giving a 4-ft. opening to the platform. One of the two stanchions on the platform is equipped with a bracket for holding a Cleveland fare box. The interior of the car is finished in cherry, with white enameled Agasote headlining. The exterior of the car is painted with "traction" orange striped in black. During the winter months the side windows are covered with storm sash, made up in three sections. These are of light framed construction and cover both the upper and lower sash.



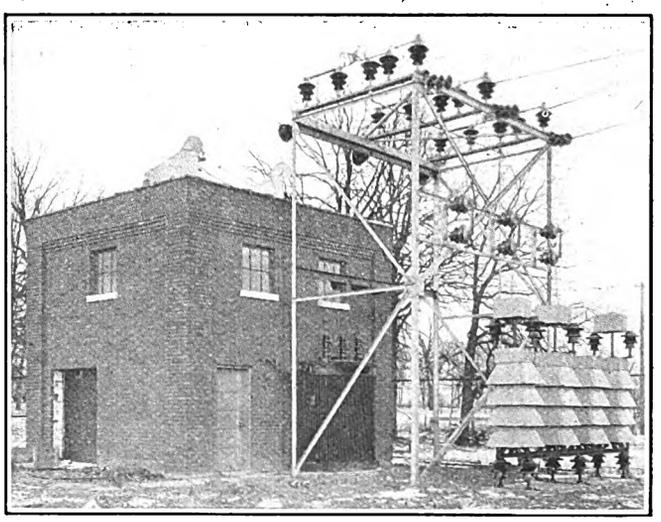
New One-Man Safety Car Purchased for City Service in Aurora and Elgin. Storm Sash Cover Both Upper and Lower Sash of Side Windows in Winter

They are held in position by bolts fastened to the side posts, and are further secured at the top to the drip rail. Another winter accessory is the Root snow scraper and track groover.

These cars averaged 1.18 kw.-hr. per car-mile energy consumption for the first month of operation. They replaced 40,000-lb., two-man, three-step cars, which had been operated at an average of 3.2 kw.-hr. per car-mile energy consumption.

City Operation Improved

Twenty-four of the new cars have been placed in service in Aurora and sixteen in Elgin. Operation of city service was radically changed with the advent of the new cars. It was possible to increase the schedule speed from 8 m.p.h. to 10.4 m.p.h., which, with a greater number of cars, made possible a 10-min. headway rather than a 20-min. headway, as had been the case with the old equipment. In Aurora and Elgin frequent headway is a necessity because of the short distance between residence and business districts which invites walking if a car is not in sight. In Elgin a change in routing was effected by placing double tracks through the downtown portion of the city. This facilitated through-routing from one side of the city to the other and made possible a 12-m.p.h. schedule speed on a 12-min. headway, where the former schedule called for a 9-m.p.h. speed on a 20-min. headway. Improvements



Type of Automatic Substation Installation Made at Batavia and at St. Charles. The Building Houses a 300-Kw. Unit

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in service were immediately recognized by the public, with the result that 434,470 passengers were carried in Aurora and 306,428 were carried in Elgin during the month of January, 1924. These figures, compared with 307,188 for Aurora and 246,120 for Elgin for January, 1923, indicate the increase in patronage. Comparing the same months, the revenue showed an increase in gross of $9,000 for Aurora and $5,000 for Elgin, making January, 1924, the best month the company has experienced.

New Light-Weight Interurban Cars

Shortly after the city cars were received, seven new light-weight, one-man, two-man, double-truck, interurban cars were delivered for operation on the line between Aurora and Elgin. These cars were also built by the St. Louis Car Company, and are of the straight-side, arch-roof type, mounted on 26-in. wheels and equipped with four G.E. 265, 35-hp. motors. Complete safety equipment similar to that of a safety car has been installed in order that this car may be operated by one man should the occasion demand. Each car seats 48 passengers on St. Louis Car Company's reversible interurban seats, which are full spring cushion and back type, covered with Fabrikoid. Above the upper sash, at each side post is a hat and coat hook. The interior trim is cherry. This and the white Agasote headlining give a very light, pleasing appearance. In place of a bulkhead, aluminum stanchions and railings separate the car body from the platform, allowing an unobstructed view from the seats through the front vestibule windows. A partition with swinging door divides the car into two compartments, one of which is used for smoking. A toilet has been provided in one corner of the main compartment.

Illumination of the car is accomplished by a row of 92-watt lamps with shades mounted on the headlining above the aisle. The platform areas are illuminated by five 32-watt lamps. Besides these lights, two emergency lamps are provided, operated from a 6-volt battery, for illuminating the interior of the car in case the trolley voltage fails. A thermostatically-controlled electric heater has been placed under each seat to maintain a temperature of 60 deg. F. Ventilation is taken care of by 12 St. Louis ventilators spaced six on each side of the roof.

A slight ramp in the aisle connects the floor of the body with that of the platform, and a transverse ramp from the center of the platform to the double entrance and exit doors makes the entrance level 3½ in. below that of the car body floor. These cars are equipped with safety devices and air-operated doors and step. A single folding door at the rear on the right-hand side, operated by hand, serves as an entrance when the car is operated by two men.

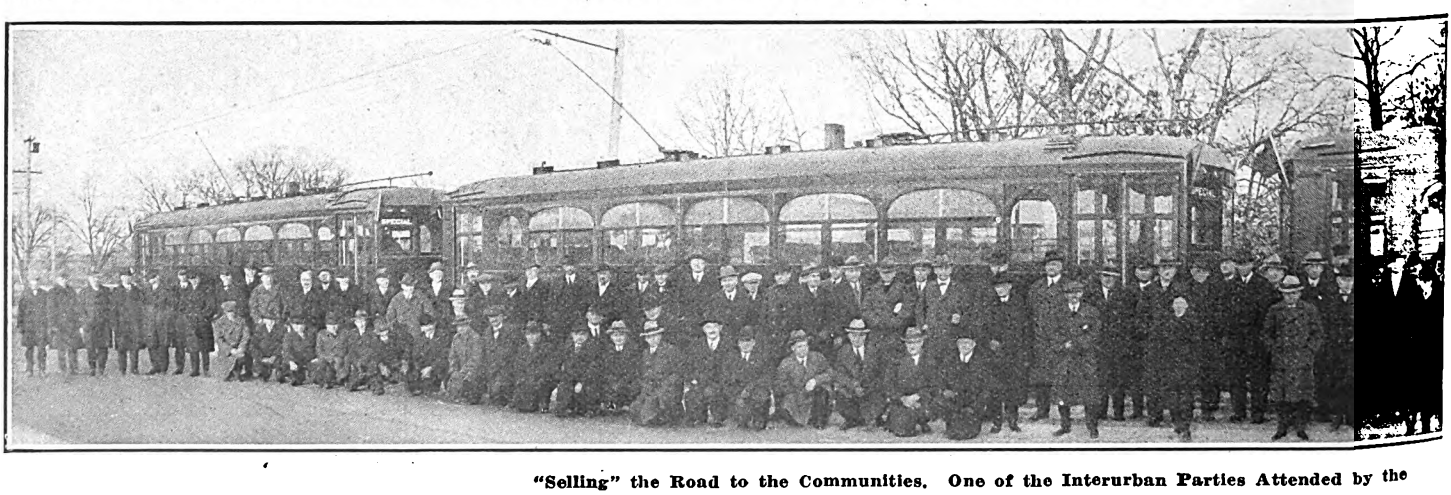
Streamline appearance has been obtained in the design by continuing the arch roof over the vestibules. Gothic shaped Florentine glass is used in the upper sash over each pair of windows, and an individual single sash window has been placed in each of the four panels at the corners of the car body. During the winter, storm sash made up in five sections cover both upper and lower sash, and are held in position by the drip rail at the top and by means of bolts at the belt rail and on the side posts. These are constructed of ¾-in. cherry with the upper portion shaped to conform with the design of the upper sash of the windows.

A set of two marker lights has been placed at each end of the car above the end windows on the vestibule corner posts. These serve as indicating markers on the front end of the car and as tail lights at the rear end. In normal operation each set of marker lights is illuminated by a lamp operating as part of a five in series circuit. In case of a power failure, illumination is supplied by a 6-volt lamp mounted beside the high-voltage lamp. These four low-voltage lamps, one in each marker box, with two lamps in the car interior, are operated from a 6-volt, 120-amp.-hr. storage battery located in the toilet. This battery is charged in series with the five marker lamps from the trolley voltage. A relay cuts in the 6-volt circuit automatically when the trolley voltage is off. This arrangement does away with oil lamps and lanterns for marking purposes, and at the same time insures protection in case the line voltage fails.

Nature of Interurban Operation

The interurban operation is more nearly suburban in character, because of the many adjoining small towns between Aurora and Elgin. In the 22 miles there are 50 regular stops, with 52 additional stops made on signal. During the day an hourly service is rendered, which is increased to 30 min. during the rush period. A schedule speed of 16½ m.p.h. makes it possible to complete the run in 1 hr. and 20 min.

The zone system of fare collection is employed, the distance between Aurora and Elgin being divided into 31 zones. No fare box or register is used, the conductor collecting the fare and giving a "hat check" receipt, upon which is some figure or mark designating the zone to which the passenger is entitled to ride. The checks are carried in holders mounted on each



"Selling" the Road to the Communities. One of the Interurban Parties Attended by the

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side post and are taken up by the conductor as the car passes through the zone preceding the one to which the passenger is entitled to ride. This system met with the disapproval of the passengers at first, because of the necessity of keeping the check in sight. The conductor is placed entirely on his honor in the handling of cash fares, and the company thinks that the system has worked out as satisfactorily as the more elaborate systems involving fare boxes and registers.

Power Requirements

Power for the railway operation and for lighting purposes in Elgin had been obtained from the third-rail division of the Aurora, Elgin & Chicago Railroad. The contract under which the power was delivered expired on Jan. 1, 1924, and notification that this contract would not be renewed was sent to the Fox River division in November, 1922. Negotiations were immediately opened with the local power company at Aurora for the purchase of alternating-current high-voltage energy. A contract was closed for 10,000 kva. of 33,000-volt energy. As the capacity of the Aurora generating plant was such that it could not handle this load, two 7,500-kva. turbine-alternator units and the necessary boilers were purchased and mounted in an addition to the power company's plant. This more than doubled the capacity of the generating plant and involved an expenditure of more than $1,000,000, but was accomplished in the remarkably short time of five months.

As the third-rail division had delivered the railway energy at 600 volts direct current, the Fox River division was not prepared to convert high-tension a.c. energy into 600-volt d.c. Consequently, the railway company was required to construct a three-phase high-tension pole line from the generating plant in Aurora to the distributing center in Elgin, a distance of 22 miles, with taps at St. Charles and Batavia for two d.c. substations.

At Elgin the railway company does a general lighting business, supplying the city with both d.c. and a.c. energy for light and power purposes. This energy had been purchased at the proper voltage for distribution. With the advent of the 33,000-volt line from Aurora it was necessary to construct a building to house two 500-kw. hand-operated rotary converters for the railway power requirements, two 300-kw. motor-generator sets for d.c. commercial power requirements, and the necessary regulators and switchboards for operating the station as a power and lighting distributing center. The power transformers, regulating transformers, oil switches and lightning arresters have been mounted in the yard to the rear of the building. The building installations were completed in five months, the new equipment going on the line on Dec. 28, 1923, just three days before the contract with the third rail division expired.

Trolley voltage is maintained by two 500-kw. hand-operated rotary converters mounted in the addition to the power plant at Aurora, two 500-kw. hand-operated machines in the distributing center at Elgin and two substations along the interurban line, one at St. Charles and one at Batavia. Each of these installations is of 300-kw. capacity with full automatic control. The rotary and switchboard are housed in the conventional type of brick building with ventilators on the roof and louvers in the walls near the floor level. The high-tension feed for each substation is carried on a steel framework, which supports the fuse and choke coil for each phase. This framework, the lightning arresters and transformer are mounted in the yard adjacent to the building. The transformer is connected to the line at all times and is protected by choke coils, while the line in turn is protected by a high-tension fuse in each phase. An aluminum lightning arrester is connected to each phase through a disconnect switch. These substations, the distributing center at Elgin and the power plant addition at Aurora were equipped by the General Electric Company.

Financed by Local Money

The Western United Corporation, the holding company of the Western United Gas & Electric Company, the local power company at Aurora, became interested in the railway property and purchased it through the bankruptcy court. The outstanding obligations of the railway company are: $2,500,000 of preferred stock, $2,500,000 of common stock, and $250,000 surplus replacement reserve. All of the new equipment was purchased on money obtained through the sale of receivers' certificates, which have since been refunded by bonds of the new company. There are 3,000 stockholders of the holding company; that is, the Western United Corporation, and of this number 98 per cent live in Aurora or the adjoining territory. The local bond houses and banks of Aurora handle all of the finances of the corporation. This places the railway property on a customer-ownership basis, whereby the public, through ownership of stocks and bonds, furnishes the capital for rehabilitation work and in turn derives a return on the investment in the form of dividends and service.

City Councils of All of the Municipalities Through Which the New Cars Operate

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New German Cars Have Unique Features

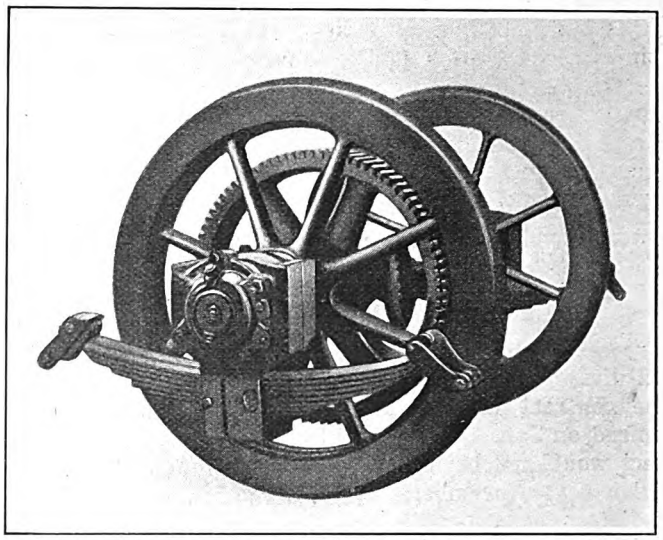
Thin Castings for Truck Side Frames—Special Leaf Springs Used—All Bearings Are Roller Type—Air for Motors Taken In at Roof—Doors on Ball Bearings

SOME interesting details of the construction of thirty new cars added to the rolling stock of the Krefeld Street Railway system (Germany) is given in *Verkehrstechnik* for Sept. 7, 1923. This is a meter gage electric railway and the cars are 34 ft. 4½ in. long, 7 ft. 1⅞ in. wide and 10 ft. 8¾ in. high. Seats are provided for twenty-two passengers, with additional room for twenty-five standing passengers. Single trucks are used which have a wheelbase of 9 ft. 9 in.

The construction of the trucks is of particular interest, as the side plates are cast of extremely thin electro-furnace steel. These plates have a strength of from 600 to 700 lb. per square inch and an elongation of 20 per cent. After the frames were cast they were annealed for several days. All supporting bosses for the brake rigging, motor suspensions and cross beams are cast in one piece with the main plates. The brake shoe heads are rigidly connected by a cross bar. This eliminates side motion and provides a uniform setting so as to utilize the full surface of the brake shoes. The diameter of the wheels is 35.1 in.

The spring suspensions for the body and the truck are also of particular interest. Leaf springs are used under the center of each axle. These are held in place by a single wide block. The springs are 31.2 in. long and 3.9 in. wide. They are composed of eight individual leaves, having a cross-section of 3.9 in. x 0.39 in. Additional leaf springs are provided for supporting the car body. These are 46.8 in. long and 9-ply. The cross-section is the same as the truck axle springs. Exceptionally thin spring leaves have been chosen after an extended investigation and are giving very good results.

All bearings are of S.K.F. precision roller type with no side play. A special arrangement of the cage rings prevents edging of the individual rollers. The outer guide rings of the rollers are held in place with a cap over the end of the shaft, and this is fastened to the shaft by three small screws. Rollers can be removed by taking off this cap, leaving the inner smooth guide ring on the shaft, thus assuring proper reassembling. Provision is made for packing the bearing with a special paste so as to make it watertight. The inner side of the bearing is equipped with a stuffing box and all bearings have sufficiently large internal pockets to hold enough lubricant for several days operation.

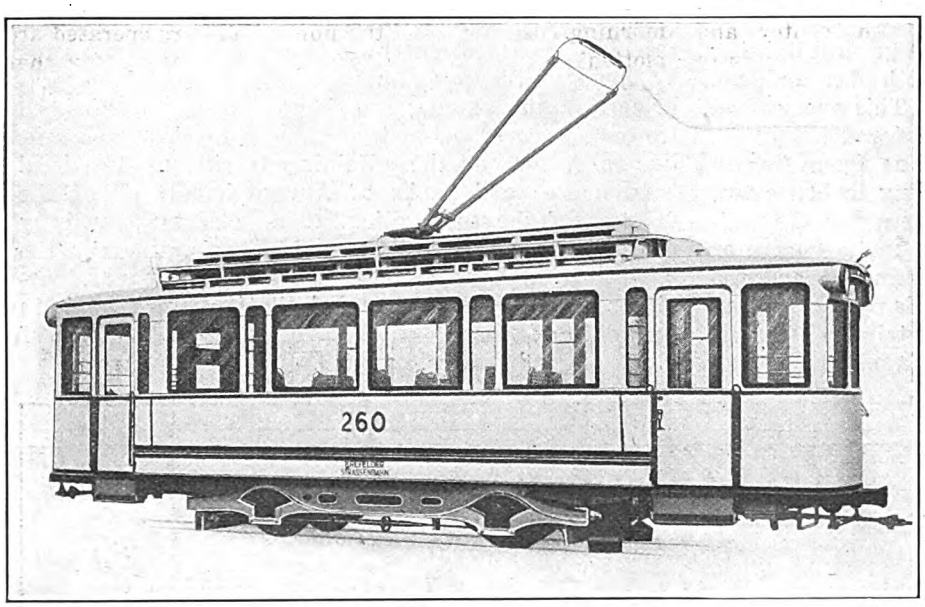


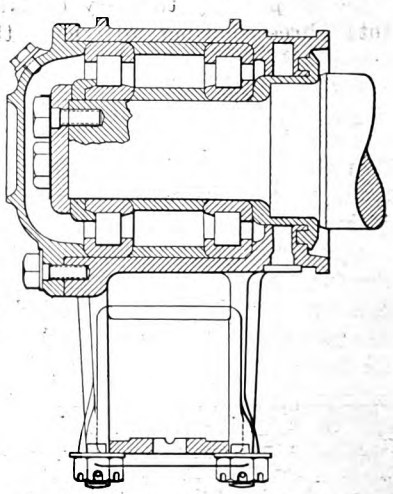
Roller Bearing Construction Used for Journals

These cars are intended for operation with a trailer and a draw bar is provided which will pull the truck and car body at the same time. The coupler has a hinged crosshead with an adjustable conical bolt to avoid excessive motion.

The car body construction consists of oak upon a steel skeleton. Pressed steel is used for the main and cross girders. The platforms are completely inclosed and all doors are single and 25.35 in. wide. The doors are mounted on ball bearings with adjustable ball races. A special lock permits opening of the doors from both sides. By closing two side panel doors against a permanent narrow center panel, an inclosed compartment is provided for the motorman.

The motors are A.E.G. with commutating poles and self-ventilation. The armatures have S.K.F. roller bearings and a very small air gap. Air for cooling the motors comes from the roof of the car through a duct.





At Left, New Type Car Used in Germany. The Line Drawing Shows Type of Spring Suspension Provided Between Truck Frames and Axles

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This duct has a filter to keep out grit or dust, and a tin cap covers the intake to prevent rain from entering.

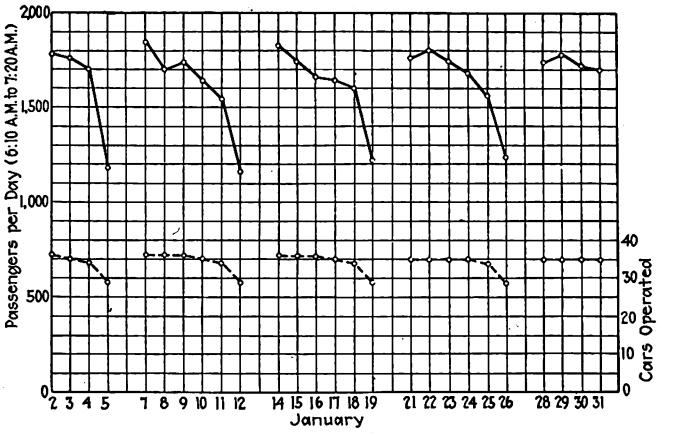
The current collector is of the bow type with a carbon contact edge. The trolley pole can be raised or lowered from within the platforms. The starting resistors are mounted on the roof. Illumination of the car is from lamps arranged in three circuits, each with four lamps in series. All circuits contain automatic ballast resistors, consisting of iron wires in hydrogen gas, such as are commonly used in Europe. This causes the lamps to burn uniformly on voltages varying between 550 and 750.

Variable Mill Riding Requires Careful Checking

Early Morning Peak Serves as a Barometer for the Regulation of Schedules in New Bedford—Modern Light-Weight Cars Have Been Purchased to Assist in Handling This Traffic

THE principal industry of New Bedford, Mass., is the manufacture of cotton cloth and yarn, and traffic on the Union Street Railways varies directly according to the prosperity or depression of this industry. Riding in the morning prior to 7:30 o'clock is confined almost entirely to mill employees and constitutes the morning peak on the railway. It is subject to peculiar fluctuations and in some respects serves as a barometer of what the traffic will be throughout the day. An increase in the morning mill riding usually indicates that there will be an increase in all other riding during the day. For this reason the railway makes a very careful check of the morning rush hour daily and regulates its schedules for the remainder of the day from that.

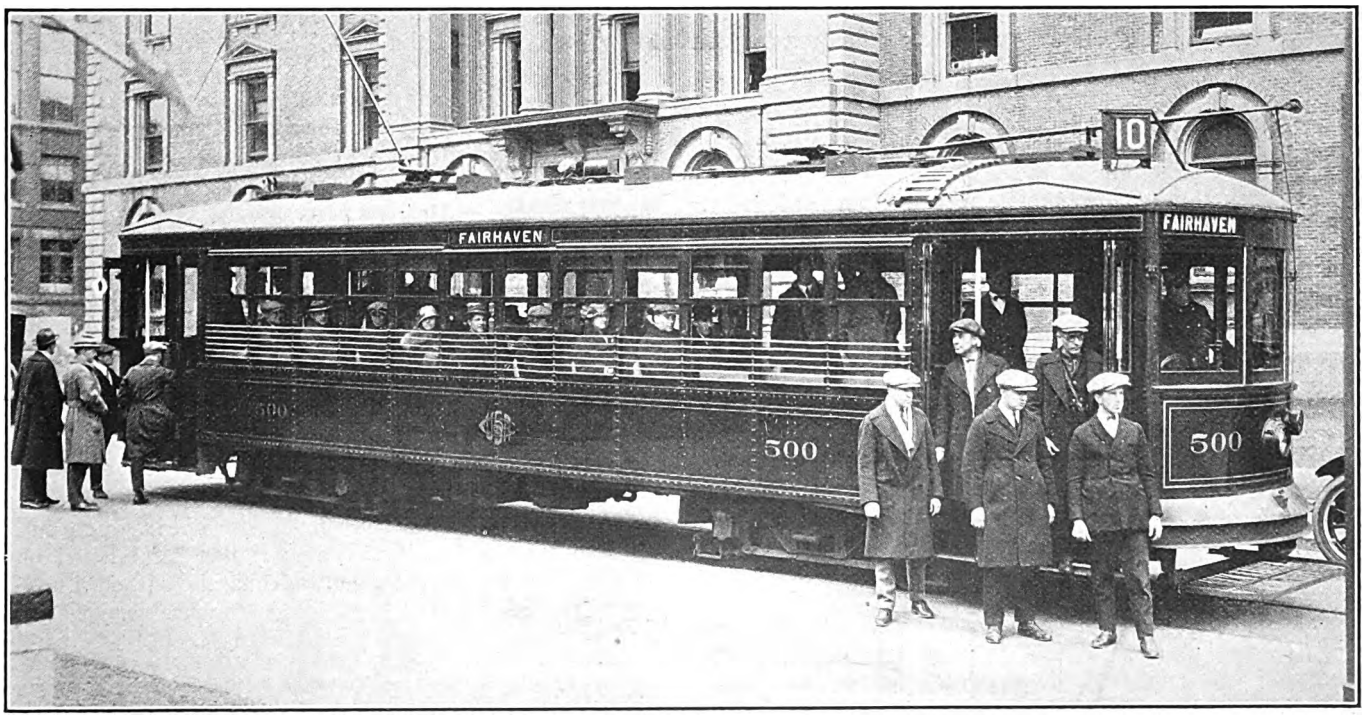
Geographically the city of New Bedford is divided into three distinct districts, the north, center and south. Each district is covered by a uniformed railway inspector during the hours that the cars are operated, who from 6 a.m. to 7:30 a.m. week days is stationed at the point of heaviest loading in his territory. He records on a checking card the scheduled and actual time of arrival of every car and the number of passengers carried. These cards are turned in to the office of the superintendent of transportation before 8:30 o'clock the same morning.



Manner in Which the Morning Peak Riding Is Plotted for Comparison with Other Days in Order to Adjust Service for the Balance of the Day

It was formerly the practice of the Union Street Railway to check its traffic by totaling the conductor's reports of register readings on the cars. Experience showed, however, that this was a misleading figure, because the difference between the maximum load on the car at any one time and the total number of passengers carried on a trip was variable. For this reason the method was adopted of checking by actual count at the point of heaviest load.

Each morning after the inspector's checks are received in the office, the figures are copied on a large traffic sheet made especially for the purpose, and plotted. The total number of passengers carried during the morning rush hour and the number of cars operated are plotted separately for each district. Riding for that particular morning is then compared with other mornings of the same week and with riding for the cor-



This Type of Modern Light-Weight Car Has Speeded Up the Service in New Bedford

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responding day of previous weeks. This comparison provides an accurate forecast of what the railway's passenger traffic will be for the entire day. The method of plotting these figures is shown in an accompanying illustration. From this chart for one particular division it will be noted that the riding varies considerably from day to day, being consistently less in the latter part of each week, with a very decided drop on Saturday morning. Part time working of the mills is the explanation of this phenomenon. Each district has characteristics of its own, however, one being quite even throughout the week and another declining very sharply as in the case illustrated.

This system of checking makes it possible to regulate the service for the remainder of the day according to the riding during the morning rush. The time-tables are so arranged that many of the tripper runs can be allowed to remain in the carhouse without disorganizing the schedules. As soon as the inspectors' morning checks have been received by the transportation officials, it is decided what trippers will be operated that evening. A list of the tripper runs to go out in the afternoon is then posted on the bulletin board. However, as only about one-half of the evening rush-hour traffic is composed of mill employees, it is necessary to consider also some other factors when deciding how many trippers shall be run.

Modern light-weight two-man cars suitable for handling the rush-hour traffic in New Bedford have recently been purchased by the railway. A saving in weight of 6 tons per car has been accomplished, the new type weighing only 30,000 lb. They are equipped with four Westinghouse No. 508 motors per car, giving a total horsepower of 100 as compared with 160 hp. for the older cars. The wheel diameter has been reduced from 33 in. to 27 in. No change has been made in the seating capacity, and the new cars are the same length as the older type. The lower steps and wider doors, as well as the absence of the end bulkheads, make for more rapid loading and unloading. These cars have proved particularly well adapted to the service for which they were bought. At the same time their attractive apearance, resulting from pleasing lines and careful painting, created a favorable impression on the general public.

Hose Jumpers Sent to Every Fire

THE track layout in the city of Providence, R. I., is such that emergency rerouting in case of fire in the downtown business district is somewhat difficult. In order to prevent tieups of the street railway system, as far as possible, the company has established the practice of sending hose jumpers to every fire occurring along streets used by the cars. The jumpers are carried on a small railway car kept in a central location expressly for this purpose.

The city fire alarm system has been connected up with the office of the superintendent of transportation, and every alarm rings there as well as at fire headquarters. On a near-by wall is posted a list of the boxes and immediately upon the sounding of an alarm examination is made to see if the fire is located along the railway tracks. If it is, word is at once sent to the emergency car, which proceeds with the hose jumpers to the location of the alarm. These devices thus come in for frequent use and they have saved the railway many serious delays.

Public Relations in San Diego*

Railway Company Has Developed a Number of Ways to Cultivate Good Public Relations—Rendering of Special Service Is a Feature

THE San Diego Electric Railway has developed some rather unusual ways for improving the good public relations which have always existed in the city of San Diego. The company has made an effort, at various carnivals and affairs held during the year under auspices of county and city organizations, to erect education booths, where by means of maps, charts and diagrams a story of the company and its relationship to the citizens has been shown graphically. Some representative of the executive department, or sometimes a platform man, has occupied at these booths to answer questions and to deliver impromptu explanatory talks upon such subjects as visitors might indicate by their queries. The relationship established through these contacts has been continued by encouraging the participation of the employees of the company in civic affairs and in various fraternal and social organizations. Particularly has membership in district improvement clubs and in church and social groups been encouraged.

At the end of one of the company's lines it has maintained at its own expense one of the most beautiful flower gardens in southern California. This is at Mission Cliff Gardens, as the reservation is called. It is the site of most of the reunions and state picnics which are a part of California life, and is kept attractive at all times by an ample force of gardeners and caretakers. No admission is charged. The company's interest in similar undertakings conducted under public or semi-public auspices is shown by its support of a zoological society, organized during the past year. Free service has also frequently been given for outings and picnics by orphanages. A girls' club, made up of young women employees of the company, has been encouraged by the company to contribute its social hours, money and material to the various welfare organizations of the city.

Not the least of the accomplishments in this direction has been the co-operation which the company has given to the local office of the United States Veterans' Bureau, rehabilitating men disabled in the war. A number of these veterans are in what is known as "Placement Training," that is, they are learning with the company under government supervision the trades and occupations which will fit them again to be self-supporting. If possible the company employs the graduates.

The company carries on its payroll a man who is stationed every day in the Plaza, a park in the heart of the city, which is a favorite starting point for tourists, and it is his business to answer all questions and give all directions requested pertaining to local points of interest. This information clerk has answered as many as 7,000 questions in a single day, and on an average Sunday morning he directs some 250 to 300 persons to churches.

Finally, the company has made a special effort to serve any particular transportation need which may exist in the community. Thus, it has established bus feeder lines to districts not adequately served by the trolley line, and it has contracted with the school board to give a special service to the high school.

*This article is based on material included in the brief submitted to the Charles A. Coffin Prize Committee of the American Electric Railway Association by the company named.

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Toronto's Two and a Half Years of M. O.

Operating Success to Date May Be Attributed Largely to the Integrity and Progressiveness of the Management, Rather than to Municipal Ownership —The Property Has Been Completely Rehabilitated and the Principal Lines Rerouted—Many Other Improvements Made

By "Observer"

ENOUGH time has elapsed since the city took over the lines of the Toronto Railway Company on Sept. 1, 1921, that some idea can be obtained of the progress made under municipal operation. Unlike some other municipal properties, every effort has been made to give real service and provide the city with a good and modern transportation system.

Canada is more given to municipal ownership than the United States. Several of the smaller electric railway properties are owned by the municipalities. Then, too, one cannot overlook the great "Hydro" system which supplies the greater part of Ontario with electrical energy from Niagara at reasonable rates. The way this project has taken with the public is noticeable in the housefurnishing stores, where electric ranges are on display. They are advertised in the newspapers as commonly as gas ranges are on this part of the continent. The Canadian National Railways is another example of government ownership on a scale far larger than anything attempted in the United States.

Toronto is the largest city in the Province of Ontario, and is running a close second for the greatest population in all Canada, with about 550,000 inhabitants. Its growth has been quite rapid, and unless some unforeseen condition halts its progress, it will not be surprising if it passes Montreal within the next few years. While there is considerable manufacturing, the city is more of a commercial center, the distribution of merchandise being a leading activity. This is inevitable, as the city is situated on the northern shore of Lake Ontario, with a fine natural harbor formed by an island directly off shore. Rail transportation is furnished by the Canadian National Railways and the Canadian Pacific, the two great railway systems of the Dominion.

Since the railways are located along the waterfront, the business section of the city naturally began its development close to the harbor. Yonge Street, the principal thoroughfare, runs back directly northward and at right angles to the lake front. Its intersection with King Street, a few blocks away, was formerly the business center, but in recent years there has been a trend uptown, so that now the retail district is closer to Queen Street, which is four blocks further back. Thus the stores are concentrated in a relatively small area, a condition that tends toward serious congestion similar to that in the average city of the United States.

For a long time previous to municipal operation the street railway system was on the down grade. The tracks and the cars were badly in need of repair, and the facilities for housing the cars and for doing the repair work became more inadequate as time went on. This condition was in part due to the determination of the city to obtain control of the property and to operate it as a municipal enterprise, which kept the owners from investing new capital. The story of the proceedings has been recounted in detail in this paper. It culminated in the purchase of the property by the city in 1921, the price being settled by a board of arbitration after a long drawn out series of hearings.

One factor that has contributed in no small degree to the success of the enterprise is the non-political character of its control. This has been divorced entirely from the local political fields, being in the hands of a non-partisan commission of three men chosen on the basis of their business ability. In their turn, they have adopted the same method in the selection of the active management. H. H. Couzens, who has been general manager from the beginning of municipal operation in Toronto, had already made an enviable record as an executive when he took charge of the system. That his administration was successful is attested to by his recent selection for the vice-presidency of the subsidiary companies of the Brazilian Traction, Light & Power Company, a private enterprise. The esteem in which Mr. Couzens is held locally is attested to by the commendatory editorial comment in all the Toronto papers on the announcement of his new connection, no matter what their political complexion.

The same policy of non-partisan control has been continued with the promotion of D. W. Harvey, who has made an excellent record as assistant manager under Mr. Couzens, and who will succeed him.

Rehabilitation of the Property Was a Real Problem

A big problem of rehabilitation faced these men when they took control of the property. In addition to the Toronto Railway, there were several so-called civic lines that had been built by the city to serve outlying districts in which the old company had failed to make extensions. These had to be tied in and coordinated with the rest of the system. This situation required an extensive program of track reconstruction, in which all but about 50 miles was rebuilt. Then the portions of the radial lines located within the city limits were added, so that today the commission operates all the street railway track in the city.

The condition of the property when it was taken over ranged from 55 to 90 per cent, according to the engineers who testified at the arbitration hearings, an average figure being about 74 per cent. This indicates a standard much lower than that found on the average American property in fair operating condition, which will run about 85 per cent.

Quantity production methods had to be worked out for the construction of the track, but the proposition was handled so well that all of the work was done during the past two seasons and this year's construction program will be quite small, the track all being in good condition. The construction methods used were described in this paper, issue of April 1, 1922.

The rolling stock was all of it old, the greater por-

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tion being of the types familiar a generation ago. Trailer trains of single-truck cars were familiar sights in the rush hours right up to the time the city took hold. Within two years rolling stock was purchased to meet all the requirements, except for a few of the lighter lines where it was felt that the older cars could be remodeled to advantage. This work has now been done, so that all of the cars in service are either new or have been thoroughly overhauled within the past two years. On all the heavy lines trains of pay-as-you-pass motor cars and center entrance trailers are in use. Improvements of many kinds have been incorporated in these cars, the three-door design of the trailer being unique. These cars were described in detail in ELECTRIC RAILWAY JOURNAL for June 23, 1923.

The best of the old cars have been overhauled and are in service on lines where the duty is not so severe. Thirteen of them have been re-equipped for one-man operation.

The carhouses were inadequate to care for the old rolling stock, and entirely unsuitable for the new large cars. This necessitated the construction of a series of carhouses and storage yards of modern design.

Proper facilities for overhauling cars were almost entirely lacking when the commission began its work. A new shop, with a capacity for handling fully twice the number of cars in active service, has been placed in service within the past month. This has all the latest facilities for rapid handling of equipment and economical operations. A complete description will be published in an early issue of this paper.

That the commission has had the funds with which to make these radical improvements is due largely to the foresight displayed at the outset in fixing a rate of fare that was sufficient to provide enough revenue to leave a surplus after paying normal operating expenses. The fare had been 5 cents for years. Even before the beginning of city operation, the announcement was made that the fare under the new control would be 7 cents cash, or four tickets for 25 cents. Children's fares were raised proportionately.

The increase in fares caused considerable adverse criticism from those who had expected some form of magic from municipal operation, but they have long since forgotten their displeasure in view of the improved service rendered.

Another move made at the beginning was the cancellation of licenses of all competing buses. These had given the old company some trouble, and had caused a loss of revenue. This did not have to be faced by the commission, making it somewhat easier to handle the situation.

The result of these arrangements and improvements has been that the system is now able to give real service to the city. The increase in rate of fare did not affect all the riders, as the civic lines, which were taken over by the commission, formerly had collected an additional fare of 2 cents above that charged by the company. Through service was given on these lines, thus making them an integral part of the system.

It soon was found that the routes as formerly laid out did not serve the city at all well. There was too much duplication of service, and the congestion in the heart of the city was bad. A few minor changes were made as quickly as possible, but in July, 1923, the principal routes were changed quite radically. There was a material saving effected by the rerouting, but the major part of it was put back into service. The service given in the non-rush seems to be more than adequate, while in the rush hours the capacity furnished is apparently ample to handle the loads without undue crowding. If anything, the service could stand a reduction. Then, too, there is practically no short-routing of cars except on a few lines in the rush hours. Many cars go through to the outer terminals with light loads, and the routes are so long that there is no chance for cars to make second trips in the rush.

BUSES AND TROLLEY BUSES ARE ALSO USED

Advantage has been taken of all available means of transportation. Both gas buses and trolley buses are in use on certain of the outlying lines, where it has not been felt that rail service would be justified at present. These vehicles are being operated strictly as adjuncts to the trolley cars, and it is stated that the rails will be extended in each case if the business warrants. The buses used are of the most modern types, and they are maintained on the same standards as have been adopted for the cars.

The organization is much the same as that of a private company. There is no difference in the attitude of the department heads toward their work. They appear as anxious to keep down expenditures and obtain maximum results as men in similar positions anywhere. In fact, they seem to take pride in the fact that they can do things better than their competitors. All positions are under the control of the general manager, which in itself indicates the desire to keep political appointees out of office.

The platform men seem well trained and courteous. They appear to be working for the interests of their employers as much as in any private corporation. They are unionized, but up to the present time there has been no conflict with the management. They have requested vacations with pay similar to those of monthly employees, but have accepted the statement that such concessions cannot be granted to men working by the hour and being paid for overtime.

A good point noticed was the method of determining what children should pay full fare. In each car a mark is made on a stanchion or some other vertical part 51 in. from the floor. If the child is under this height he pays half fare, if above, full fare. This eliminates disputes and makes it unnecessary for parents or children to resort to perjury.

A factor which is the source of serious concern to the management is the competition of private automobiles. The past winter was very mild until February, and many people kept their machines in service, with the result that the receipts were slightly lower than for the previous year. In February, however, the weather was quite bad and there was a heavy fall of snow, with the result that the automobiles remained in their garages and the people rode the cars, producing an increase in business over last year. Even though it is a municipal enterprise, it must face adverse conditions, just as the private company.

Altogether, the public seems well pleased with the venture in municipal ownership. Of course there is the contrast with what had gone before, so that the service has been a distinct improvement. It ranks as good service, however, when measured by the standard of any American city, and is far better than some of the private operations one might mention.

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Unified Traffic Control Tried in Los Angeles

Movement of Motor Vehicles in the Congested Area Has Been Facilitated, but Railway Operation Has Been Slowed Down Considerably

THE Los Angeles Railway has found the unified traffic control system installed three years ago a handicap to its operation. Comments on this subject were made by G. B. Anderson, manager of transportation Los Angeles Railway, at the Midyear Meeting of the American Electric Railway Association at St. Louis March 4, as noted on page 372 of the ELECTRIC RAILWAY JOURNAL for March 8, 1924. In the opinion of the railway there is no automatic signal that can handle traffic as expeditiously as a manually operated signal when the latter is in charge of a competent man.

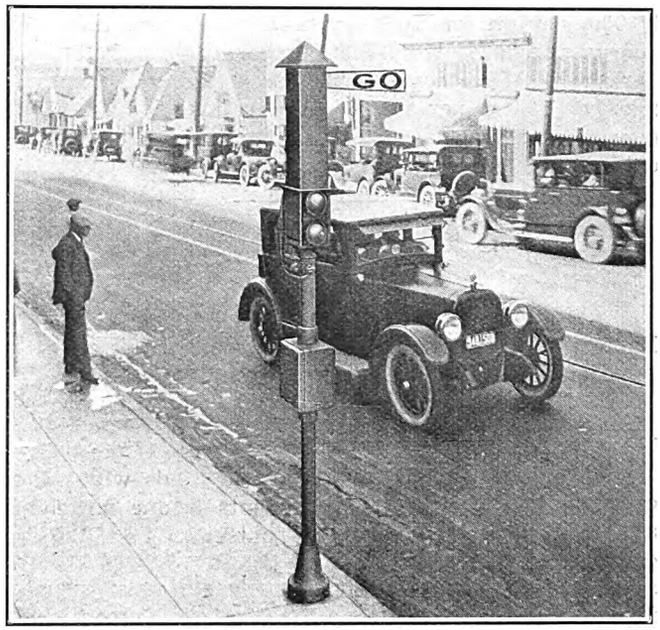
Prior to 1921 the handling of traffic in Los Angeles was accomplished by stationing a patrolman at each important street intersection. Increasing congestion eventually demonstrated the inadequacy of this system and indicated a need for some sort of control that would permit faster traffic movement. During that year a new system was installed, consisting of signals at the busiest intersections in the city, all controlled from a single central station.

The timing station is located in the approximate center of the congested area of the city. From there five main circuits connect with signals at 31 intersections. At each corner there are four signal standards, equipped with "go" and "stop" arms, as shown in the accompanying illustration. Under the normal method of operation traffic proceeds when the "go" arms are displayed at diagonally opposite corners. The "stop" arms at these corners are then folded out of sight. Simultaneously the "stop" arms are displayed at the other two corners, while the "go" arms there are folded up. In case it is necessary to change the method of operation at any particular intersection the four signals may be operated manually from one of them, which is known as the master control unit for that corner.

Below the semaphore arms there are red and green lights. The former operates in conjunction with the "stop" arm and the latter with the "go" arm. During the daytime the lights are switched off. At the top of the signal standard under the hood is located an electric bell which rings for three seconds with every movement of the semaphore arms. The bell, however, is operated from the central station independently of the arms and can be used also to give special signals as in case of an alarm of fire.

When the system is operating automatically the direction of traffic flow is alternated at consecutive intersections, the theory being that this alternation makes possible a continuous movement over several blocks in a single direction, the signals changing to "go" just as the moving vehicles reach the corner. This is thought by the advocates of the system to be a better arrangement than to have the intersections controlled by traffic officers who may not co-ordinate their signals, thus allowing more traffic to flow into some blocks than is allowed to flow out again at the next intersection. It is said to be superior also to a traffic control system whereby all traffic is simultaneously halted over a large area to permit the movement of cross-traffic. The claim has been made that it is possible for an automobile to pass from one end of the congested district in Los Angeles through to the other end without being once delayed by cross-traffic. Careful observation, however, does not confirm this contention.

One of the difficulties with the present arrangement is that the north and south interval of 45 sec. is too long in comparison to the east and west interval of 35 sec. Observation has shown that there is often from 8 to 20 sec. when the signals are clear for north and south movement and no traffic to move. Meanwhile east and west bound traffic is held up. Traffic officers make little attempt to stop the flow of traffic over the intersections until the change of signals. As a consequence signals are found reading "go" in one direction while the traffic is still moving on an intersecting street.



A Signal Standard of This Type Is Used at Each of the Four Corners of Every Street Intersection in the Congested District of Los Angeles

The railway has found that there is a temptation for motormen to try to beat the traffic signal and start their cars too soon. When the signal is clear there is a natural desire to take advantage of it and the cars sometimes fail to wait until all passengers have boarded. Also, drivers of motor vehicles often operate at excessive speed in their desire to beat the signal at a crossing. It is thought that a majority of the automobile accidents in the congested districts are attributable to this cause.

Purchasing Energy Saves $15,000 a Year

ARRANGEMENTS have recently been completed by the Hartford & Springfield Street Railway, Warehouse Point, Conn., for the purchase of electrical energy from the Northern Connecticut Light & Power Company, Thompsonville, Conn. The railway's steam power plant at Warehouse Point has been shut down and direct current for car operation is obtained through a 1,000-kw. rotary converter substation.

The railway company has been in the hands of a receiver for some time, so that the agreement made with the approval of the court is for one year only and thereafter from year to year until terminated by either party. The introduction of central station energy into this situation indicates a substantial saving

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to the transportation company, the rate for energy being on a sliding scale to compensate for variation in power demands.

Two 500-kw. rotary converters with the necessary transformer equipment have been installed by the railway to supply the trolley service, energy being purchased at 13,200 volts. The converter and transformer installation cost about $25,000. The railway company generated 2,392,000 kw.-hr. in 1922 at a total cost of $69,950 (the principal items were fuel, $46,210, and power station labor, $14,262). Allowing 15 per cent loss in the conversion would require the purchase of 2,673,410 kw.-hr. At the contract price, including 15 per cent charges on a total investment of $30,000 on the part of the railway to provide for the supply and $1,000 a year for maintenance, the same amount of energy purchased from the Northern Connecticut Company would have cost $54,948, or a saving of approximately $15,000 per year to the railway on the 1922 consumption basis—50 per cent on the cost of the equipment installed to permit the purchase of energy.

Daily Statement of Earnings and Expenses

Eastern Massachusetts Street Railway Finds It Useful in Making Service Adjustments—Also Keeps Census of Industrial Population

FOR about four years the Eastern Massachusetts Street Railway has followed the practice of requiring each of its fifteen local managers to compile a daily statement of earnings and expenses. The advantages of such a statement over the monthly statement are apparent, especially as the monthly statement usually is not available earlier than the 10th of the month following that for which it is compiled. With the daily statement, tendencies in both earnings and expenses can be very quickly detected, and the plan makes possible very prompt action in controlling service and other expenses.

Possibly closer attention to changes in the demand for transportation is necessary in very highly developed industrial territory, such as that served by the Eastern Massachusetts Street Railway, than in a community with more diversified interests. Slight changes in the cost of raw materials or in the demand for finished products affect directly the number of employees required in the many large cotton mills, woolen mills and shoe factories in the territory of the Eastern Massachusetts Street Railway.

The form upon which this daily statement is compiled is reproduced herewith. The reports from each division are assembled by one of the assistants in the central office. He keeps in close touch with all work being done and with the records as they come in from the divisions and thus can watch the margin between receipts and expenses as well as quickly detect any abnormal or unwarranted tendencies in either gross or net. Any such tendency is investigated and called to the attention of the proper officials. Summaries of the major items are prepared every seven days.

This plan makes available for the management reasonably accurate figures on the second day after the day to which they apply. While some estimates necessarily have to be made, it has been found that the figures are so accurate that the totals at the end of the month will not vary to any important extent from the corresponding actual figures in the regular monthly report. In practice, a few of the daily expense figures are the daily average of the monthly figure, so that it is necessary to calculate only the variable items.

While this daily statement has proved most useful for the purpose intended, it is not the only means used for determining promptly possible variations in the demand for transportation. Another and very effective way is by keeping an up-to-date "census" of the employees in the principal factories served. The basis for

Form A 1123

EASTERN MASSACHUSETTS STREET RAILWAY COMPANY
DAILY ESTIMATE OF EARNINGS AND EXPENSES

.....DISTRICT, DATE.....

		DAY		CURRENT MONTH TO DATE	
	REVENUES AND INCOME				
	Cash Receipts				
	Ticket Sales				
	Miscellaneous				
	Divisional Adjustments				
	TOTAL REVENUES AND INCOME				
	EXPENSES				
	Track and Roadway Labor				
	Ties				
	Other Material				
Electric Line	Labor				
	Material				
Buildings	Labor				
	Material				
	Depreciation—Way and Str.				
	Equalization—Way and Str.				
	TOTAL WAY AND STRUCTURES				
Equipment	Divisional Labor				
	" Material				
	Shop Orders				
	Depreciation				
	Divisional Adjustments				
	TOTAL EQUIPMENT				
Power	Labor				
	Fuel (South Quincy Point Power)				
	Other Material				
Power Interchange	Day / To Date				
	Bought from Other Companies	KWH	KWH		
	Sold to Other Companies	KWH	KWH		
	Interdivisional Exchange	KWH	KWH		
	Depreciation				
(KWH Generated / Converted	Day / To Date) TOTAL POWER				
Cond. Transportation—Wages of Trainmen—Adjusted					
	Other Trans. Labor and " p.				
	Material				
	Snow and Ice				
	TOTAL COND. TRANSPORTATION				
Gen. and Miscellaneous—Per Cent Passenger Revenue Last Month ... %					
	Injuries and Damages				
	TOTAL GEN. AND MISCELLANEOUS				
	TOTAL OPERATING EXPENSES				
TAXES					
	TOTAL OPER. EXPENSES AND TAXES				
	NET EARNINGS (Deficit in Red)				
Amount Required to Meet "Cost of Service"					
	SURPLUS (Deficit in Red)				
Adjusted Revenue Car Miles					

Form Used for Daily Statement on Earnings and Expenses, Eastern Massachusetts Street Railway

this census is a count which was taken three or four years ago, showing for each district the distribution of industrial workers and their demands for transportation. Since then, the railway company has arranged with each large employer of labor in the district to appoint some one in his organization to inform the railway promptly of any changes in the factory force which will affect transportation schedules. The interest of the employer lies in the fact that his employees in this way are insured of adequate car service when the working forces are increased.

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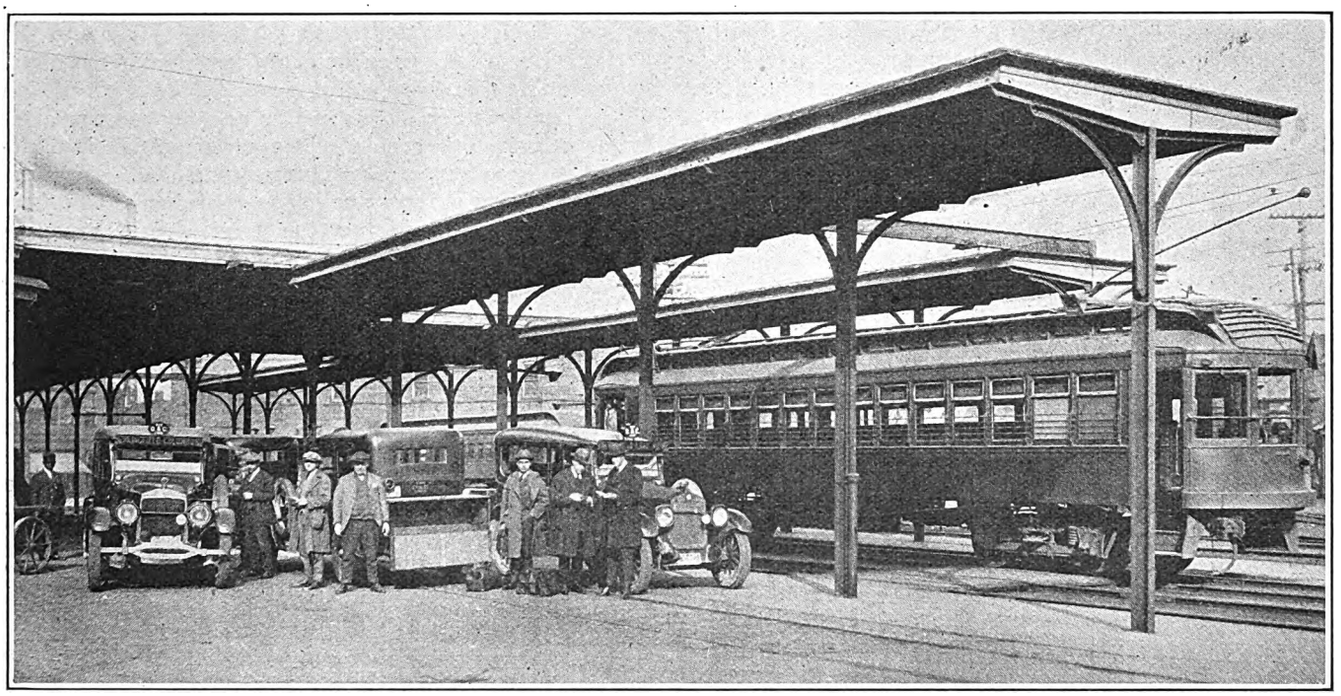
Railway Operates Passenger Automobiles for Intercity Service

Indiana, Columbus & Eastern Traction Company Uses Seven-Passenger Touring Cars Under Competitive Conditions—Cost of Operation Is Comparatively Low—Rules Insure Careful Operation—Regular Maintenance Reduces Road Failures



Buses and Cars, Both Operated by the Railway, Use the Same Terminal

BUS service in competition with their own interurban lines as well as with other buses has been operated for the past year by the Indiana, Columbus & Eastern Traction Company, Springfield, Ohio, and the Columbus, Newark & Zanesville Electric Railway. Twenty-six Studebaker seven-passenger touring cars are operated on an hourly schedule between Columbus and Dayton and between Columbus and Zanesville. Bus schedules are arranged so that they are staggered with the interurban cars to give the equivalent of half-hour service.

In order to gain the advantages accruing to those who were bona-fide bus operators when the revised Ohio motor bus law went into effect, these railways were forced to put an extended bus system into operation hurriedly. They entered the bus business to control the routes paralleling their interurban lines and also because they believed that there was a real public demand for this type of transportation and that it should be furnished by the existing companies. The entire plan was inaugurated between April 8 and April 12, 1923. Considerable publicity has been given the new operation to assure the traveling public that the bus service will be continued by the electric railway after competition has been eliminated.

In studying the effect of private automobiles on interurban earnings, the management found that more serious inroads were made on local business than on through business. The conclusion was reached that the passenger automobile had also created a certain demand for motor transportation that really represented new business. It was believed that a certain proportion of intercity riding in private passenger cars could be induced to utilize a properly operated bus system. This would thus represent new traffic that could not be induced to use the interurban railway line. Providing competition was eliminated, such business could be handled profitably by bus. Moreover, it was felt that the use of comparatively light, cheap passenger cars would give low investment and low operating costs and would reduce the losses incurred during the period of competition.

The bus routes parallel practically all the divisions of the electric railways with the exception of sections between Dayton and Union City, Lakeview and Lima and Newark and Zanesville. Twenty-one vehicles are required to operate the hourly schedules, although twenty-six were purchased to provide a sufficient number of extras. They are seven-passenger Studebaker "Big Six" touring models, equipped with winter tops.

At first, to determine the possibilities of the new service, the buses were operated from 4 a.m. to 11 p.m. The fare is on the basis of 3 cents a mile and with a vehicle seating seven paid passengers the maximum possible revenue would be 21 cents per bus-mile. Under the competitive conditions existing, however, only 8 cents per bus-mile was actually obtained.

A schedule speed of about 30 m.p.h. is maintained.

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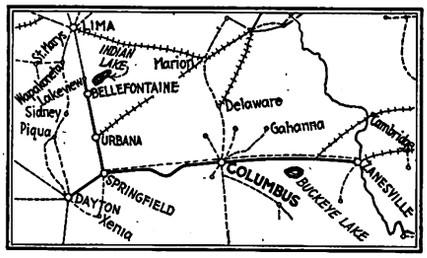
Drivers get 45 cents an hour and are paid for ten hours of operation. A careful check has shown that from seven-tenths to eight-tenths of this time is actual operating time. Hence, platform wages are in the neighborhood of 2 cents per bus-mile. It was soon found that the total operating costs were approximately 9 cents per bus-mile. This is based on a three-year life, or an estimated mileage of 150,000 miles. In the 9 cents, however, only that portion of the railway overhead represented by actual expenses incurred incident to the bus operation is charged against the buses.



Railway Bus Routes Between Dayton and Zanesville Parallel Company's Tracks

This schedule showed a loss due primarily to the small load factor incident to the long hours of operation. When the service was changed to a so-called daylight schedule, namely, from 7 a.m. to 6 p.m., corresponding with the hours operated by competitive lines, the revenue was increased from 8 cents to 11½ cents per bus-mile, with practically the same operating costs per mile. The change in schedule gave a slightly increased fixed charge per mile, but also resulted in a reduction of 30 per cent in the number of miles operated per day and a consequent reduction in the depreciation rate.

The estimated life of 150,000 miles per vehicle is based on experience with motor cars which have already been in service for more than 100,000 miles. It is estimated that this mileage will allow cars to be scrapped before any serious increase in maintenance cost or service delays is experienced. Rigid inspection and prompt renewal or replacement of defective or questionable parts are practiced and are considered very important in connection with obtaining reliable service for this mileage from each vehicle. Tires, which are the most frequent cause of road failures and delays, are inspected and examined at frequent intervals and removed as soon as any question arises as to their condition.

The maintenance charges, over a six-month period, including vehicles which had made more than 90,000 miles, was 3¼ cents per mile. For the month of May, 1923, with entirely new equipment, the cost was 3.69 cents per mile, whereas during the month of September, after six months of service, the cost was 2.93 cents per mile.

A mechanical organization for the maintenance of the bus equipment has been built up entirely separate from the regular railway maintenance forces, with the exception that the garage foreman reports to the railway master mechanic. A separate building is equipped for the maintenance, storage and servicing of the buses and mechanics trained in automobile maintenance are employed for this work.

The buses are operated by subsidiary organizations known as the Dayton & Columbus Transportation Company and the Columbus & Zanesville Transportation Company. Tickets are sold by agents in the interurban stations in the various towns through which the buses operate. Seats are reserved in advance when tickets are purchased. The station agent is provided with a diagram which is turned over to the driver at the time of the departure of the bus, showing the seat number, ticket number and destination of each ticket sold for that vehicle. The passenger's ticket also specifies the seat in the bus to which he is entitled. A diagram similar to a Pullman diagram is filled out, giving each passenger's destination. It provides for seven seats in addition to the driver. Room for one additional passenger is arranged by fastening the two folding seats in the rear section of the car together at the center and building a short extension on either side. The construction is illustrated in an accompanying illustration.

A bus driver's report envelope contains on its face full information covering the trip, and a separate envelope is used for each trip made. These reports are turned in to the cashier and contain all canceled tickets, cash fare receipts, stubs and the seat diagram for the trip. Cash collected en route is handled in another special envelope provided for this purpose. A bus driver's wheel report is used to inform the garage of all mechanical and tire defects. Drivers are required to give receipts to passengers for all cash fares collected. Careful accounting is made of the receipts on a form giving a complete record of the operation, and each driver is required to sign for the receipts issued to him. Daily reports of ticket sales are made by agents to serve as a further check on cash handled by employees.

Rules for the operation of buses were prepared as soon as this service was put into effect and included practically all provisions that have subsequently been laid down by the Public Utilities Commission of Ohio for the regulation of motor vehicles operating as public carriers. These rules include the following provisions:

(a) Drivers must operate in a careful and prudent manner, with due regard to traffic and use of the way by others, so as not to endanger the life and limb of any person.

(b) Drivers shall be American citizens, twenty-one years of age, of good moral character, must be fully competent to operate the vehicle under their charge, and shall have a certificate of license from the Secretary of State.

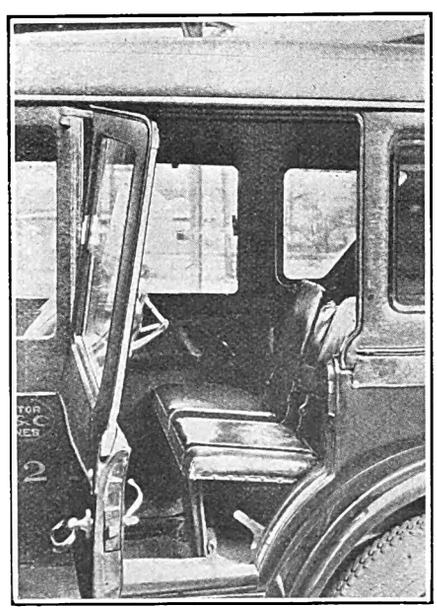
(c) No driver shall drink any intoxicating liquor during the time he is on duty, or at any time use intoxicating liquor to excess.

(d) No driver shall smoke any cigar, cigarette, tobacco or other substance while operating a motor bus.

(e) No driver shall carry on any unnecessary conversation with passengers.

(f) Upon approaching any bridge, sharp curve, steep descent or any other dangerous place, or in traversing such bridge, curves, jut way, descent or other dangerous place, the driver or operator of the motor vehicle shall slow down and have the vehicle under complete control.

(g) A driver of a motor vehicle shall bring it to a full stop before crossing the tracks of any steam or electric interurban railroad, such



An Additional Seat Is Made by Bridging the Space Between the Two Regular Seats

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stops to be made not more than 75 ft. from the nearest rail of the crossing and at points where the clearest view of the approaching trains, locomotive or cars can be had. After making the stop hereby required, the driver shall carefully look in each direction for approaching trains, locomotives or cars, and if certain that no such trains, locomotives or cars are approaching, he shall then cross such tracks with the transmission of said vehicle in not higher than second gear. The foregoing does not apply to electric railways within public streets in municipalities.

In addition to the promulgation of these rules, the company has equipped all cars with red flags for emergency use in the daytime and fuses for use at night. All cars are equipped with chains, and the drivers are instructed to use them in slippery weather.

Insurance is carried in compliance with the state law of Ohio, which requires on seven-passenger cars the following total liability: $6,000 for any recovery for any personal injury by any one person, $12,000 for all persons receiving personal injury by reason of one act of negligence, $1,000 for damage to property of any person other than the assured. The insurance against damage by collision is carried by the transportation company. The liability insurance has been placed with old line companies on an experimental basis. Under this arrangement all cars are covered by insurance for a minimum rate and it is expected that the final insurance rate will be worked out at the close of the year on the basis of the car-hours in service, taken from bus drivers' time slips, deducting from them such time as dead layover time at terminals. The company and the insurance companies have co-operated with a view to working out an equitable basis for this form of insurance.

Bonus for Increased Revenue

Pay of Employees Goes Up One Cent per Hour with Every Cent of Passenger Revenue per Car-Mile Over Previous Average

A VERY simple profit-sharing plan has been in force on the New York & Queens County Railway since July 1, 1923. It provides that for every cent above 31 cents which the railway earns in passenger revenue per car-mile during any month the wages are increased during the following month one cent an hour over a specified basic wage. Those who participate in this bonus include all transportation employees except the superintendent, all mechanical department employees except the superintendent and shop foremen, all line department employees and all substation employees except the chief engineer. The trackmen are not included, as the service of individual trackmen on the property is far less continuous than with any of the other classes.

The plan was announced by Gen. L. C. Andrews, receiver for the company, last June, and 31 cents per car-mile was the figure set for the men to exceed, because that had been the average receipts of the system subsequent to the appointment of the receiver. The basic transportation wage, to which the bonus is added, went into effect at the same time as the bonus system, and is somewhat higher than that previously in force. It is on a ten-year schedule, like the wages on the other lines in Greater New York, and is as follows:

For motormen and conductors, first year, 47 cents; second year, 49 cents; third year, 51 cents; fourth year, 52 cents; fifth year to ninth year, 53 cents; tenth year and thereafter, 55 cents. Operators of one-man cars receive 5 cents an hour in addition to this regular rate.

In his announcement General Andrews pointed out that the company wanted more revenue and the men wanted more pay. If they would help the company get the revenue, they could have part of it in the form of higher wages. The passenger revenue per car-mile during the previous year had averaged just under 29 cents, and since the receiver had been appointed it averaged just under 31 cents. This was the smallest car-mile revenue of any street railway company in New York. It was pointed out that if each operator would pick up only one more fare for each car-mile of his run, then the average car-mile revenue would be increased by 5 cents and the employees' pay also by that amount. The announcement promised also that each day the company would post at its carhouse the car-mile earnings of the day before and the average of the month up to that day, so that the men could see what their chances were of having a bonus the following month.

There are only two restrictions to the plan. The first is that a man must work at least 150 hours during the month in which the increased earnings are created to receive the bonus during the following month. The second relates to accidents. Where a liability accident results in a settlement in favor of the claimant and investigation has shown that the accident was the fault of the motorman, he is obliged to forfeit thirty days of his increased pay, effective immediately after the decision of the general manager. The announcement also suggested ways in which the different kinds of employees could help. On this point it said:

How Transportation Men Can Help to Increase Car-Mile Earnings

By keeping your eyes open and picking up every possible passenger.

By running on time, so passengers learn to count on the cars coming along.

By being courteous to passengers.

By making every passenger want to ride on our lines again.

By encouraging local riding during non-rush hours.

By avoiding accidents that tie up the road.

By taking care that every passenger puts correct fare into the fare box.

How Shop Men Can Help to Increase Car-Mile Earnings

By putting out shop jobs that will stand up on the road.

By putting out cars that are clean and comfortable to ride in.

By working with the trainmen to get cars on the road in time, to avoid dead mileage, and to live up to schedules.

How Line Men Can Help to Increase Car-Mile Earnings

By not blocking the line more than you can help while doing line work.

By getting on the job promptly in case of line trouble.

How Everybody Can Help to Increase Car-Mile Earnings

By being a booster for the New York & Queens trolley service.

By co-operating with the other men in your department and in other departments in everything that affects the car service.

By working for the interests of our trolley lines in the same way that a man works for his own business.

By making it part of your job to be a salesman of the New York & Queens trolley service.

By keeping on the lookout for anything that will help make service better or cheaper and by telling General Manager Roberts about it.

The results since the plan went into effect on July 1 have been quite satisfactory. During June, 1923, the car-mile receipts were 32.1 cents, so that during July

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the wages were up 1.6 cents per hour. During July the increased wage earned was 1.4 cents per hour. The record for the year up to March 10, 1924, with corresponding figures for the previous year, follows:

EARNINGS AND BONUS ON NEW YORK & QUEENS COUNTY RAILWAY

Earnings per Car-Mile

	1922, Cents	1923, Cents	Increase, Per Cent	Bonus Payment, Cents per hour
June	29.6	32.1	8.5	1.1
July	31.6	32.4	2.5	1.4
August	29.1	32.5	11.7	1.5
September	29.5	32.8	11.2	1.8
October	28.2	31.8	12.8	0.8
November	27.6	31.6	14.5	0.6
December	27.7	32.3	16.6	1.3
January	27.2	31.8	16.9	0.8
February	27.5	30.9	12.4	...
March	30.1 (1 to 10)	32.5	8.0	...
April	30.7	....	....	...
May	33.7	....	....	...

It is impossible to say what proportion of the increased earnings, as compared with the previous year, is due to the bonus plan, because there are other factors which have tended to increase the passenger revenue. The management believes, however, that the greater interest taken in their work by the men, particularly the trainmen and inspectors, is responsible to a considerable extent for the better showing.

Better Illumination with Less Wattage

BY E. E. DORTING
Lighting Engineer Interborough Rapid Transit Company, New York

BETTER illumination, aimed to speed up passenger movement within the "L" stations, has been provided by the Interborough Rapid Transit Company in several stations of the Manhattan Elevated. The new lighting system gives, without glare, a maximum amount of light at the turnstiles, with a nearly uniform intensity of illumination over the rest of the station. Four 75-watt lamps in dome reflectors mounted on the ceiling replace the old installations of ten 40-watt bare lamps mounted on wall brackets.

Both the lamp renewal cost and the operating cost are less for the new system. The renewal cost of the four 75-watt white Mazda lamps of the new installation at 55 cents each is $2.20, whereas the ten 40-watt bare lamps at 30 cents each cost $3. Four 75-watt lamps total 300 watts, while the ten 40-watt lamps total 400 watts—a saving of 100 watt-hours for each hour the lights are lighted.

While the Interborough has been confronted with the problem of designing and equipping its stations to handle larger and larger crowds, and traffic experts have arranged stairways, turnstiles and locations of doorways for accommodating a maximum number of people with a minimum of delay and confusion, until recently little consideration was given to the possibility of improved lighting as an aid to traffic congestion. Many tests have proved that a higher intensity of properly diffused illumination speeds up production in a factory, increases sales in a store, reduces traffic accidents. Good lighting is equally applicable to enable the hurrying "L" passengers to move along faster. At least the stations are brighter and more cheerful when they are well lighted, which fact alone warrants the change.

The old lighting system consisted of ten 40-watt bare lamps mounted on wall brackets. These were spaced about the station wall and gave considerable glare. On all sides the lamps threw unshaded light directly into the eyes of the people. The walls were brightly lighted, but there was not nearly enough light in the center of the station, and especially at the turnstiles, where the most congestion exists, and consequently a high intensity of light is important.

The new lighting system of four 75-watt white lamps in RLM standard dome reflectors largely eliminates the shadows. From the standpoint of glare the new installation is much better than the old as the units provide a high quality of well-diffused illumination, while their location close to the ceiling "softens" any glare as they are out of the line of vision.

Photometer readings taken at numerous points in the station show the average illumination to be increased 75 per cent, while over the turnstiles it was increased almost 350 per cent. The present average intensity of illumination in the station at the floor level is approximately 4 foot-candles. This greater effectiveness results from the use of a smaller number of large units equipped with efficient reflectors which direct the light where it is needed rather than allowing it to be wasted largely on the side walls.

Old and New Method of "L" Station Lighting
Ten 40-watt lamps on wall brackets (left) have been replaced with four 75-watt ceiling lamps with reflectors (right), giving 350 per cent better illumination over the turnstiles, without glare.

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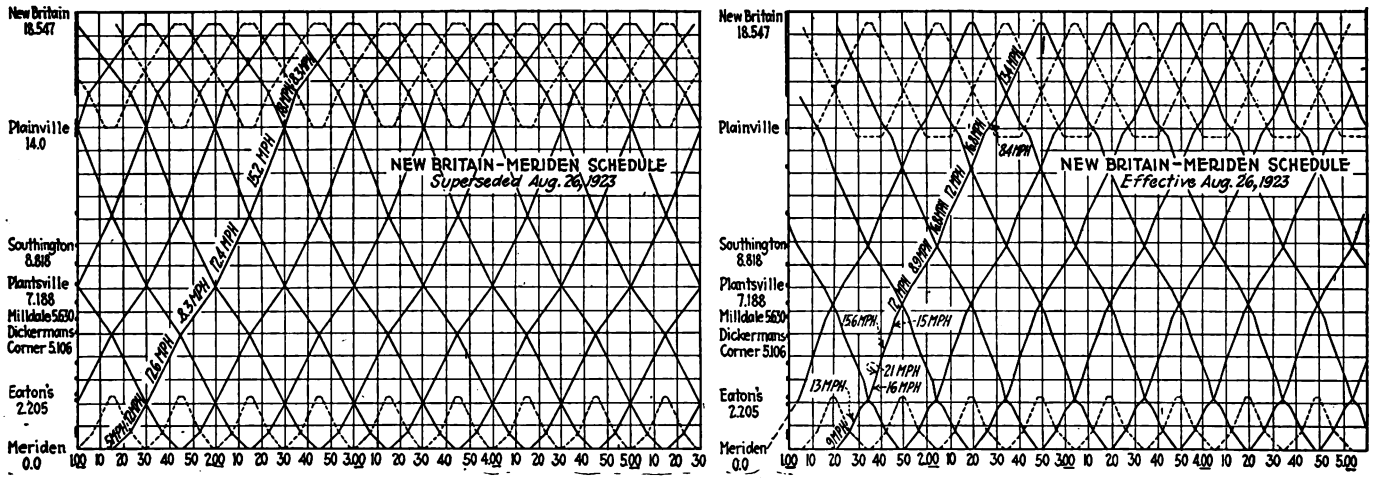
Signals Reduce Operating Expenses

Block Signals Installed by Connecticut Company Pay for Themselves in Six Months by Reducing the Car-Hours Lost on Turnouts

AN INTERESTING example of the way in which block signals reduce the time of cars waiting at turnouts and so save operating expenses is shown by an installation completed last August by the Connecticut Company between Meriden and New Britain. The length of route between the center of Meriden and the center of New Britain is 18.547 miles and, outside of a short section of double track at each end, is single track with turnouts. This track is laid partly in side location, partly in the center of city streets and partly in improved state highways, and the route passes through Milldale, Plantsville, Southington and Plainville. All are fair-sized industrial towns with narrow streets.



One Car Less Is Required to Operate This Half-Hourly Schedule Since Signals Were Installed. Old Schedule at Left, New Schedule at Right.

A portion of the afternoon time-table, from 1 p.m. to 5:30 p.m. before the installation of signals, is given in the first engraving. The through time-table was half-hourly, with an intermediate half-hourly local service out of Meriden as far as Eatons and out of New Britain as far as Plainville. This, with the through service, gave a fifteen-minute headway for short distances out from both Meriden and New Britain. There is also an additional fifteen-minute service, not shown in the chart, from New Britain as far as Corbin Avenue during the morning and afternoon on week days. These three local services are with one-man cars.

The through schedule shown had to be somewhat slack to give the cars ample time to make the turnouts at which they were scheduled to pass each other, and, as will be seen, seven cars were required to give this through half-hourly service. With the introduction of signals, it was possible to tighten up the schedule, so a car would make the half trip in one hour and twenty-eight minutes, instead of one hour and forty-three minutes. This allowed the service to be given with six cars instead of seven cars and gave a more dependable and faster service. While there were no more passing points, their location was changed, so that the change required the installation of two more turnouts. Altogether there are five passing points, but as two are on double track, only three turnouts are required. The old turnouts were left in position for emergency use. The cost of the two new turnouts was about $5,000, including some land which had to be purchased for one of the turnouts.

The cars used are four-motor double-truck cars, equipped with Westinghouse 101 or G.E. 80 motors. The speed given, as shown in the chart, is of course not high, compared with some interurban lines, but it must be remembered that the line passes through several small industrial towns and roads with many automobiles.

Before disturbing the schedule on the line, which had been in operation a great many years, and to which the patrons had become accustomed, the company interviewed a great many people who would be apt to be interested in the change, including the managers of the major industries. The advantages of the plan were explained and the co-operation of the various industries secured.

The cost of installing the signals was about $10,000, and even if the $5,000 spent for the additional turnouts is included as part of the cost of installation, the company estimates that the saving made from running the schedule with one less car pays for the entire improvement in about six months.

All-Electric One-Man Car in Holland

A NOVEL type of one-man car has been put in operation on the street car lines of Amsterdam, Holland. This is designed along similar lines to its American prototype, according to *Elektrotechnische Zeitschrift*, but differs in that it is not equipped with compressed air, being operated electrically throughout. Double doors, for separate entrance and exit, are provided at each end. These are opened and closed by ½-hp. electric motors with worm drive and slip clutch. The doors can be opened manually if necessity arises.

A dead-man handle is used on the controller, which is arranged to disconnect the motors, apply the brakes and light a red lamp at each end of the car if the motorman removes his hand. A foot-operated by-pass permits the temporary use of both hands for purposes of making change, etc. The car is driven by two 30-kw. motors. An electromagnetic rail brake in installed for regular use, while a hand brake can be used in emergency. The registering fare box is illuminated electrically so that the operator can see within it at night. The window in front of the motorman is inclined inwardly so that it prevents confusing reflections from the lights within the car which would hinder the operator in his work at night.

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American Association News

Executive Committee

THE executive committee of the American Association met at headquarters in New York on April 11. The members present were President Britton I. Budd, Secretary J. W. Welsh, and Messrs. C. L. Henry, R. P. Stevens, J. H. Hanna, C. E. Morgan, C. D. Emmons, H. B. Flowers, R. I. Todd, Harry Reid, H. A. Johnson, J. K. Punderford, E. M. White, Barron G. Collier, M. B. Lambert for H. D. Shute, Cornell S. Hawley and A. A. Hale.

Mr. Henry reported for the committee on national relations, summarizing the recent work done at Washington. The matter discussed by Mr. Henry was covered in the issues of the ELECTRIC RAILWAY JOURNAL for March 29 and April 5. Mr. Welsh presented a report for the committee on subjects and meetings which outlined tentatively the program for the annual convention. The executive committee decided that one day should be devoted entirely to the reports and discussion of the committees on city operation and interurban operation. Otherwise the report of the subjects and meetings committee was approved as presented. It was also tentatively decided to devote one entire day to the inspection of exhibits and to that end there will be no business sessions during one day. Whether this exhibits day will be Tuesday or Wednesday will be decided later.

Mr. Budd spoke briefly of the great desirability of formulating some plan which would tend to make delegates to the convention attend meetings and take an interest in all of the proceedings as far as time permitted, whether of immediate interest in the delegate's own work or not. Suggestions were made that it might be helpful if every employee sent to the convention were required by his executive to report upon attendance and impressions of meetings and exhibits. The executive committee requested the president and secretary to formulate a letter to be sent to member companies to impress upon delegates the importance of attending to business while at the convention.

Mr. Collier reported for the publicity committee, outlining the activities of the past 60 days. E. C. Faber made a financial report on *Aera* for the publication committee, which showed the paper to be improving.

Mr. Stevens reported for the committee on company and associate membership, stating that three railway, one manufacturer and one associate members had been added to the membership. The new members are the Muncie & Portland Traction Company, Portland, Ind.; the Sioux Falls Traction System, Sioux Falls, S. D.; the Eastern Massachusetts Street Railway, Boston; the General Tire & Rubber Company, Akron, and the Buchanan & Layng Engineering Corporation, New York.

Mr. Morgan reported for the committee on individual members and company and community sections that there had been a net gain of five individual members since Nov. 1 of last year, and that there is at present a membership of close to 200 signed up toward the organization of the Metropolitan Community Section of New York.

A letter from W. H. Sawyer gave a preliminary financial report of the Midyear Dinner at St. Louis. The receipts will be approximately $7,500 and expenses slightly below that.

A report of the exhibit committee, which appears elsewhere in this issue, was presented by Secretary Welsh in the absence of J. C. McQuiston, chairman. The report stated that satisfactory contracts had been negotiated for holding the convention at Atlantic City, and recommended that a rate of 65 cents per square foot be charged for exhibit space. This was approved.

Annual Convention and Exhibits

A.E.R.A.
Atlantic City, N.J.

October 6, 7, 8, 9, 10

President Budd suggested the appointment of a committee of bankers, with the idea that they would take an active interest in electric railway financial matters and advise the association on these subjects. The association has special advisory committees on nearly every other phase of the industry but none on finance. It was thought that a committee of bankers would not only be of vital assistance to the association but would bring these men more actively into the association work. Furthermore, their knowledge of the association's activities would tend to bring a feeling of confidence with respect to electric railways into the financial circles. A motion was made and carried authorizing the president to appoint a committee to select and secure five bankers to serve on such a committee, preferably all located in New York so that they could readily get together.

F. C. J. Dell read a report for E. F. Wickwire, chairman of the committee on co-operation of manufacturers. In this it was pointed out that 41 manufacturers had been added to the list of those who were actively interested in co-operating with the association. The report stated that the personal visits of Mr. Dell upon manufacturers in various parts of the country had been very well received and that it was thought this would be most helpful in promoting the spirit of co-operation.

On Referendum 43 of the United States Chamber of Commerce on transportation, the matter was referred to the committee on policy with power to act.

An invitation from the international railway association, which is to meet in Paris on June 16-22, was read, but no action was taken as to official representation.

Mr. Johnson reported that the Engineering Manual, which has been revised and prepared for publication in book form by the Engineering Association, would be ready for distribution within the next 60 days. The plan is to print 2,200 copies, of which 1,200 will be bound and the remainder held for binding later if needed, or for binding in sections if companies desire a supply of the matter pertaining to any particular department. The bound volumes will sell to members for $5 and to non-members for $7.50, and a credit of $1.50 will be allowed upon the return of the old Manual. The idea of this refund is to encourage the use of the new Manual in place of the old one, much of which is obsolete. This plan of distribution was approved.

Some discussion was introduced by Mr. Stevens on inconsistencies in the present membership provisions of the association. After an expression of views by several members, the question was referred to the committee on policy with instructions to report back in time for a revision of the constitution to be made at the annual convention, should this appear to be desirable.

The next meeting of the executive committee will be held on Wednesday, May 7, at 4 p.m. in Cleveland, during the annual meeting of the United States Chamber of Commerce, which opens there on Tuesday.

Exhibits Committee

THE committee on exhibits reported to the executive committee on April 11 that it had completed negotiations with the officials in charge of the convention and exhibit facilities at Atlantic City. Proposals for rental of Young's Million Dollar Pier had been submitted by the Associated Realties Corporation and, after considerable negotiation of all terms and conditions, had been made acceptable to the committee, and the contract was recommended for signautre by the association.

The committee had also received proposals from the other contractors at Atlantic City including those for furniture, floral decorations, drayage, etc. These have all been approved.

The committee carefully considered the probable sale of space for this year

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as well as the expenses to be incurred and formulated the following budget which was approved by the executive committee:

Expenditures	
Exhibit expense	$33,015
General convention expenses	9,250
Entertainment expense	5,000
Total expenditures	$47,265
Estimated Receipts	
Sale of exhibit space—60,000 sq.ft. at 65 cents per square foot	$42,250
Contribution from Hotel Men's Association	3,500
Total estimated receipts	$45,750
$47,265	
45,750	
$ 1,515—Total Deficit	

The committee considered this a very conservative estimate, and believed there would probably result a profit rather than a deficit. The rate of 65 cents a square foot for exhibit space, the same as last year, was recommended. This was approved by the executive committee.

This report and the action of the executive committee assure the convention being held in Atlantic City during the week of Oct. 6.

Engineering Executive

A MEETING of the executive committee of the Engineering Association was held on April 9 at association headquarters, New York. Those present were President H. A. Johnson, chairman; R. C. Cram, Daniel Durie, C. R. Harte, M. B. Rosevear, C. H. Clark, R. H. Dalgleish, G. C. Hecker and J. W. Welsh.

Mr. Harte reported on the progress of projects being handled with the American Engineering Standards Committee, and Mr. Dalgleish reported on the progress of work in which the Bureau of Standards is co-operating.

Considerable time was given to discussion of the publication of the new Engineering Manual. This is now in the hands of the printers, and it is anticipated that distribution can be begun within a month. The book will contain about 1,000 pages. It was agreed that it should be bound in cloth, uniform with the annual proceedings, and that it be sold to members and others at a price sufficient to cover the cost of publication. It was considered desirable that, in order to retire the existing Manuals, a rebate be allowed on the price of the new book in case an old one is returned.

In addition to the bound volumes it was voted to prepare separate pamphlets in paper covers, divided according to the eight general sections in which the new Manual will be printed, to be sold in response to requests for individual specifications.

The committee adopted a resolution expressing the appreciation of the association to the manual committee, Messrs. Cram, Harte, Durie and Hecker, for the thoroughness with which it has done the work of revision and publication of the new manual.

President Johnson reported that the approval of the American executive committee had been given to the request of the heavy traction committee to have Prof. R. G. Warner prepare a bibliography of heavy electric traction. It is proposed to mimeograph this material and supply it to members and others. The price will be determined later.

Mr. Dalgleish reported that he had several conferences with the Bureau of Simplified Practice of the Department of Commerce relative to the simplification of car parts resulting from an article in ELECTRIC RAILWAY JOURNAL for Sept. 29, 1923. It was agreed that the matter should be referred to the committee on unification of car design.

A sub-committee of the Engineering Association reported on relations with the A. E. S. C. It was felt that a more effective means for handling these activities is needed, as the existence of the A. E. S. C. undoubtedly will have a marked effect on the committee work of the association. Recommendations were made with regard to the procedure so as to safeguard the interests of the electric railway industry. The report was approved for presentation to the A. E. S. C.

Reports were made on a number of projects for standardization, which it was proposed to submit to the A. E. S. C. jointly with the American Society for Testing Materials. These included a specification for hard-drawn copper trolley wire, five specifications for sundry track materials, and one for open-hearth girder rails.

Several other activities were also discussed in which the association is co-operating with other bodies.

Two plans were presented for the program of the Atlantic City convention, one for a four-day schedule and the other for three days. A tentative program was approved subject to revision by the president and the secretary. Approval was given to hold a session of the purchasing agents and storekeepers, similar to that of last year.

An effort will be made to have an exhibit in the association booth showing the A. E. R. E. A. standards.

A recommendation was approved that the committee on subjects be appointed at the beginning of the association year in order to give more time for the consideration of subjects.

City and Interurban Directing Committee

A NEW committee has been formed to direct the activities of the committees on city operation and interurban operation. It consists of the chairman and one regional vice-chairman of each committee, together with the secretary and a representative of the president. A meeting of this new directing committee was held at New York on April 10. Those present were Chairman H. B. Flowers and Regional Vice-Chairman R. F. Carbutt of the city committee, Chairman Harry Reid and Regional Vice-Chairman H. L. Mitchell of the interurban committee, Secretary G. C. Hecker and E. J. Blair.

It was planned to request the subjects and meetings committee to arrange for the presentation at the convention of a brief report by each regional vice-chairman on his activities. For the preparation of the final report the form of operating handbook originated by Mr. Carbutt was approved as a guide for the collection of information. Arrangements will be made to send copies of the handbook to all regional vice-chairmen for use in their visits to properties.

Membership

THE committee on company and associate membership met in New York on April 10. Members present were Chairman R. P. Stevens, C. E. Morgan, H. B. Flowers, Edward Dana, H. B. Potter, A. Flor, K. A. Simmon, R. F. Carbutt, Charles W. Kellogg, E. P. Waller, Harry L. Brown, F. C. J. Dell and Secretary J. W. Welsh.

Mr. Stevens reported the results of his extended correspondence with non-member companies, and each member of the committee was assigned the non-members in his vicinity so that he might follow up the correspondence of the chairman by personal call.

Rapid Transit

THE committee on rapid transit met in New York on April 10 with Chairman W. S. Menden and the following members of the committee present: Edward Dana, B. J. Fallon, James Walker, W. S. Twining, L. H. Palmer, W. H. Maltbie, R. F. Kelker and Secretary J. W. Welsh.

The committee discussed at considerable length the work which might profitably be undertaken by this committee and tried to arrive at the scope of work which it could expect to complete this year. It seemed to be the sense of the meeting that the work should be confined to that of gathering facts as to the circumstances surrounding the construction, financing, operation and regulation of the existing rapid transit systems.

Coffin Prize

A MEETING of the Charles A. Coffin Prize Committee of the A. E. R. A. was held in New York on April 11. Some suggestions had been made that it might be desirable to have, in addition to the main prize, recognition for other companies in the form of an "honorable mention" or "award of merit" for the four or five leading contenders for the prize. Some doubt was expressed by the members of the committee as to the wisdom of this proposal and a letter from J. G. Barry, vice-president General Electric Company, stated that the proposal had been discussed by the officers of his company and they had unanimously agreed that they believed only the single prize should be awarded. His letter suggested, however, that the practice followed by the committee last year of sending letters to the various contestants, pointing out the principal things in which they excelled, should be continued.

A title for the book which is being prepared by H. H. Norris from the proceedings last year was approved, namely, "Electric Railway Practices in 1923."

Those present at the meeting were James H. McGraw, W. W. Trench, E. J. Blair for Mr. Budd, C. D. Emmons and Secretary Welsh.

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Maintenance of Equipment

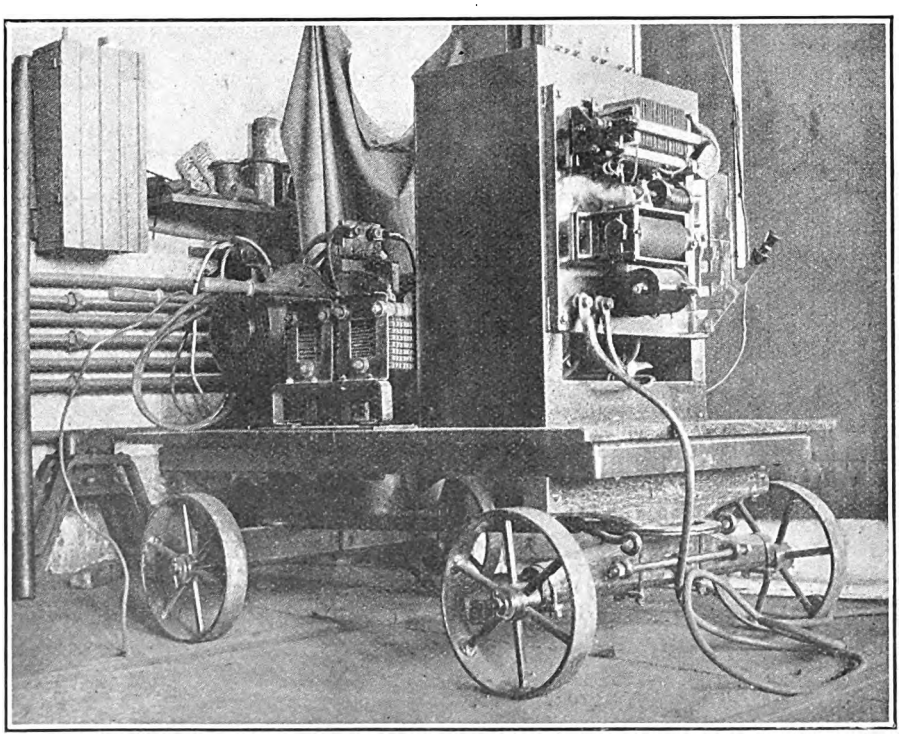
Making the Welding Set Portable

WHILE a welding room offers facilities that are not available in cases where the welding set is taken to the job, still there are cases frequently occurring where it is inconvenient to take the work to a fixed welding room. Sometimes, by taking the welding set to the job, much work can be saved in dismantling parts which would otherwise be necessary if a portable welding set were not available.

To meet such conditions, the Philadelphia & Western Railway, Norristown, Pa., has constructed a truck for its shop welding set. The various switches and resistance for control of the welding equipment are mounted permanently on top of this truck, as shown in the accompanying illustration. The set can thus be used either in the welding room or at any other point where welding current is available.

The truck consists of a wooden platform with four wheels, the two forward ones being arranged to swivel and thus make short turns readily. In order to make the top of the platform level, the rear end is supported by two straps, which rest on top of the rear axle. A center bearing with support is provided for the front axle, so that this can turn. A rod on the forward side of the front axle provides a means for attaching a handle. This handle is made with hook ends, so that it can be readily attached. When not in use it is placed inside underneath the platform of the truck, so that there is no danger of workmen falling over it, as might occur if it were left projecting out from the truck.

The wheels of the truck have a diameter of 14 in. They were constructed in the shop by bending a band of iron to a circular shape and welding six spokes and a hub in position. The hub is made of a piece of armature shaft. Its diameter is 3 in. and its length 4 in. The axles of the truck are of wood with 1¼-in.-diameter steel rods attached underneath. These are turned down to 1-in. diameter where they pass through the wheel hubs.



Welding Equipment Mounted on Truck for Portability

Weather Is Primary Cause of Signal Failures

BY H. J. CHARTERS
Portland Railway, Light & Power Company

THE annual report of block signal operation on the lines of the Portland Railway, Light & Power Company, Portland, Ore., for the year 1923 shows that adverse weather conditions are the most frequent cause of signal failures. During the summer and fall months the failures are comparatively few, although on account of extra trains the daily signal movements are more numerous than at other times. In June, because of severe electrical storms, there were more failures than in any other month.

Directional relays and contactor difficulties were the most frequent causes of interruption notwithstanding the fact that the original No. 5 contactors had been replaced by more rugged home-made devices at all points where high speed is maintained. For the last three years the number of contactor failures has shown a steady decrease. Fuses and

ANALYSIS OF SIGNAL FAILURES, PORTLAND RAILWAY, LIGHT & POWER COMPANY

	1921		1922		1923	
	Number	Per Cent	Number	Per Cent	Number	Per Cent
Line wires	5	4	5	7	6	6
Switch and pole wiring	2	2	3	4	12	11
Blown fuses	7	6	3	4	15	14
Directional relay	29	25	22	30	34	31
Signal trouble	6	5	1	1	3	3
Contactors	44	38	26	35	24	22
No. 5 switch	7	6	2	3	8	7
Miscellaneous	6	5	1	1	0	0
No trouble found	11	9	11	15	6	6
Totals	117	100	74	100	108	100

SIGNAL FAILURES BY MONTHS AND YEARS

	1921	1922	1923
January	..	6	22
February	..	5	10
March	10	3	13
April	13	8	8
May	17	4	8
June	9	15	16
July	16	8	6
August	12	1	8
September	8	1	4
October	6	8	2
November	16	6	6
December	10	9	5
Totals	117	74	108

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switch and pole wiring were also important causes of interruption. Cases where no trouble was found were numerous and constitute a considerable part of the reported failures, but it is felt by the railway that it is better to report a signal out of order and inspect it than to "take a chance."

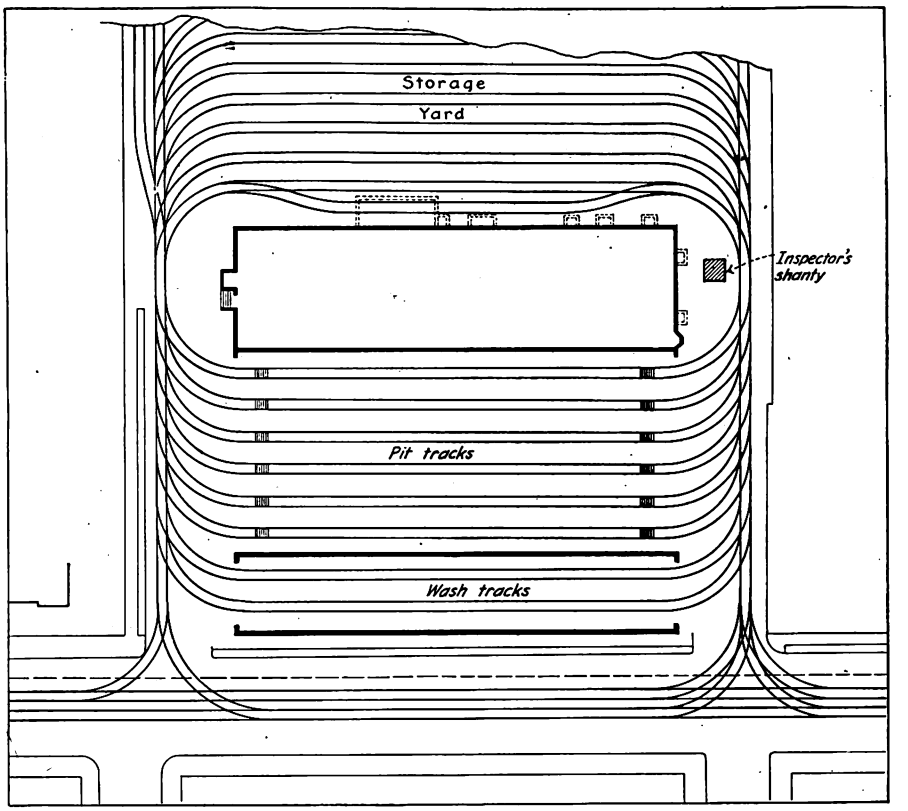
The total number of signal movements during the year was 991,082, the same as during the preceding year. The number of failures was slightly greater on account of bad weather conditions. The durability of the type G1 United States signals, however, has been notable. After being in continuous service for 10 years, they required in most cases nothing but cleaning and adjusting to place them in perfect order.

Detachable Letterboard Simplifies Spray Painting

THE Boston & Worcester Street Railway has adopted the spray painting method for use on the exterior of its cars. The process is simplified as much as possible by the elimination of striping, lettering, etc. A single shade of brown is used for the entire side. Repainting of cars is done more quickly and cheaply on account of the practice of having a detachable letterboard. This is a long wooden strip about three-quarters the length of the car body bearing the legend "Boston & Worcester Trolley Air Line." When a car is being repainted this letterboard is removed. It can be brightened up by washing and varnish, and the expense of relettering the whole sign can thus be saved.

A Track Layout that Facilitates Inspection

THE track layout of the North Main Street carhouse and the adjacent yard of the Springfield Street Railway, Springfield, Mass., has been so designed that all entering cars pass an inspector's shanty. The motorman is required to stop at the shanty and find out from the inspector on duty there where his car is to be placed. The storage yard for cars consists of thirty-one loop tracks, each having a capacity of five cars. The entrance from the street and a portion of the storage tracks are shown in the accompanying diagram. The inspector on duty in the shanty makes a note of the location to which he has assigned the car as it enters the yard. By referring to this list, he is able to tell at any moment exactly where any particular car has been ordered placed.

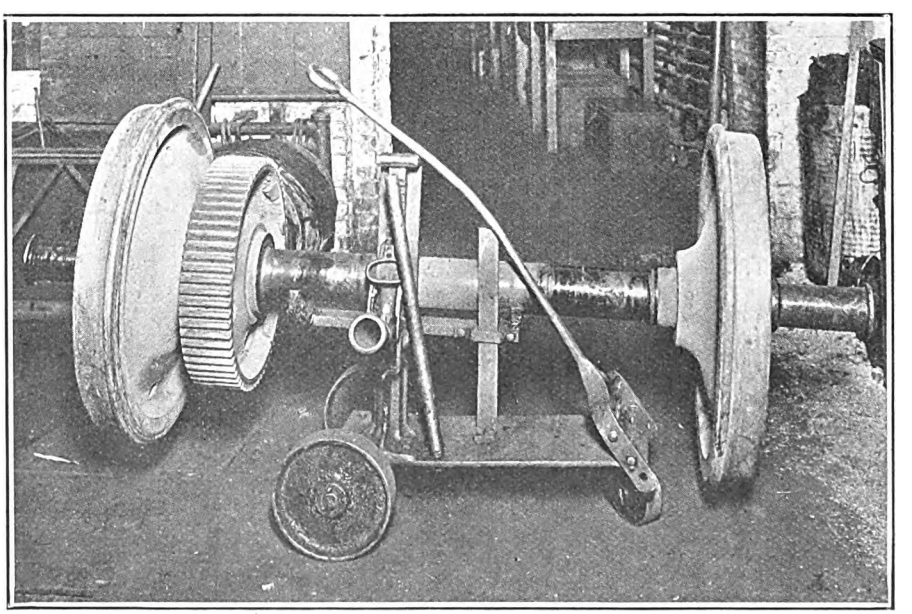


All Entering Cars Must Pass the Inspector's Shanty and Are Assigned by Him to Specific Tracks

A washroom in the house has two tracks and will accommodate ten cars. Alongside of this is a pitroom with six tracks accommodating thirty cars. About twice as many cars are washed and inspected each night as can be placed simultaneously in the washroom and pitroom. The procedure is for the inspector at the shanty to assign the first batch of cars to the washroom and pitroom. The motormen pulling in during the evening leave their cars there. After work has been completed on these cars they are run out into the yard and a second batch brought in.

Handy Truck for Moving Wheels

A VERY convenient apparatus for moving a pair of wheels mounted on an axle from place to place in the shop has been devised by the welding foreman of the



Simple Cart for Moving Wheels at Worcester

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Worcester Consolidated Street Railway, Worcester, Mass. This is a little truck with two 11-in. steel wheels at one end and a revolving castor at the top. On the floor of the truck has been fastened a Barrett jack equipped with a special support to fit a street car axle. This little cart is placed directly under the axle to be moved, and by manipulating the jack the axle is raised sufficiently for the wheels to clear the floor. The cart can then easily be moved to any part of the shop.

New Equipment Available

New Highway Crossing Signal

ON ITS line to Erdenheim, a suburb beyond Chestnut Hill, the Philadelphia Rapid Transit Company recently installed a new type of highway crossing signal made by the Nachod Signal Company, Louisville, Ky. This gives indications by a bell and flashing lights. At this location the double-track trolley line crosses the Bethlehem Pike, a main automobile highway out of Philadelphia on which traffic is quite heavy. The crossing is at right angles to the track at the bottom of a long grade on the highway.

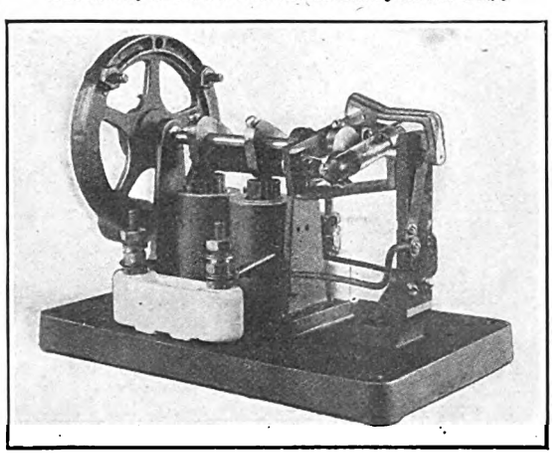
The signal is set on a concrete foundation, with a relay box mounted on a pipe standard, at the top of which is a large bell. Brackets attached to the standard hold two parabolic reflector units each fitted with a red cover glass and a 23-watt lamp. A large portion of the light is projected into an approximately parallel beam, thus giving a brilliant indication by day as well as by night. The projectors are pivoted on gimbals, so that the beams may be accurately directed along the highway in both directions.

Control of the signal is through overhead trolley contactors of the wiping type, four of which are required for this double-track installation. As the car movements are comparatively slow at this point, the starting contactors are located only a short distance from the highway in each direction.

The light is flashed by a new form of oscillator-type flasher relay shown in an accompanying illustration. The lamp circuit is broken by the tilting of a sealed tube containing mercury, to break the connection between terminals within the tube. On a test of this flasher relay twenty 23-watt lamps on a 600-volt circuit were flashed, the circuit being broken more than 10,000,000 times without any noticeable deterioration of the contacts. The relay base measures 9½ in. x 5¾ in.; it is 7⅛ in. high, and weighs 10 lb. It is said to be noiseless, smooth in operation, and to require little maintenance except lubrication once a month. The flashes are at the rate of sixty per minute in this installation, although the frequency is adjustable.

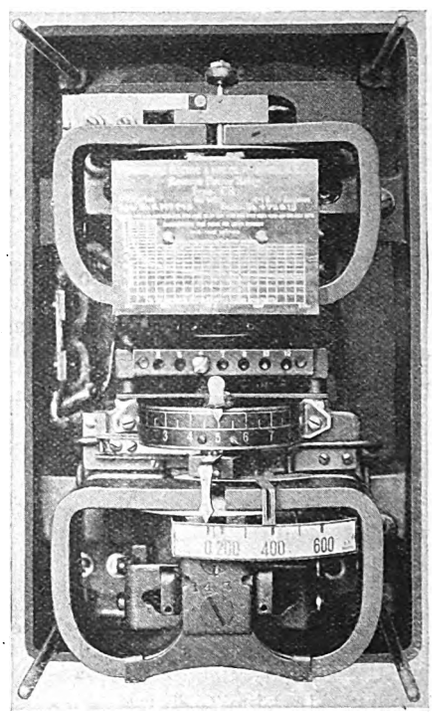
New Signal Recently Installed Where the P. R. T. Crosses the Bethlehem Pike

Below, the Contact in This Relay Is Made and Broken by the Movement of Mercury in the Tube



Relay with Self-Contained Ammeter

A LINE of over-current and directional relays equipped with a current-indicating element is a new product of the Westinghouse Electric & Manufacturing Company. These relays, known as COA and CRA, differ from the company's standard CO and CR over-current and directional relays in that they have self-contained ammeters which give a continuous indication of the current flowing in the circuit to which the relay is connected. They are designed for use where the relays are mounted on the front of a switchboard and where there is insufficient room to provide separate ammeters.



This Type CRA Directional Relay Incorporates a Current Indicator

In addition to operating as protective relays, these relays indicate the current flowing through the relay circuit, which not only shows the current in the feeder, but also proves that the relay is receiving current and is in condition to operate if a short circuit should occur.

The indicating element is mounted on a separate shaft and has its own jewel bearing and control spring, but is actuated by the same flux which operates the contacts of the relay. This prevents the indicating element from operating when there is any trouble either inside or outside the relay that would prevent the main electro-magnet from being energized.

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The News of the Industry

Compromise Transit Bill Passed

New York City Authorized to Engage in Municipal Operation Under Self-Supporting Fares—Present Transit Commission Continued in Office with Supervising Powers

The Legislature of New York has passed the compromise transit bill for the city of New York and the constitutional amendment authorizing the issuance of bonds to the amount of $300,000,000 for grade crossing elimination, which must be passed by another legislature and receive approval by the people. The Assembly stopped the passage of the Ryan bill, which would have restored 5-cent fares in Troy, and killed the constitutional amendment which would have permitted the city of New York to borrow $275,000,000 for transit construction, which amount would be exempted from the debt limit of the city in the same manner as water bonds are now exempted. All of the administration program for municipal ownership and regulation of public utilities failed to pass in the Assembly.

General Session Disappointing

Final decision on many of these things remained an uncertainty, however, up to the last hour. With the desk force of the Senate and Assembly swamped by hundreds of bills amended and passed in its closing hours the legislature adjourned as of April 10. It is said that never before in legislative history in the State has an adjournment been had in such confusion. The clerk had been on practically continuous duty for seventy-two hours. It will be days before the fate of many measures is definitely known.

The compromise bill affecting transportation in New York City was reached as a result of the conference between the Senate and Assembly committees. Substantially the terms of the bill are as follows:

1. All construction and equipment of all new rapid transit railroads, including the determination of new routes, passes to the city.
2. All uncompleted construction under the dual subway contracts is to be under the jurisdiction of the city.
3. The city is authorized to engage in municipal operation or to lease for operation all new rapid transit lines.
4. If the city engages in municipal operation the fare for an initial period of three years shall be 5 cents, but after such time such operation must be self-sustaining, and the revenues sufficient to pay operating expenses, maintenance, interest, amortization and to provide a reserve for depreciation.
5. The powers of the city are to be exercised through a Board of Transportation of three members to be appointed by the Mayor, originally for two, four and six years and thereafter for six years. No salaries are provided, the Board of Estimate and Apportionment being authorized to determine the amount thereof.
6. The present transit commission is retained in office, with power of supervision and regulation of existing rapid transit lines, and the administration of the dual subway contracts, except construction of uncompleted parts and additions and extensions.

The additional power conferred on the Transit Commission by the legislation of 1921 authorizing the commission to adopt a plan of readjustment of existing lines is not disturbed.

All employees of the Transit Commission engaged in construction work will be transferred to the Board of Transportation.

Aside from the transit legislation the New York State legislature closed with less accomplished than in many years. Its chief performance was the passage of a 25 per cent income tax reduction good for 1924 only, the presentation of a home rule measure for cities, much of the interpretation of which will be for the courts to decide, and a constitutional amendment providing for the issuance of grade crossing elimination bonds.

The water power measure was aided by Republication votes, among them Senator Davenport, who declared in voting for the Rabenold bill that the people had spoken at the last election on the defeat of the Ferris amendment to the constitution and that they wanted the ownership of water power to vest forever in the people of the State.

In the Assembly a bill was introduced by Mr. Davison of Nassau county adding a new section, 261-b, to the General Corporation Law, by providing that preference in payment of judgments recovered in actions for torts against public service corporations shall be given in liquidation of affairs of the corporation.

The proposal of the Governor for a commission to devise ways and means to relieve public service corporations of unequal taxation met defeat in the Assembly, the speaker holding that the Davenport committee has already covered most of the gound that such a commission might explore.

Use of Canal Bed Urged for Newark Transit Line

Construction of a rapid transit line by either the city or the Public Service Railway, Newark, N. J., along the bed of the Morris Canal between the Pennsylvania Railroad at River Street and Bloomfield Avenue was suggested on April 7 by Thomas N. McCarter, president of the Public Service Corporation. Mr. McCarter stated the case of his company at a conference of the City Commission with representatives of the railroads and the Public Service Railway to determine what should be done with the canal property. The cost of adapting and equipping the property for rapid transit purposes is estimated at $2,500,000. Mr. McCarter said that plans for a rapid transit line such as the company proposed would be ready in about a week and would be submitted to the city.

Five suggestions were made in the Public Service statement on the plans for the use of the canal property. The opening paragraph stated that it was on the "assumption that there is to be within a reasonable time a co-ordinate railway and bus service under one management, furnishing local transportation so that railway financing can be accomplished," that the Public Service made the suggestions.

Scranton Strike Settled

After a strike of four and a half days, the cars on the lines of the Scranton Railway, Scranton, Pa., began operating on April 5, following an agreement between the employees and the management whereby the men accepted the rush-hour run with modifications and consented to the matter of wages going to arbitration. Trainmen are demanding an increase of 17 cents an hour.

As was reported in the ELECTRIC RAILWAY JOURNAL of April 5, the management and the employees could not come to an understanding on the demands made by the Amalgamated for a new contract. The management presented a new agreement requesting that the men operate rush-hour tripper service morning and afternoon, with time to be worked on these runs eight hours and the spread to be five hours. After a number of conferences the division agreed to waive all demands in its proposed agreement except wages and rush-hour runs, nor would they arbitrate them.

The men said they would arbitrate the wages, but would not arbitrate the rush-hour runs. Consequently, there was a deadlock until late on April 4, when the men yielded from their stand and agreed to accept the rush-hour runs with the modification of straight time for the morning service and time and one-half for the afternoon service. This the management agreed to since the men waived all other demands and agreed to submit the wage question to arbitration.

The proposal for rush-hour tripper service makes the following provisions:

1. Rush-hour tripper runs operated in the morning shall be paid at the regular rate of wages, for the first four hours or any part thereof.
2. After eight hours continuous time, after schedule time of leaving carhouse the rate of wages shall be paid at the rate of time and one-half per hour.
3. No tripper runs shall exceed thirteen hours from time of leaving carhouse in the morning.
4. All motormen and conductors assigned to regular tripper runs shall be guaranteed eight hours pay at the rates specified in clause No. 2 of this proposal.

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Indiana Union Traction Takes Over Bus Operation

The Union Traction Company, Anderson, Ind., has completed negotiations with the several bus owners of Muncie for the company to take over and operate all lines that have been running more or less regularly since granting the recent court injunction.

By the terms of the sale entered into by the traction company and the bus men, the company buys the rolling stock from the several owners, including not only the half dozen or more large buses that have been running over well-established routes to the different parts of the city, but also becomes owner of touring cars run on irregular schedule during the winter.

While it is extremely probable that a few of the established routes will be changed, it is understood that all of the buses will be continued in use. The plan is to place more street cars on certain runs where street car traffic has always been heaviest. In other places the buses will be used in auxiliary service.

Rochester & Syracuse Injunction Against Buses

The Rochester & Syracuse Railroad has been granted an injunction by Supreme Court Justice Cheney restraining temporarily the operations of the United Arrow Lines, Inc., operators of a motor bus route between Syracuse and Rochester. The temporary injunction will be in effect pending action for a permanent injunction.

The application for the order was based on the claims that the bus line had cut into the profits of the railway and had operated without authority from the Public Service Commission and the municipalities through which it passed. Fred H. Hout, John Griswold and Norman Waterhouse are named in the order as partners in the bus line.

The Arrow line began operations about March 27 and made two trips daily from Rochester to Syracuse. It operated a 25-passenger Pierce Arrow bus. The fare was $3.90 one way.

Suburbs of Vancouver to Have Rapid Transit

A new entrance into Vancouver, B. C., is planned by the British Columbia Electric Railway for its interurban lines, which will bring both freight and passenger trains into the heart of Vancouver without the use of city streets. It is estimated that it will cost $1,000,000. At the present time, Central Park, Burnaby Lake and Fraser Valley trains operate over 3½ miles of city streets on which there is a frequent service of city cars. At the point where the private right-of-way ends it is proposed to drop into a short tunnel, then running by means of depressed tracks, using a creek bed to a reclaimed area in the heart of Vancouver known as False Creek. By way of a disused Great Northern Railway right-of-way and bridge, trains will be brought into the back of the company's terminal station. This will cut off at least ten minutes from the running time between Vancouver and New Westminster and virtually bring rapid transit service to the suburban population between the two cities.

Investigation Completed

Wisconsin Commission Recommends Double Tracking Most of System and Purchase of New Cars

The Wisconsin Railroad Commission, which has been conducting an investigation of the service of the Madison Railways, has recommended double tracking for virtually all parts of the system as soon as possible and the purchase of seven or eight new cars before next December. The investigation and report were made by C. M. Larson, chief engineer, on order of the state commission following many complaints received from the public during the severe cold weather of last winter.

The report suggests that the people who complain so much in general terms study the service rendered in other cities which compare in size with Madison and they will find difficulty in referring to a place where the service compares favorably with Madison.

Mr. Larson found that cars were overloaded on most of the lines during the morning, afternoon and early evening rush periods, "causing inconvenience and discomfort to the passengers and resulting in delays that slow up cars and distort schedules."

The investigation showed that the company owned 12 miles and 142 ft. of first main track and only four miles and 1,858 ft. of second track. The report recommended that certain parts of the system be double tracked as soon as possible.

In making their investigation, inspectors made counts of the passengers on all cars on all lines at the points of heaviest loading and also made observations of the intervals between cars. Intervals of fifteen to twenty minutes were numerous. Insufficient double track and cars were largely the cause of this condition.

According to the report there was overloading of cars during the morning rush on the Fair Oaks line and during the afternoon rush on the Fair Oaks, South Madison and North Street lines. It was recommended that improvements be made in the block signal system.

The report stated that it was true that during the rush periods larger cars would be much more satisfactory than those now in service. Many more passengers could be handled without the necessity of placing additional cars in service, but it said that there was another feature that could not be overlooked. During the larger part of the day the small cars have sufficient capacity. Larger cars would give no better service and the cost of operating the larger cars would be very much greater than the cost of operating the smaller ones.

Officials of the company expressed their desire to co-operate fully with the commission in carrying out recommendations contained in the report.

Franchise Extensions Arranged in Birmingham

Thirty-year extensions of franchises of the Birmingham Railway, Light & Power Company, Birmingham, Ala., covering 140 blocks of track were granted by the City Commission on March 25 in consideration of the payment of $35,000.

The steam heating franchise of the company was also extended by the commission for thirty years. The company agrees to furnish free heat to the City Hall and city jail as long as they are maintained in the present location and the present contract remains in effect.

Approximately 90 per cent of the company's franchises were originally granted in perpetuity. The present extensions cover only about 10 per cent of the total.

Another ordinance was adopted providing that the discontinuance of service on any portion of a line with the consent of the city shall not work a forfeiture of the franchise if the company upon ten days' written notice from the city restores service. In the event tracks have been taken up and poles removed, the ordinance provides a reasonable notice in writing with allowance of time to replace the tracks and resume service. This same ordinance provides that in the event the city desires to pave any street upon which the company has a franchise for a double-track line, but has only laid one track, the company must make an election and either forfeit the franchise for one track, or else put down its second track, or as another alternative must pay for the same proportion of the paving it would have paid for had its second track been laid.

Maumee Valley Railway Ousted from City

The City Council of Maumee, Ohio, a municipality 8 miles south of Toledo, has passed an ordinance ousting the Maumee Valley Railway from operation within the city limits. The ouster was the result of a controversy between the city and the railway over the improvement of the main highway from Toledo to Maumee. The railway follows the highway.

Officials of Lucas County recently decided to widen the road to 27 ft. The Council of Maumee at the same time passed a resolution authorizing the widening of the road within the jurisdictional limits of the city to 32 ft. This would have necessitated taking over part of the right-of-way of the railway.

The city demanded that the railway move its tracks from the west side to the middle of the road. The company protested against the demand contending that the change would involve the expenditure of $85,000, which it was not in a position to undertake at this time.

L. G. Van Ness, president of the railway, said that the proposed improvement would be enjoined or the ruling of the Council appealed to the Ohio State Public Utilities Commission.

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Thirty New Jersey Jitneys Ordered to Suspend

In decisions handed down on April 8 the Board of Public Utility Commissioners of New Jersey disposes of eighty-eight complaints filed by the Public Service Railway against alleged unlawful operation of jitneys in various cities in North Jersey. Thirty jitney drivers were adjudged guilty of unlawful operation and ordered to discontinue service by April 30. In the meantime applications may be submitted to the board for approval of municipal consents to operate buses. Complaints in twenty-six other cases were substantiated, but no order of discontinuance was issued, because applications for state approval have been filed since submission of the Public Service charges. The board will dispose of the question of the necessity for operation of these buses in a decision to be handed down later. Because the Public Service Railway failed to submit evidence in thirty-two other cases the complaints were dismissed.

Automobile Body Comments on Akron

The National Automobile Chamber of Commerce says that a great deal of misinformation grew out of the twenty-seven days' war at Akron. That body says that in the excitement it was utterly lost to view that the motor bus industry and the electric railway industry both join in the belief that the function of the motor bus and the street car—two distinct agencies of transportation—is to furnish co-operative transportation by means of co-ordination. The chamber says that the bus and the street car have not been, and are not, at war to exterminate each other. Complete motorization of a city's transportation service has not been the desire or the hope of the motor vehicle industry.

The statement by the chamber was prepared at the suggestion of a number of papers that wanted the story. In its statement the chamber further said:

> What has happened in Akron cannot be considered proof of any of the following hypotheses: That the motor bus as an agency of transportation fails to measure up to the street car; that the public prefers street cars because of certain positive advantages; that complete motorization of transportation is impracticable in a city the size of Akron.
>
> None of these points was supported by proof because of the confusion attending the sudden suspension of street car service and the over-night efforts of the city administration to induce free lance bus operators from various parts of the country to install bus service. The experiment was tried under the most unfavorable conditions as far as buses were concerned—whether one views the situation as a supporter of complete motorization or with the well-considered viewpoint of the motor vehicle industry which believes in co-ordination of buses with street cars to improve public service.
>
> The chief difficulty was that the city administration could not guarantee to a bus operator any franchise or stated period of operation. Not even a license could be given or even guaranteed; insurance could not be obtained, and inasmuch as the time was too short to get permits from the Public Utilities Commission there was not only no regulation of these common carriers, but contentions arose that laws were being broken.
>
> As a result, responsible bus operating companies having adequate and up-to-date equipment could not be induced to invade the Akron field. Only those willing to take a chance were attracted to Akron. The response was from the widest variety of free lance operators; their equipment was not regulated in size or type, and much of it was worn out or certainly inadequate.

Bus Extension in District of Columbia Authorized

The Public Utilities Commission of the District of Columbia has authorized the Capital Traction Company to extend its bus line, now operating between Randle Highlands and Seventeenth Street and Pennsylvania Avenue, Southeast, to the Eastern High School. The rate of fare is to be the same as the current rate of fare in force on the railway lines in the District of Columbia, or such other rate as may be prescribed by the commission. The commission also ordered that transfers between this extension of the bus line and the railway line of the company be issued at 2 cents each. The order is to take effect on May 15.

In authorizing this extension the commission stated in its report that the operation of a bus service over the route covered by the application of the Capital Traction Company would be of advantage not only to those desiring to go to the Eastern High School, but to the residents of the section south of East Capitol Street and east of Thirteenth Street, who are now without adequate transportation facilities. Further, that the operation of this bus line would not conflict with any of the bus routes the Washington Railway & Electric Company had indicated its willingness to operate in the eastern section of the city.

Offers Counter Fare Proposition for Jacksonville

At the conclusion of the hearing before the Florida Railroad Commission on the petition of the Jacksonville Traction Company for an increase in fares, Peter O. Knight, chief counsel, submitted a counter proposition to the city attorney's request that the cash fare be left at 7 cents and that twenty tokens be sold for $1. Mr. Knight's plan would afford the car riders a lower fare than the present one of 7 cents. The offer called for a cash fare of 10 cents, the sale of five tokens for 35 cents and the sale of weekly tickets at $1.25. In other words, patrons who would not care to purchase tokens would pay 10 cents for a ride. If they desired tokens, they could ride at the same fare now in effect, and if they bought a pass they could ride an unlimited number of times for the week for $1.25.

City Attorney Strum, in answer to the offer advanced by Counsellor Knight, declared that a cash fare of 10 cents would more than offset whatever good the token and ticket sales would do. He contended that he had not sought a straight 5-cent fare, but wanted the 7-cent cash fare retained, allowing patrons to ride for 5 cents on tokens. He said that to increase the fare above 7 cents would tend to decrease the number of car riders, which had already been dropping off considerably. To the contrary, Attorney Knight argued that the automobile had permanently affected the patronage of the railway and that the company's only hope was to get more money for its service.

He stated that the company had paid in dividends to its stockholders $744,000 during the past twenty-two years. He said that it had paid the city $371,438 in gross receipts taxes, $736,000 for paving and $254,000 in free rides, making a total of $1,361,000 paid to the city during this period.

The Railroad Commission reserved decisions.

Pittsburgh Men Present Demands

Following a joint conference on April 4 of the company's representatives and the wage scale committee representing the men it developed that 3,000 trainmen of the Pittsburgh Railways, Pittsburgh, Pa., are seeking an increase in wages from the present 67 cents an hour limit to the maximum rates of 75 and 77 cents. A new phase of the matter is the part the city is to play in the controversy.

The demands include a two-year schedule. Up to the present the wage agreements have been on a one-year basis. The wage demands for the two-year period, the second year's rates being a 2-cent an hour increase over the first year's rates, are as follows:

For the year May 1 to April 30, 1925: First three months, 68 cents an hour; next nine months, 73 cents an hour; a year or more, 75 cents an hour.

For the year May 1, 1925, to April 30, 1926: First three months, 70 cents an hour; next nine months, 75 cents an hour; after one year, 77 cents an hour. The present rates of pay are 60 cents for the first three months, 65 cents for the next nine months and 67 cents for those employed a year or more. The present agreement between the company and the carmen expires April 30.

Estimate Board Approves Subway Extension

The Board of Estimate of New York City on April 4 approved a report of Arthur S. Tuttle, its chief engineer, recommending a route for a subway extension of the Fourteenth Street-Eastern subway, and rejected the route submitted by the Transit Commission.

The route approved is somewhat shorter than that submitted by the Transit Commission and was evolved by Mr. Tuttle and Edward Riegelmann, Borough President of Brooklyn. Mr. Tuttle reported that the chief engineer of the Transit Commission had agreed that the substitute route was feasible and it was said that the commission would probably approve it. The cost is estimated at about $14,000,000.

The extension is proposed as an underground line and will connect two units of the B.-M. T. system, joining the Fourteenth Street-Eastern subway at Meserole Street, Brooklyn, to the elevated system at East New York and spanning a distance of approximately 3 miles. The Transit Commission advocated a similar extension with a large part of the line elevated.

The company's estimate of additional wages to be paid amounts to $1,638,000.

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Foreign News

Swiss Electrification in 1924

The Swiss Federal Railways construction program for the current year, totaling 72,342,550 francs, provides for a substantial amount of electrification. Conversion to this form of operation has been progressing for a number of years, until with the completion of this season's construction all but 260 miles will have been electrified. The program for electrification will be accelerated as much as possible this year, work having begun on the Lucerne-Basel, Thalwei-Richterswil, Zurich-Bern, Sion-Lausanne, Lausanne-Vallorbe-Yverdon lines, a total of 242 miles. The Renens-Geneva line is also on the program for this year.

P-L-M Electrification Progress

The Paris-Lyons-Mediterranean line is at present electrifying that portion of its main Franco-Italian section between Culoz (the junction for Bellegarde and Switzerland) and Bardonneche, Italy, via Modane and the Mont Cenis tunnel.

This portion of the line centers around the summer capital of Aix-les-Bains, and on to the Italian frontier. It is the most scenic length of railroad in France; that electric traction, observation and tourist cars should here be first tried out is not astonishing.

The work already would have been put through to Culoz but for the difficulties of the company in securing right of way for its transmission lines across certain private properties of this virtual mountain fastness. It finally was necessary to obtain from the government a public decree and authorization to expropriate the necessary rights. It is doubtful if electrical operation will begin this summer, as was hoped.

Paris Tramway Profit

The Eastern Paris Tramway Company (the unit of the "Transports en Commun" running eastward from the center of the city) announces a net profit of 3,181,931 francs for 1923. This is sensibly the same as for 1922. The company owes for material and supplies 6,754,189 francs, but has carried to reserve for the amortization of bonds the sum of 1,724,790 francs.

New Electric Lines for Upper Savoy, France

The governmental authorities of the French department of Haute Savoie have decided on the construction of electric car lines from Annecy to St. Julien and Annecy to Seyssel and also electrification of the line from Annemasse (the Swiss frontier station) to Samoens, with an ultimate extension as far as the village of Sixt. Another branch line will tap in midway on this latter route. On the Annecy-St. Julien line there will be a reinforced concrete bridge with a single arch of 150 m. crossing the River Usses at a height of 147 m.

Work has already begun. The railway construction will be in the hands of separate contractors from those who will build the 45,000-volt transmission lines to serve the railway and to provide light and power along the lines.

Glasgow Studying Subway Situation

Steps are being taken for improving the service, and ultimately of changing over the system from cable to electric traction, of the Glasgow Subway Railway, which recently was purchased by Glasgow Corporation.

The Tramways Committee is considering engineering and traffic reports made by city officials, and plans have been called for to provide improvements in the approaches to certain stations, and to install underground sidings where car repairs can be carried out. This work is all being planned with a view to the electrification of the system. It also was arranged that the waterproofing of the tunnels should be completed.

London Strike Settled

April 1 marked the end of the strike of London tramway employees and the sympathetic strike of London, the General Omnibus Company employees, which began March 22 and continued during the following week. The earlier events were described in this paper last week on page 558. The workmen stood out for an increase in wages of 8s. a week, which the employers said they could not afford to pay. After a few days the trade union representing railway locomotive drivers and firemen announced that unless a settlement was arrived at by March 28, they would call out their members employed on the underground railways and on the electric suburban lines of the main railway systems. By this time the Prime Minister and other members of the Government were taking an active part in the negotiations for a solution, on account of the seriousness of the situation. The Government announced that if the threatened extension of the strike took place the Emergency Powers Act would be brought into operation and everything possible done to maintain passenger transportation in London. On March 28, however, the representatives of the men agreed tentatively to a new offer made by the employers. This provided an immediate advance of 6s. per week for the uniformed men, that the war bonus part of wages should not be affected till the cost of living index figure dropped 8 points below 75, and that wages should be further increased by 1s. for each rise of 4 points. To grades other than the uniformed staff the offer was an increase of 4s. a week immediately and the other terms as above. These proposals were submitted to a vote of the men. The ballot was taken on March 31, and resulted in the acceptance of the terms by 9,428 votes against 4,377. The services of tramcars and buses were resumed next day.

Interurban Subway Proposed in France

The city engineer of Tourcoing, which with Roubaix and Lille forms a triumvirate of industrial cities with perhaps the most intense interurban traffic in France, has brought forward a project for a new line to connect Turcoing and Roubaix. The route would be underground for 4 or 5 miles, the remaining 6 or 8 miles being either at surface level or elevated. Traffic conditions have here become such that something of the sort was obviously demanded. Trains under a ten-minute headway were proposed to supplement the present tramway services, which are said to be about the best of their kind today in France, even though in the reconstructed, invaded regions.

The proposition provided for an extension at some future time in the form of a belt subway linking the three industrial cities and the intermediate villages, with double tracks and trains running in both directions.

Continuation of Weekly Pass Recommended.—The manager of the Bradford Corporation Tramways has recommended a continuation of the weekly pass system, which has been under trial. This has caused a certain amount of local criticism, as it is averred that business houses are gaining an advantage by purchasing bundles of passes for their employees. It is also said that the post office is saving £150 a week, as passes have been supplied for the postmen, who may use the pass as often as twenty-five times a day.

Bordeaux Tram and Omnibus Profits Off.—The annual report for 1923 of the Tramways Electriques et Omnibus de Bordeaux shows a net profit of 2,267,844 francs, as compared with 2,578,627 in 1922. The section within the city limits brought in 1,889,052 francs of the total and the suburban lines the remainder.

Assets Turned Over to New Company.—At a general meeting of the Belgian company which owns the Ottoman Tramways and Electricity Company of Beirut, a concession of Syria, now under French mandate, the conditions were fixed upon which the company assets will be turned over to the new French company. The French company will pay 6,000,000 French francs to the Belgian company, which will retire the Belgian stock and bonds by exchanging for those of the French company to the value above set forth. The stock carries 7 per cent and the bonds 4½ per cent interest.

Tube Railway Proposed for Manchester.—The Manchester, England, City Council has appointed a committee to consider the desirableness and feasibility of an underground electric railway running beneath the main arteries of the city and suburbs, and to investigate the probable cost.

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Financial and Corporate

Pittsburgh Receivers Report

File Final Accounting Covering Their Stewardship for Period Since 1917

The receivers of the Pittsburgh Railways have filed a final accounting in the affairs of the Pittsburgh Railways during the last six years. A feature of the report, which summarizes the six years' work, is that receipts from fares in 1923 increased almost 70 per cent over the amount in 1917, the year preceding the receivership.

The receivers handled $118,606,987 in fares, improved equipment at least 50 per cent and, about two months ago, turned back the property to its owners in good condition, with more than $3,000,000 in free cash.

The receipts of the company, as outlined by the receivers, by years follows:

1917	$13,551,135
1918	14,192,065
1919	16,628,936
1920	21,494,795
1921	21,731,944
1922	21,580,464
1923	22,978,783

With one exception, 1922, each year under the receivership has shown an increase in receipts over the previous years.

The cash in the hands of the receivers on Jan. 31, when the company was turned back to its owners, the report discloses, was $3,282,715, and the accounting adds:

> Against this sum there were outstanding the current bills and monthly payrolls due on that date, and which were assumed by the corporate company.

The seven years' receipts recorded cover also a period in which the fare went from 5 cents to the present 8⅓ cents, or three tokens for a quarter. In 1918, when the fare was increased from 5 cents to 5½ cents and then to 5 and 7 cents, or zone fares, the receipts jumped more than $600,000; in 1919, when in July the fare was raised to 7½ cents, or four tickets for 30 cents, receipts increased about $1,500,000; in 1920, when in September the fare was raised to the present 8⅓ cents, receipts increased nearly $3,000,000. In 1922, receipts dropped about $150,000. This decrease was attributed to industrial depression, for in 1923, fare receipts increased again another $1,500,000, reaching $22,978,783, the highest figure ever recorded in the history of the Pittsburgh company.

Then the receivers' accounting goes into what they have attempted in the way of rehabilitating the property. Buying for cash, they point out, they purchased, first twenty-five new cars, then forty, then twelve, then fifty-five cars, with an option for twenty more, or a total of 152 new cars.

The accounting continues:

> Earnest and continued efforts were made to comply as near as was possible with the recommendations of the commission. Maintenance of way and structures expenditures were increased from $1,394,540 in 1918 to $3,410,489 in 1923, and the amount of new track laid during each of the past four years was: 31.34 miles in 1920, 23.7 miles in 1921, 45.84 miles in 1922 and 41.83 miles in 1923.
>
> During the period of the receivership a total of nearly $600,000 has been expended on repairs and reconstruction of bridges.
>
> It is of interest to note that of the various items of work formally demanded in petitions to the court, by the city of Pittsburgh and other municipalities, while each could not be undertaken at the time of original presentation, practically all have been eventually performed and completed.
>
> In this connection earnest effort was made during the year 1923 and January, 1924, to bring to full completion and conclusion every one of the possible 263 items of work in progress during 1923, with the result that the accounts were closed on all but fourteen.

Stabilizing Fund Shows Profit in March

March operations of the Community Traction Company, Toledo, resulted in a profit of $2,617 for the stabilizing fund after all charges under the Milner ordinance were made. A heavy maintenance was set up for the month to take care of track repairs during the summer months. This added about $15,000 to the expense as compared with a year ago. In March this year the maintenance set-up was $70,000.

Gross revenue for the month was $374,723 and operating and maintenance expense $307,025. This left net earnings from operations of $67,698 for the payment of capital charges, depreciation, sinking fund and other fixed charges. After these the net to the stabilizing fund was $2,617. The number of revenue passengers carried was 5,415,974 in March as compared with 5,813,634 for the same month a year ago.

Due to increased fare, however, there was an increase of 5.3 per cent in revenue. Total passenger revenue was $349,953 this March as compared with $331,180 a year ago. Decrease in riding is attributable in part to greater use of private automobiles and a slight tendency for industry to slacken in March.

Toledo & Western Operates Under New Management

The old Toledo & Western Railroad, Toledo, Ohio, was taken over by a new company on April 1 with its one-time receiver, Albert Swartz, in complete charge of operations. The road was purchased from Frank R. Coates of Henry L. Doherty & Company by the Willys-Overland Company and the Wabash Railway about a month ago.

The Ohio Public Utilities Commission has authorized the purchase of the road for $200,000 and the issuance of $500,000 of common stock of the Toledo & Western Railway, as the successor company will be known. It is understood that work on improvements at the Toledo terminals will be under way in a few weeks. A new right-of-way and land development for factories and home sites will be part of the plan.

$150,532 Loss in Providence

Earnings Affected by Unusually Severe Winter and Unavoidable Delay in Putting in Economies

The total revenue of the United Electric Railways, Providence, R. I., for the year ended Dec. 31, 1923, was $8,104,043. The net loss from operation for the year, after deducting all operating expenses, interest, taxes, depreciation, etc., was $150,532. As the company is subject to the jurisdiction of the Interstate Commerce Commission and is required to keep its accounts in conformity with the methods prescribed by the commission, the difference in the amount of the net loss from operation for the year as shown by the auditor's statement and the amount of the net loss of $69,501 shown by the company's report filed with the Rhode Island Public Utilities Commission is explained by the treatment of certain items during the year to conform to the requirements of the Interstate Commerce Commission.

On Dec. 24, 1923, the Public Utilities Commission of Rhode Island entered an order approving the issue of $1,455,000 par value, prior lien mortgage, twenty-five year, 6 per cent gold bonds, Series C, and $624,200, par value, common capital stock to be applied to reimburse the company for cash expended for extensions, betterments, improvements and the acquisition of new property in the amount of $2,079,227. Conditions being unfavorable to the advantageous marketing of the company's securities on Dec. 31, 1923, only $450,000 par value of Series C, prior lien mortgage bonds had been nominally issued, and these were pledged to secure notes for loans necessary to furnish money for the company's immediate needs. The company explains that when improved conditions permit the sale of these bonds to advantage, the proceeds will be available for further additions and betterments to the company's property as may be required.

During the year 1923 dividends were declared and paid amounting to $206,267, the last dividend payment having been made July 2, 1923.

CONDENSED INCOME AND SURPLUS ACCOUNT OF UNITED ELECTRIC RAILWAYS FOR YEAR ENDED DEC. 31, 1923

Total revenue from all sources		$8,104,043
Operating expenses	$6,499,299	
Depreciation	736,316	
Taxes	341,618	
Bond interest and other deductions from income	677,342	8,254,575
Net loss from operations for the year		$150,532
Less: Miscellaneous adjustments of prior years' expenses		120,072
Deducted from surplus		$30,459
SURPLUS ACCOUNT		
Balance Jan. 1, 1923		$1,747,457
		$1,716,99[illegible]
Less: Dividends paid	$206,267	
Paid to bondholders in consideration of reduced rate on P. L. bonds, Series A	45,040	251,307
Surplus Dec. 31, 1923		$1,465,690

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In September, 1922, an announcement was made that a reduction in fares would become effective Jan. 1, 1923, by the sale of ten tickets for 50 cents with a 6-cent cash fare. Labor and material prices began to rise, however, and this, with the severe winter conditions, unavoidable delays in receiving new cars and power station equipment and other adverse conditions, brought about a situation which made necessary the passing of further dividends in 1923.

On Nov. 22, 1923, the company filed with the Public Utilities Commission a new tariff providing for the sale of nine tickets for 50 cents instead of ten, this tariff to become effective on the thirty days' notice required by law. On Dec. 24, 1923, this new rate of fare became effective. It is expected that this change will increase the revenue of the company $422,000 annually.

The new rate of fare will not, however, produce sufficient revenue to meet the cost of service, including in the term "cost of service," in addition to operating expenses, depreciation and fixed charges, the payment of 6 per cent on capital, which is as much a part of the cost of service as the payment of wages to labor. In consequence, application will be made for a rate of fare sufficient to meet the cost of service.

During the year 1923 the company placed under one-man operation sixteen of its lines, making a total of twenty-eight lines now under one-man operation. During the morning and evening rush hours, however, these cars are operated by two men.

During 1922 the company operated 1,781,641 passenger car-miles more than were operated in 1921, or an increase in service of approximately 13 per cent. During 1923, the company operated 16,783,773 passenger car-miles, an increase of 1,129,475 over 1922, or 7.2 per cent, and an increase over 1921 of 2,911,117 miles, or 21 per cent. The term "car-miles" includes passenger and bus miles.

During the year 1922, 126,209,026 revenue passengers were carried. In 1923, 138,578,286 revenue passengers were carried, an increase of 12,369,260 over 1922, or 9.8 per cent.

$42,166 Balance in London, Ont.

The net income balance for the year ended Dec. 31, 1923, of the London Street Railway, London, Ont., amounted to $42,166. The gross earnings were $693,411, of which $685,608 was from passengers alone. The total operating expenses were $572,082. Compared with 1922 the gross earnings showed an increase of $98,827 and the operating expenses also increased $77,096.

In his annual report, President Charles Currie referred to the company's loss due to the competition of buses. He says that this condition was eliminated in February of last year, when the city demanded from the bus operators reasonable protection for the public against accidents. Early in 1923 the company itself established a bus service for the distance of 1 mile, operating through a growing section.

He refers to the question of municipal ownership being taken up by the City Council during the latter part of 1923. He says that after considerable negotiations the company and the city were unable to agree on a price to be submitted to the voters, and that as a result the Council did not submit the question to a vote of the people at the regular election held in December.

Seeks Issue Approval

Birmingham Electric Company Wants to Float $8,000,000 in Securities—Tidewater Sale April 15

The Birmingham Electric Company, which company recently purchased the properties of the Birmingham Railway, Light & Power Company, at Birmingham, Ala., filed application April 5 with the Alabama Public Service Commission, at Montgomery, for approval of the issuance of $8,000,000 securities and the transfer of the old Birmingham Railway, Light & Power Company to the Birmingham Electric Company. The commission set April 16 for the hearing of these applications.

The application for the transfer of the old Birmingham Railway, Light & Power Company to the Birmingham Electric Company states, among other things, that as a result of the reorganization more than $5,000,000 of securities and obligations of the Birmingham Railway, Light & Power Company, including its $3,500,000 of preferred stock, will be eliminated from securities senior to the new company's stock and become part of the equity represented by the common stock.

A second application is for the approval of the issuance of securities by the Birmingham Electric Company, which include $8,000,000 of 6 per cent bonds to be due in 1954, 20,000 shares of no par value preferred stock entitled to a dividend of $7 a share each year, and on any distribution of assets entitled to payment of $100 a share, or a total of $2,000,000, and an issue of no par value of common stock to represent the equity in the property.

It is stated that substantially the entire proceeds of the new bonds are required for payment of existing 5 per cent first mortgage bonds and 6 per cent refunding and extension mortgage bonds of the old Birmingham Railway, Light & Power Company, and the payment of claims filed in the receivership proceedings against the Birmingham Railway, Light & Power Company.

Up to the present time there are no inquiries as to the sale of the Tidewater line, which is advertised to take place at public auction about April 15. There were no bidders at the two former sales. The Birmingham Railway, Light & Power Company operated the Tidewater for some time past, but its successor is under no obligations to continue to operate the line. Officials say the Tidewater line has one of two things in store for it—rearrangement on an economic basis or the junk pile.

The Tidewater line is about 14 miles in length. It operates from East Lake to Ensley. Several miles of the trackage of this line is operated through territory not yet developed. Moreover, the Birmingham Railway, Light & Power Company has been operating two lines to Ensley.

Chelsea Leasing Bill Likely to Pass

The committees on street railways and metropolitan affairs of the Massachusetts Legislature has voted to report the bill to the Legislature for the state to take the Chelsea division of the Eastern Massachusetts Street Railway and then lease it to the Boston Elevated Railway.

Under the terms of the bill the Eastern Massachusetts will receive $3,000,000 for the property located in Boston, Chelsea, Revere, Malden and Everett, and of this sum the Elevated will eventually pay $2,000,000 and the communities which are benefited will pay $1,000,000, to be apportioned in a conference of their representatives.

The measure as drafted has the approval of the two roads and of the city of Boston. It is regarded as the most important step taken in the Massachusetts Legislature in many years toward the solution of a difficult transportation problem, affecting particularly Chelsea and Revere. It will mean the extension of through service and a 10-cent fare to those communities, including Revere Beach.

Mayor Curley of Boston believes that the change will cost the city of Boston about $10,000 annually, but he is wholeheartedly in favor of it. He contends that it even will facilitate the movement for a Greater Boston by the merging of the independent municipalities. The proposition has had such smooth sailing this year in the Legislature that the prospects of its enactment into law are good.

St. Louis Details Not Yet Arranged

A member of the committee which is working on the plan for the reorganization of the United Railways, St. Louis, Mo., said on April 8 that although no fixed plan could be announced, the agreement contemplates that the $30,000,000 outstanding general mortgage 4s, due in 1934, will remain outstanding, as the committee has been advised by counsel that there will be no permanent default in these bonds if certain legal requirements are met.

These bonds, it was said, are technically in default because of the default in about $6,000,000 of the underlying bonds which matured last year. Necessarily the receiver's certificates, the underlying bonds and other temporary or past due obligations will be provided for, the plan being largely confined to the St. Louis Transit Company 5s, of which $9,790,000 are outstanding, the St. Louis & Suburban Railway general 5s, and to the preferred and common stocks.

The plan also contemplates the conversion of the $9,790,000 Transit 5s which mature next October into preferred shares of the same amount, thus reducing the bonded indebtedness of the company, and proposes the conversion of the present preferred stock into common shares of no par value, thereby reducing the charge for dividends.

The immediate undertakings of the committee will be to determine, with the Public Service Commission, a proper valuation of the properties, and then to arrange for a new franchise "which will

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insure proper service and protection to the car-riding public."

The committee which has evolved the tentative plan for ending the five-year receivership consists of F. O. Watts, president First National Bank of St. Louis; William P. Gest, president Fidelity Trust Company of Philadelphia; J. K. Newman, president Newman, Saunders & Company, Inc., New Orleans and New York; A. L. Shapleigh, president United Railways, St. Louis, and J. Shephard Smith, vice-president Mississippi Valley Trust Company, St. Louis. Newman, Saunders & Company are the agents appointed by the committee to assist in carrying out the plan. The firm will establish offices in St. Louis.

Suit has been filed by attorneys for bondholders of the St. Louis & Suburban Railway asking for the appointment of a separate receiver and a separate valuation by the Missouri Public Service Commission. The decision to bring suit is said to have grown out of dissatisfaction by representatives of the bondholders with the terms proposed to be extended to them for participation in the reorganization of the system.

Foreclosure action under a mortgage securing $2,000,000 of the Suburban bonds is now pending in the federal court. These bonds are secured mainly by the downtown loop of the Hodiamont division. An additional issue of Suburban bonds is also in default, but foreclosure proceedings have not been instituted.

The United Railways and Receiver Wells have denied the allegations set forth in the new Suburban petition. The answer of the attorneys for the United Railways specifically denied that the Hodiamont division of the Suburban owned the downtown loop.

City Counselor Senti of St. Louis has announced that the city will oppose all attempts to separate the two systems. The city's petition will be oral.

Indiana Interurban Suffers Loss of $179,824 in 1923

The Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., shows in its annual report for 1923, filed with the Public Service Commission, that it had a deficit in gross income of $11,500. In other words, operating expenses, taxes and depreciation amounted to more than revenues. The deficit for the year was $179,824, after charging interest on debt and an amortization item against gross income.

Passenger revenue for the year was $369,623, or $41,806 less than for 1922. Total operating revenues were $583,859, or $43,903 less than for 1922. Operating expenses were cut down $21,905 as compared with 1922, the operating expenses for 1923 being $562,403. Operating revenues were $21,456 more than operating expenses, including depreciation. Taxes were $34,437. This resulted in a loss in operating income of $12,981. The non-operating income was $1,481.

The report shows that $119,950 interest on bonds accrued during the year and that $45,275 interest on bonds was paid.

Economist Testifies on Values

Johns Hopkins Expert, in Buffalo Case, Sees Continuation of Present Price Level for Five Years

Testimony on behalf of the International Railway, Buffalo, N. Y., in the valuation case was given by Dr. Jacob H. Hollander, professor of political economy in Johns Hopkins University, before the Public Service Commission of New York on March 25. Dr. Hollander's testimony dealt with the factors affecting the general price level and the probable future price level. In his testimony Dr. Hollander stated that there were two possible ways of discussing the probable trend of prices during the next five years. One he described as "Historical Parallel" and the other "The Method of Analyzing as to Cause."

Historical Parallel Method Fallacious

With respect to the method of "Historical Parallel," Dr. Hollander stated that the defect in it is that the historical parallel is meaningless unless it can be established that the same conditions operated or will operate in each successive case. He contrasted the situation after the War of 1812 and after the Civil War with the situation after the World War, pointing out that the two powerful causes for the decrease in prices after the two previous wars had been the return to a gold standard and the scarcity of gold, neither of which causes was present after the World War, as the United States had always maintained specie payments and the country was not threatened with a gold famine, but with a gold plethora. The historical analogy, the doctor stated, fails not only in that the causes which operated after the two early wars are not present after this war, but exactly the converse obtains.

In continuing his testimony, the doctor stated that the tendency, therefore, is to discredit the historical analogy method and turn to the other, or analytical method, which is practically ascertaining what factors influence prices and what may be expected as to those factors.

Dr. Hollander stated the two factors that influence prices are the amount of goods and the amount of money. By means of graphic charts the doctor demonstrated that the industry of the country is operating on a scale unparalleled in our national history and that the basic industries of the country are exceeding the war peak in their volume of production. From this he concluded that if there should be any drop in prices it will not be because of enormous increase in the volume of production.

With respect to any change in the volume of money, money in the business sense meaning the volume of credit, the doctor after explaining charts showing the position of the Federal Reserve system and explaining the Federal Reserve ratio had increased from 40 per cent in 1920 to 80 per cent at the present time, stated that the country was in a situation in which it was practically deluged with gold, and the possibility of utilizing that increased gold structure for the expansion of credit is so apparent that it makes conservative banking a good deal of a resistance to popular demand from those classes of the community who call for rising prices.

The analytical method, the doctor explained, proceeds on the theory that opinion as to the course of prices is simply trivial unless it is based upon the conclusion drawn from the forces which determine prices. These forces are the volume of trade and the amount of credit. As to the volume of trade, affairs have reached the point where maximum production is in sight. As to the volume of currency, matters are in the position where banking policy and conservative administration are called into play to prevent that expansion which would be the natural consequence of an accumulation of gold. It is a reasonable conclusion, confirmed by the developments of the last year, that banking policy, in so far as it is subject to control, will be in the direction of encouraging price stability and that a period of five years may be expected in which prices are likely to hover approximately around 150, where they have been for the last twelve months.

In reply to the question, "Is the use of the historical analogy for predicting future prices based on anything more than supposition?" the doctor stated:

> I think it is not entitled even to be described as supposition. It enjoys no recommendation whatsoever, anything more than it would be to say that because two things look alike, therefore they are alike. To base a conclusion as to what will happen after the third peak upon what happened after the two earlier peaks, without ascertaining whether like conditions prevail, is certainly an uncharted flight into the realms of fancy.

Receiver Appointed for Isle of Palms Company

Perroneau R. Rivers, Charleston, S. C., has been appointed receiver of the Charleston Isle of Palms Traction Company, by order of Judge H. A. M. Smith, in federal court upon petition of the Baltimore Trust Company, Baltimore, Md., trustee under the indenture securing $250,000 of 5 per cent bonds. The sheriff of Charleston County, on Feb. 21, seized the ferryboats and cars of the company, under attachment proceedings. He was ordered to show cause why he should not be restrained from proceeding to advertise and sell that portion of the property which he seized.

No resumption of operations of ferry and car service is contemplated. Meanwhile a public ferry and bridge service has been provided for in a bill passed by the General Assembly to take the place of service formerly run by the company.

The company was incorporated under the laws of South Carolina on Jan. 9, 1913. It took over the Seashore Division of the Charleston Consolidated Railway & Lighting Company, a line of 10 miles, extending from Mount Pleasant to Sullivan's Island and Isle of Palms, with its equipment and powerhouse on Sullivan's Island. Mount Pleasant and Charleston are connected by ferry by the company by means of two ferryboats.

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Kansas Merger Completed

The Topeka Railway & Light Company, Topeka, Kan., has changed its name to the Kansas Public Service Company and taken title to the property of the Atchison Railway, Light & Power Company and the Wichita Railway & Light Company. It will, as formerly, own all the stock of the Topeka Edison Company and the Topeka Railway, and in addition purchase all the common stock of the Kansas Power & Light Company.

New companies have been formed to be known as the Kansas Public Service Company and the Kansas Power & Light Company. Their formation was effected around the Topeka Railway & Light Company, which was the holding company and owned all the stock of the Topeka Edison Company and the Topeka Railway. The Illinois Power & Light Corporation owned all of the stock of the Topeka Railway & Light Company, also the Atchison Railway, Light & Power Company and the Wichita Railway & Light Company.

The Kansas Power & Light Company has been formed primarily to build a new power plant at Tecumseh and transmission lines in Kansas, among them the line from Topeka to Atchison.

Officers of the Kansas Public Service Company are: Clement Studebaker, Jr., president; William A. Baehr, H. L. Hanley, vice-presidents; Scott Brown, vice-president and secretary; George M. Mattis, treasurer, and Edward Woodman, clerk.

Brief mention of the intended merger was made in the ELECTRIC RAILWAY JOURNAL for March 22, page 484.

Auction Sales in New York.—At the public auction rooms of A. H. Muller & Sons there were no sales of electric railway securities this week.

Prior Preference Stock Offered.—A new issue of $7,500,000 Standard Gas & Electric Company, Chicago, Ill., 7 per cent prior preference stock is being offered by H. M. Byllesby & Company, Janney & Company, Hambleton & Company and the Federal Securities Corporation. The stock is priced at 93½, to yield approximately 7.50 per cent. The new financing is part of the plan to retire secured funded debt.

Reorganization Agreement Reached.—The committee representing the refunding 5 per cent, thirty-year gold bonds of the Buffalo & Lake Erie Traction Company, Erie, Pa., amounting to $7,066,000, notified the holders of these bonds and deposit certificates recently that a plan and agreement for the reorganization of the company have been reached. Alvin W. Krech is chairman of the committee.

Gold Debentures Offered.—A syndicate including Halsey Stuart & Company is offering at 99 and interest, yielding 6⅝ per cent, $3,500,000 of the West Penn Railways three-year 6½ per cent gold debentures due April 1, 1927. The railway part of the West Penn system, largely interurban, is located in the Pittsburgh industrial district of southwestern Pennsylvania and in West Virginia.

Stock Issue Approved.—The Public Utilities Commission has authorized the Central Maine Power Company, Rockland, Me., to issue and sell at not less than par 2,310 shares of its 7 per cent preferred capital stock of the par value of $100 each. The proceeds of the sale are to be used to reimburse its treasury and discharge indebtedness incurred by its payment of the sum of $231,000 for the retirement of 2,310 shares of the preferred stock of the Androscoggin Corporation.

Attempts to Keep Line Operating Fail. — Several attempts have been made, since the Connecticut Valley Street Railway shut down, to keep the line in operation between Northampton and Hatfield, Mass., but all efforts have failed. It is said that the road between Northampton and Amherst may be purchased by the Northampton Street Railway.

Bonds Offered to Yield 5.75 per Cent.—The Paine-Webber Company, New York, and R. L. Day & Company, Boston, are offering for subscription at 102 and accrued interest to yield 5.75 per cent $550,000 of Holyoke Street Railway first mortgage 6 per cent gold bonds dated April 1, 1915, and due April 1, 1935. It is explained that since 1919 net earnings prior to depreciation in each year have been more than three times the interest requirments on the entire funded debt, including this issue. During this period the amount charged to maintenance and depreciation in each year has been more than 23 per cent of the total revenue. Dividends are being paid at the rate of 6 per cent per annum on the capital stock.

Railway Buys Light Company.—The Indiana Public Service Commission has approved the sale of the Geneva Light & Power Company to the Marion & Bluffton Traction Company. The purchase price is $65,000, of which $50,000 is payable in cash and the remaining $15,000 in bonds of the Bluffton-Marion line. The property just purchased furnishes light and power to Vera Cruz, Craigville, Linn Grove, Berne and Geneva in Indiana and Chattanooga, Ohio.

Want to Issue Bonds for Improvements.—The Columbus Railway, Power & Light Company, Columbus, Ohio, has filed an application with the State Utilities Commission for authority to issue $2,250,000 in bonds, the proceeds to be used to reimburse the company for capital expenditures for further extensions and improvements. The application cites that between Oct. 1, 1921, and Feb. 29, 1924, the company paid out of its treasury a total of $4,750,565, none of the amount covered by the issuance of bonds, stocks, notes or other indebtedness securities. The railway department benefited in the expenditures to the extent of $1,571,545, while $1,501,336 went to the power, light and heat department for transmission, storage and distribution equipment. Land, structures and equipment consumed the remainder of the amount, it is shown.

Preferred Stock Offered.—A syndicate including A. E. Fitkin & Company, New York, is offering $1,250,000 of the Jersey Central Power & Light Corporation's 7 per cent cumulative participating preferred stock at 92½ per share and accrued dividends to yield more than 7½ per cent. The proceeds from the present financing will be used to acquire the stock of the Consolidated Gas Company of New Jersey and the Tri-County Electric Company and the balance for other corporate purposes, including additions and betterments to the properties. In addition to its operations in New Jersey the Jersey Central Power & Light Corporation controls the Tide Water Power Company, which owns and operates the entire electric light and power, gas and electric railway business in Wilmington, N. C., and suburbs and other light and power properties in Florida.

Local Service Abandoned in Temple.—Street car service in Temple, Tex., which has been maintained for the last nineteen years by the Belton-Temple Traction Company, has been practically abandoned since the new owners took over the interurban line between Belton and Temple. Service has been abandoned altogether in the northern part of the city, and the line serving South Temple has been shortened and several cars taken off. It was said by the new owners that the local service was a losing proposition and that it could not be maintained. The City Commissioners assented to the abandonment of the service. Tracks of the abandoned lines are being taken up.

Accumulated Deficit $326,270.—The Sacramento Northern Railroad, operating in Sacramento, Chico, Colusa, Woodland and vicinity, reports to the California Railroad Commission for the year 1923 that its operating revenue was $1,592,247; operating expenses $1,361,466, giving a net operating revenue of $230,781. Interest, rent, taxes and other deductions totaled $344,484. The corporate loss for the year was $79,561. The deficit at the beginning of the year amounted to $203,420. Miscellaneous additions to surplus for 1923 amounted to $4,587 and miscellaneous deductions were $47,876, leaving an accumulated deficit at the end of the year of $326,270.

New York City Tractions Offer Investment Opportunities.—William Carnegie Ewen, who has specialized for many years in New York City traction securities, has prepared a frank discussion and a general forecast of the local situation which he calls: "What's Ahead for the New York Tractions." He discussed the present political situation and reviews briefly the terms of the existing rapid transit contracts and then concludes: "Viewed from every angle, only one conclusion may be drawn—that the traction companies are on the eve of a period of great prosperity. As time goes on, their strong strategic position will be realized more and more by investors, and as a result we look forward with confidence to a steady appreciation in the value of those traction issues which have an adequate degree of security behind them."

Must Pay Increased Taxes. — The New Jersey Supreme Court has handed down an opinion in the franchise tax case of the city of Phillipsburg, N. J., against the Phillipsburg Transit Company, affirming the contention of the town. This means that the transit company will have to pay increased franchise taxes. In February, 1922, the city complained to the State Tax Board

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that the return of gross receipts made by the transit company was incomplete and did not show all of the gross receipts. The city wanted a return for the assessment of the franchise tax, based on the gross receipts from passengers carried in New Jersey and also in Easton, Pa. It is said that fares collected in Pennsylvania were not reported. The state board entered judgment and the Supreme Court upholds the decision.

Unusual Pamphlet Tells Earnings Story.—For the year ended Dec. 31, 1923, the Middle West Utilities Company, Chicago, Ill., a holding company for more than twenty subsidiary companies on which several hundred communities are dependent, reports a net income of $2,742,706. The surplus as of Dec. 31, 1923, was $2,064,417. These facts are contained in the annual report, which is an unusual pamphlet from the point of view of picture display and interesting data contained in its pages. Besides explaining the status of the physical properties involved the booklet describes in detail the company's activities during the year just ended in the matter of customer ownership, employees' life insurance and public relations. Some instructive charts accompany the story of accomplishment. Many scenes depicting the company's doings in the various states it serves are reproduced. To show the plants geographically a map is included locating the various properties.

Legal Notes

FEDERAL COURTS—*Taxation of Property of Street Railways as Personal Property Held Legal.*

In 1919 the State tax commissioner of Washington, acting under a state law, assessed a street railway property as "personal property." As so much of the property consists of cars, tracks, poles, appliances, wires and power houses, such an assessment was upheld as legal. [Puget Sound Power & Light Co. vs. King County, 44 Sup. Ct., 261.]

CALIFORNIA—*Pedestrian Injured While Walking Around Dirt Pile Wrongfully on Street.*

A water company, in violation of ordinance, piled dirt on the street less than a foot from the car track, so that a person crossing the street had either to climb over the pile or skirt it along the track. While doing the latter in the dusk of the evening, a pedestrian was hit by a car. It was held that both water and railway company were negligent. [Hansen vs. Market Street Railway, 221 Pacific Rep., 955.]

INDIANA — *Duty to Keep Depot and Platforms Safe Not Extended to Premises Not Adapted to Invitee's Business.*

The ticket agent at a station was in the basement when a person stopped to buy a ticket and check his baggage. Not finding the agent, he walked out to the freight platform and fell off a point that was unguarded. The company was held not responsible. [Union Traction Co. of Indiana vs. Grohs, 142 Northeast Rep., 389.]

KANSAS—*Purchaser of Street Railway at Receiver's Sale Takes Property Subject to Franchise Liabilities as to Paving.*

A person who becomes the assignee of a purchaser at a receiver's sale of the property and franchise of a street railway company takes the property and franchise subject to all the terms and conditions imposed by the franchise, including the obligation to pave certain portions of the streets. Hence, a sheriff, under a tax warrant issued by the county treasurer to collect this tax, may sell any non-exempt property of the person or corporation holding the franchise. [Fort Scott Public Utilities Co. vs. Sheriff et al., 222 Pacific Rep., 93.]

MASSACHUSETTS — *Persons Stepping from Automobiles Must Use Care.*

In order to allow a guest riding in an automobile to get out and take the trolley, an automobile was stopped suddenly on the track just beyond a white pole. The automobile driver expected the car would stop at the pole, but it did not and struck the automobile, injuring the person alighting. The court held that in these circumstances the person injured was guilty of contributory negligence. [Will vs. Boston Elevated Railway, 142 Northeast Rep., 44.]

MICHIGAN—*Words "Public Convenience and Necessity," as Applied to Motor Vehicles, Include Them Only.*

This case arose through a writ of certiorari by the Rapid Railway Company against the Michigan Public Utilities Commission to review an order granting a permit to the Wolverine Transit Company to operate a bus business between Detroit and Mount Clemens. The act under which the commission granted this permit declares that bus permits must be obtained from the commission and "said permit shall be issued in accordance with the public convenience and necessity." The majority of the commission held that the language of this section limited the inquiry to "whether a public convenience and necessity exists as to the motor vehicle business," but the Rapid Railway Company contended that all means of transportation between the points to be served must be considered. The court held, however, that this is not the case, partly because there is no reference in the act to indicate the Legislature had in mind the protection of existing railroad transportation interests, partly because the history of the bill in its passage does not indicate any such intention and partly because the purpose of the bill as declared in its title was to regulate the use of motor vehicles on the highways. [Rapid Ry. et al. vs. Michigan Public Utilities Commission, 196 N. W. Rep., 518.]

NEW YORK—*Consent of City Held to Embrace Consent to Spur in Front of Lots.*

Where a franchise is given to operate a railroad on certain streets, and it is reasonably necessary to construct a spur on an intersecting street in order to connect with a carhouse, it may be so laid if no suitable site for the carhouse can be found along the route. [Westchester Electric Railway vs. City of Mount Vernon et al., 142 Northeast Rep., 585.]

NEW YORK—*Lease and Modification, When Approved by Two-thirds of Stock, Held Binding.*

Under Railroad Law, Sec. 148, a railroad is authorized to lease its property, and this lease becomes binding when approved by the owners of two-thirds of the stock of each corporation. Though the statute is silent as to how such a lease may be modified, it is a fair implication that it may be modified in the same manner. Hence, a provision of a railroad lease that the lessee's guaranty of 7 per cent dividends as rent to lessor's stockholders could not be reduced without the unanimous consent of lessor's stockholders was held to be illegal, as attempting to set up a different agency for the modification of such lease than that established by the law, as mentioned above, and the guaranty did not survive a valid modification of the lease, made as outlined above. [Peabody vs. Interborough Rapid Transit Co., 202 New York Sup. (Sup. Ct.), 287.]

OKLAHOMA — *Injury to Leaving Passenger from Car Overhang on Curve.*

When a passenger is discharged from a street car at a regular stopping point, he should have a reasonable opportunity to get beyond danger from the movement of the car. The railway company is not bound to warn a pedestrian that he may be struck by the overhang on a car in rounding a curve, since that is a matter of common knowledge, but if the pedestrian is a passenger who has just left the car, the condition is different. [Trail vs. Tulsa Street Railway, 222 Pacific Rep., 950.]

WISCONSIN — *Commission May Permit Operation of One-Man Cars, Notwithstanding Municipal Ordinance.*

This was an action brought by the city of Milwaukee to set aside an order of the Railroad Commission authorizing the Milwaukee Northern Railway to install one-man cars in its local street railway in Milwaukee. The city of Milwaukee had passed an ordinance requiring all street cars to have a crew of not less than two men. The court held that as the Legislature was the creator of municipal powers, its authority was supreme in such matters, and that it had properly authorized the commission to exercise the power to investigate and decide what constitutes reasonable and adequate service. [City of Milwaukee vs. Railroad Commission of Wisconsin, 196 N. W. Rep., 853.]

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Personal Items

Mr. Harvey Promoted

Assistant Manager of Toronto Transportation Commission Appointed to Succeed Mr. Couzens

D. W. Harvey has been appointed general manager of the Toronto Transportation Commission, operating more than 200 miles of electric railway formerly included in the system of the Toronto Railway, privately owned, and the Toronto Civic Railway. In that capacity he succeeds H. H. Couzens, who, as noted in the ELECTRIC RAILWAY JOURNAL for April 5, has joined the forces of the Brazilian Traction, Light & Power Company. He has been assistant manager at Toronto.

Mr. Harvey is not a difficult man to interview, but it is indeed very difficult to elicit any information from him about himself. Talk Toronto railways and he is at home. Hint at Harvey as a personage and he is silent. He can see nothing in his own life that should interest others. This is not mock modesty. The distressing thing about it is that Mr. Harvey is sincere in the humility which he shows toward the merits of his own accomplishments.

D. W. Harvey

As Mr. Harvey sees it, to borrow from Elmer Rice, his life has been free from marches and counter marches and any victory on a stupendous scale. About this judgment his associates disagree with him. They are reticent, however, because he is so modest about himself. They know it would be distasteful to him to sing his praises, but they insist upon the value of the performance of the man along the line of permanent, public accomplishments. Not the least of these is the ability—amounting at times almost to genius—which he displays in getting along with other men.

The man has many other merits. Because he had built solidly while with the old Civic Railway at Toronto, Mr. Harvey was made assistant to Mr. Couzens in the fall of 1921, when the lines of the Toronto Railway were taken over by the commission, and for similar reasons he has now been selected to succeed Mr. Couzens. It was logical that he should be. To them fell the task of rehabilitating the local Toronto lines, and the success they have attained—and it is real, definite success—is due in no small measure to the fact that they were permitted to work out the details in their own way and without political interference.

Mr. Harvey knows Toronto thoroughly. He knows its transportation needs. He really began to visualize them as long ago as 1911, when the first of the so-called civic lines was placed in operation. Of that line he was construction engineer. In 1912 the operation and maintenance were placed under his supervision, and in these capacities he continued until appointed to be assistant manager of the Toronto system in 1921, after the lines of the Toronto Railway had been acquired by the city. Mr. Harvey was born in London, Ont., on Feb. 24, 1887. He was graduated from Toronto University, and before entering railway work he was with the Ontario Power Company and the Toronto Structural Steel Company.

L. H. Palmer and S. E. Emmons Advanced at Baltimore

L. H. Palmer has been elected vice-president of the United Railways & Electric Company, Baltimore, Md., in addition to general manager, and S. E. Emmons has been appointed to the position of assistant general manager.

"Lou" Palmer, as he is familiarly known to his associates, has been general manager of the company since last March. At that time he succeeded in that position Herbert B. Flowers, who resigned to become president of the New Orleans Public Service, Inc. Before that Mr. Palmer had been assistant to the president at Baltimore since October, 1917.

Mr. Palmer is one of the best known men in the transportation side of the industry. He has been particularly active in association work. He was born in Chicago, but his business life has been spent in the East. He was graduated from Williams College in 1902, and then served with both the New York Central Railroad and the old Metropolitan Street Railway, New York. He has been connected with the company at Baltimore since 1915.

Mr. Emmons has been serving for the past two years as assistant to the general manager both under H. B. Flowers and his successor, Mr. Palmer. Previous to that Mr. Emmons had been in steam railway work. He came to the Baltimore company from the position of assistant chief engineer of the Ann Arbor Railroad. He had also served with the Pennsylvania Railroad and the Santa Fé. He was connected with H. E. Riggs on the Toledo valuation.

He was graduated from the University of Michigan, Engineering Department, and during the war was a captain of engineers in overseas service. Mr. Emmons is twenty-nine years old. He is a son of C. D. Emmons, president of the company.

Mr. Boylan Made Manager in New Jersey

M. R. Boylan, acting general manager of the Public Service Railway, Newark, N. J., since last December, has been elected vice-president and general manager. In that capacity he succeeds R. E. Danforth, recently resigned.

Mr. Boylan really established his reputation with the Public Service Corporation as an accountant. As such he has an uncanny capacity for digging quickly to the root of things. This ability he is said to have turned to extraordinary account since he has been handling railway matters, with the result that he has already established for himself a reputation in his conduct of the affairs of the railway both with respect to the economies that he has been able to work and in the direction of carrying out promptly policies decided upon by him for adoption.

M. R. Boylan

In short, Mr. Boylan has brought to the problems confronting the railway a new and detached point of view, but one that embodies an intimate knowledge of the history of the railway and a keen understanding of the point of view of the public. Mr. Boylan has been with the company since 1892. He is a native of New Jersey. His career was reviewed at length in the ELECTRIC RAILWAY JOURNAL for Dec. 1, 1923.

President Finlay Resigns from Montreal Company

William C. Finlay, president of the Montreal Tramways & Power Company, Ltd., Montreal, Que., and three fellow directors have resigned. The retiring directors are J. M. Wilson, George G. Foster and J. K. MacIntyre. Their departure leaves the board in full control of new officers elected at the last annual meeting.

C. N. Wilcoxon, president and general manager Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., has resigned.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Philadelphia Company Buys American Locomotive Plant

Announcement was made recently by Arthur W. Thompson, president of the Philadelphia Company, of the purchase of the property and buildings of the American Locomotive Company in Preble and Island Avenues, Northside, Pittsburgh, locally known as Manchester. The price involved was $1,500,000. More than 11 acres are involved in the purchase, six of which are covered with brick and steel buildings of modern construction. The site adjoins the present Manchester carhouse and shops of the Pittsburgh Railways.

The property was acquired for the purpose of consolidating the storehouses of the various public utility properties of the Philadelphia Company, including railway, light, power and gas companies. The Manchester site will be the general storehouse of all these companies, and the office building on Preble Avenue formerly occupied by the administrative forces of the American Locomotive Company, will serve as the headquarters of the general storekeeper, who will operate under the supervision of the general purchasing agent of the Philadelphia Company and affiliated corporations.

New Import and Export Records Made in 1923

New records were made in 1923 in both the country's export and import trade, according to an analysis of American world trade made by the Foreign Commerce Department of the United States Chamber of Commerce.

Statistics of the quantity of logs and timber exported were made available first in 1912, when 664,000,000 b.ft. were exported, the record until the 1923 shipments of 752,000,000 b.ft.

Import records also were broken in 1923, principally in raw materials and partly manufactured goods for domestic industries. Crude rubber imports of 692,000,000 lb. in 1923 were 18,000,000 lb. larger than the 1922 receipts. The 1913 receipts of iron ore—2,595,000 tons—fell far below the 1923 imports of 2,768,000 tons. Imports last year of nearly 2,000,000,000 b.ft. of lumber were 400,000,000 b.ft. greater than in 1922.

For the first time since 1919 exports from the United States show an increase to every continent of the world. Every one of the country's ten leading customers bettered its 1922 purchases. These ten leaders, Great Britain, Canada, Germany, France, Japan, Cuba, Italy, Mexico, Australia and Argentina, take about 75 per cent of the total exports. A few important markets show smaller purchases. The declines in shipments to Belgium and India were so small as to be neglible. Practically all of the country's chief suppliers shipped the United States more goods in 1923 than in 1922, the only leaders showing declines being Japan and Switzerland.

Washington Is Hopeful

Prospects Ahead Brightened by Report of Commission of Experts—Situation at Home Is Good

Official circles in Washington see as the brightest spot in the economic sky the prospect for the solution of some of the European difficulties along the lines which are being suggested by the commission of experts. With a favorable turn in European affairs in immediate prospect, strong support for the wheat market is likely to develop. Since the stocks of all commodities in Europe have been held at a minimum, better prospects there would be reflected in the demand for American goods. While the immediate effect would be stimulating to the American market generally, the advance of stabilizing influences in Europe eventually will mean keener competition for foreign markets.

Domestically, industrial prosperity continues to rest on the super-activity of the construction industry. It is the balance wheel which is keeping things going. The public is demanding more room. The building program is going to be more extended than had been estimated. There is every evidence that it will be particularly active throughout 1924 and take up any slack in employment. It is the agricultural industry which is holding things back. A scrutiny of the index figures covering agricultural prices, however, indicates that it is coming closer and closer to the index numbers covering other commodities. Prices of manufactured goods are diminishing gradually as those of agricultural products are gradually rising.

Business as yet appears to be unaffected by the epidemic of investigations which are in progress on Capitol Hill. If there is indefinite continuation, however, of the furnishing of great pulpits from which the underworld is to be allowed to pour its vituperation, it is regarded as entirely within the range of possibility to undermine confidence to the extent that business will receive a jar. Thus far, however, it seems that the inherent sanity of the American people is standing them in good stead and they are not being carried off their feet. The government employs 600,000 persons in its service. Despite all the safeguards which are provided, it is humanly impossible to guarantee the probity of each one of the 600,000. Evidence taken in executive session is the buffer which stands between the community and those accused in the malicious statements. There is no thought, however, in the statements here set down of belittling the importance of certain disclosures which have grown out of the congressional investigations.

Metal, Coal and Material Prices

Metals—New York	April 8, 1924
Copper, electrolytic, cents per lb.	13.437
Copper wire base, cents per lb.	15.875
Lead, cents per lb.	8.60
Zinc, cents per lb.	6.575
Tin, Straits, cents per lb.	51.25
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.20
Somerset mine run, Boston, net tons	2.125
Pittsburgh mine run, Pittsburgh, net tons.	1.875
Franklin, Ill., screenings, Chicago, net tons	2.175
Central, Ill., screenings, Chicago, net tons.	1.675
Kansas screenings, Kansas City, net tons..	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.65
Weatherproof wire base, N.Y., cents per lb.	17.50
Cement, Chicago net prices, without bags.	$2.20
Linseed oil (5-bbl. lots) N. Y., per gal.	$0.93
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots.	12.25
Turpentine, (bbl. lots), N. Y., per gal.	$1.00

New Shops for Columbia Machine Works Are Progressing

Rapid progress is being made in the rebuilding of the shops of the Columbia Machine Works, Brooklyn, N. Y., which were recently destroyed by fire. A building of reinforced concrete, steel and brick is being erected which is 500 ft. long and 75 ft. wide. Part of this building is two stories and the south end one story high. The new structure extends along Chestnut Street, from Atlantic Avenue to Fulton Street, and will provide facilities for the blacksmith shop, machine shop and brass foundry.

At present work is being carried on in the buildings which were not damaged by fire, and while these facilities are sufficient to handle present orders, they are inadequate to meet the increasing demand for the company's products. The new shops will be equipped with the latest type of machine tools, which will assist in speeding up production and shorten delivery time. Five or six overhead traveling cranes will be provided in the new building. A 10-ton yard crane is now being erected for handling material in the yard and for loading and unloading cars. Part of the new building will be ready for occupancy in June, but it will require nearly a year to complete the entire work.

Chicago Surface Lines Seeks Bids for 100 Cars

Inquiries are being sent out by the Chicago Surface Lines for bids on the construction of 100 new double-truck arch-roof motor cars. They are to be equipped with two 65-hp. motors each and multiple-unit double-end control for operation as single cars or in trains. The doors on both sides of each vestibule will be pneumatically operated and arranged so that quick loading and unloading can be accomplished in street or subway operation. In either direction of operation the rear doors may be controlled by an operator on either

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platform or by a street collector. The exit door at each end will be of the new automatic type which was used on a group of forty-five one-man cars described in the ELECTRIC RAILWAY JOURNAL of Sept. 30, 1922.

The specifications are as follow:

Number of cars	100
Name of road	Chicago Surface Lines
Type of car	Multiple-unit, double-end
Total weight	38,000 lb.
Bolster centers, length	22 ft. 0 in.
Length over all	48 ft. 11 in.
Truck wheelbase	4 ft. 10 in.
Width over all	8 ft. 6 in.
Height, rail to trolley base	11 ft. 6 in.
Body	Semi-s eel
Interior trim	Cherry
Headlining	¼-in. Agasote or ⅛-in. plywood
Roof	Arch, ¼-in. plywood
Air brakes	Straight air with emergency feature
Signal bells and buzzers	Consolidated, or equal
Car trimmings	Bronze, statuary finish
Center and side bearings	Railway standard, plain
Conduits	Dura ube or equal, and aluminum
Control	Multiple unit
Couplers	Automatic, with air jumpers for electric circuits
Curtain fixtures	Rex roller, fixtures to be approved
Curtain material	Double face
Des ination signs	Hunter illuminated or equal
Door operating mechanism	National Pneumatic or equal with automatic exits
Wheelguards	H. B.
Hand brakes	Pittsburgh No. 35 or equal
Hand straps	Rico No. 7
Heater equipment	Consolidated cross seat or equal
Headlights	Railway standard pressed steel
Lightning arresters	M. D. or equal
Meters	Economy
Motors	2-65 hp. outside hung
Paint, varnish or enamel	Chicago varnish and Vitrolite enamel
Rails and stanchions	Aluminum
Registers	International R-7 or equal
Roofing Material	No. 8 ational prepared roofing
Sanders	Electric Service No. 135-A or equal
Sash fixtures	O. M. Edwards or equal
Seats	Ratt n full spring upholstered
Step treads	Kass or equal
Thermostat	Ry. Utility or equal
Trolley catchers	Ohio Brass or equal
Trolley base	U. S. 14 or equal
Trolley wheels	Railway standard
Trucks	Maximum traction
Ventilators	Railway Utility or equal
Wheels	Rolled Steel, 28 in.

Belgian Concern Active in Building Motors

The progress of the Ateliers de Constructions Electriques de Charleroi, Belgium, gives a striking illustration of the industrial recovery of Belgium. From a pre-war force of 800 men and 510 machine tools, this Charleroi manufacturing shop has increased to a personnel of 4,100 and 2,000 machine tools.

Among its various manufactures is a line of traction motors which constitute an important department of the concern. Subsequent to the war motors of 25 hp. at 500 volts have been manufactured, and more recently a 30 hp. size. As a matter of fact, Charleroi works as early as 1900 built a complete series of motors ranging from 20 to 225 hp., for a gage of 1,435 meters.

With the growth of tramway services and the general reduction of the gage to 1,000 meters, the Charleroi works developed a new series of motors more compact in design and comprising 50 hp. motors at 700 volts, equipped with four commutator poles. This type of motor now competes actively in Europe with American built motors.

The company is now engaged in developing a new series of motors with forced ventilation, with the idea of securing maximum power with minimum space and weight. All air holes are to be supplied with protecting screens against water and dust, which, it is said, can be so arranged as to give all the effect of an armored motor.

Rolling Stock

Pittsburgh Railways, Pittsburgh, Pa., has placed an order for 200 new cars.

Madison Railways, Madison, Wis., will purchase seven or eight new cars if the recommendations of the Wisconsin Railroad Commission are carried out.

New Orleans Public Service, Inc., New Orleans, La., will soon ask for bids on fifty-five cars.

Track and Line

Spokane United Railways, Spokane, Wash., will rebuild tracks on Riverside Avenue, between Lincoln Street and the Monoghan monument, with new rails and ties, set in solid concrete. The double curve that now exists will be removed and one long curve installed.

Kansas City Railways, Kansas City, Mo., has applied to Judge Stone for permission to extend its line on South Prospect Avenue to Fairyland Park and to rebuild various stretches of track at an expenditure of $500,000.

Wichita Railroad & Light Company, Wichita, Kansas, plans to extend the College Hill division from Roosevelt to Belmont, a distance of five blocks. Howard Patten, general manager, has estimated the cost of this improvement at $18,000. Construction of the extension will start soon.

New York, N. Y.—Contractors' bids for the construction of the main stem of the crosstown subway in Brooklyn, in Bedford Avenue from DeKalb Avenue to Keap Street, will be received by the Transit Commission on April 25. The commission unanimously selected April 25, on motion of Commissioner Harkness that the construction work be proceeded with forthwith. This will be the first of the construction contracts for the new lines, but the commission has already submitted to the Board of Estimate proposals for the making of test borings along Bedford Avenue and for the removal of the memorial trees along that thoroughfare.

Seattle Municipal Railway, Seattle, Wash., has started on its summer construction program, involving an expenditure of nearly $750,000, under supervision of A. E. Pierce, superintendent of maintenance. An order for 600 tons of heavy steel trackage, costing $420,000, has been placed by Mr. Pierce. The work involves renewal of special trackage at Second Avenue and Pike Streets; new cable crossings and foundations, costing $30,000, at Third Avenue and James Street, and Third Avenue and Madison Street. These jobs call for replacing present crossings, excavation of concrete bed, and building up steel and concrete foundation work 26 ft. square and 39 in. deep below the track level. Track renewals in various parts of the city, paving of three spur tracks and surface reconstruction and repaving between tracks complete the work. The largest single job will be the retracking of Westlake Avenue from Roy Street to the Fremont bridge, to cost $100,000.

The Nashville Railway & Light Company, Nashville, Tenn., will spend more than $600,000 in 1924 on its construction program. It is proposed to rebuild 12.58 miles of track, which it is estimated will cost $280,000.

Power Houses, Shops and Buildings

New Orleans Public Service, Inc., New Orleans, La., expects during the next month and a half to have the 20,000-kw. generator for the Market Street power station and three months after arrival it is expected to be in operation. The generator, condenser, switchboard and other appliances will cost $1,200,000.

Manchester Traction, Light & Power Company, Manchester, N. H., has awarded a contract to Stone & Webster, Inc., Boston, Mass., for the installation of vertical hydraulic turbine units of 2,400 and 3,200-kw. rating at its Garvins Falls station on the Merrimac River and of a vertical unit of 1,000-kw. rating at Kelly's Falls, on the Piscataquog River. The Kelly's Falls plant will be equipped with full automatic control, with additional provision for supervisory control from the company's adjacent steam plant.

Trade Notes

H. E. Pratt, formerly vice-president of Babcock & Wilcox Company, New York, N. Y., has been elected president of the company, succeeding W. B. Hoxie, who becomes vice-chairman. E. H. Wells remains chairman. Isaac Harter, general superintendent, succeeds Mr. Pratt as vice-president.

Quigley Furnace Specialties Company, New York, N. Y., will move its Chicago office to larger quarters, on May 1, at 9 South Clinton Street.

Industrial-Utilities Service Bureau is now located in Suite 509, M. E. Taylor Building, Louisville, Ky.

White Company, Cleveland, Ohio, has received word that the last shipment of thirty White Model 20 buses, completing an order of sixty, has reached Tokyo, Japan, to go into the service of the Tokyo Bus Company. The Tokyo Bus Company, with the addition of the sixty new jobs, now operates sixty-seven Model 20 White buses, which is one of the largest bus fleets in operation outside the United States. All of these jobs are equipped with eighteen-passenger bodies.

New Advertising Literature

International Engineering Corporation, Malden, Mass., has issued a pamphlet describing the working of the International "Automatic" Painting Machine.

Heine Boiler Company, St. Louis, Mo., has issued Bulletin 54, an illustrated pamphlet on the Lent-tube boiler V-type. The construction, design and need of this equipment are discussed in its pages.

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New York, April 19, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 63
Number 16

Possible City Operation for New York, but with Service at Cost

AT THE present time it is somewhat difficult to forecast all the effects of the rapid transit bill passed in the closing hours of the hectic session of the New York State Legislature, recently adjourned. It came about through a compromise effected by the Governor between the divided houses of the Legislature, which resulted in the passage of a measure giving a modicum of home rule to New York City. It is something of an empty victory for Mayor Hylan, for while his opponents apparently weakened at the last moment and permitted the bill to pass, it allows far less transfer of authority to the city than had been demanded. The compromise plan, however, had the approval of Governor Smith, and he presumably will sign it.

The salient feature of the act is the creation of a new Board of Transportation of three members, to be appointed by the Mayor, who will have authority to undertake the planning and construction of new rapid transit railroads. These lines may be operated by the city if it so elects, under conditions which are outlined in the bill. If such operation is undertaken it must be at a 5-cent fare for the first three years. But if, at the end of this period, the 5-cent fare is not sufficient to make the lines self-supporting, including interest, depreciation and amortization on a ten-year basis of any traction bonds issued, a rate of fare must be adopted that will cover the cost of the service. It is obvious that a large deficit can be incurred in this initial three-year period of operation, judging by the results of the companies now attempting to give service on a 5-cent fare on the old-established lines with the densest traffic in the world, and constructed when costs were much lower than at present. Thus in effect an increase in fare has been legislated—if, indeed, any substantial subway construction is actually done. This prospect of higher fares will hardly be an incentive to the Mayor to push construction. He will more likely continue to stall.

It is unfortunate from the standpoint of real rapid transit that there is nothing in the act requiring the operation of any new lines that may be built in conjunction with those existing. Newspaper stories have it that it is the plan of the present city administration to make its new construction entirely independent, financially and physically, from the old systems, so that it will not have any connection with the private companies. This naturally will lead to the duplication of facilities and fares, so that the relief promised so often in political speeches if the "traction barons" were beaten would be much like the disintegration of the surface systems resulting from the Mayor's activities in that direction.

On one point the Mayor was beaten decisively. He asked for control over the existing lines and abolition of the State-appointed Transit Commission created under the Miller plan of 1921. Here his opponents did not yield, leaving the old lines in control of the Transit Commission. Thus there will be two commissions instead of one, and, if the construction program is carried out, three rapid transit systems instead of two, neither of which things is likely to work for the best interests of the city. But it appears that at least the construction of new subways is now put squarely up to the Hylan administration.

How Much Oil per Bearing?

THE amount of oil required properly to lubricate an armature, axle or journal bearing of an electric railway car is very small, and yet it is extremely difficult to keep these parts continually lubricated. If the bearing housing has a satisfactory height of oil when the car leaves the shop, this oil is drawn up through the waste by the turning of the shaft or axle, so that after a run of an hour or two, this oil height is frequently reduced to one-third of its original value. All of the oil does not go to flood the bearings, however, and if the car is withdrawn from service, the oil will return nearly to its original level, as the bearings cool off. Modern motors are designed with an overflow pocket to take care of any waste oil.

When a car goes into service after oil has been added to the bearing chamber to bring the level to a maximum height, the amount of oil used at the start will be much greater than at the end of its run. The article by C. Bethel in this issue gives some very interesting data in regard to the relations between lift and feed of oil with wool waste. The maximum lift which can be depended upon to give a safe oil supply is found to be 3 in. While most modern railway motors are provided with an oil well separate from the waste packed portion, in most cases it is unsafe to run the motor until the oil level nears the bottom of the oil well. This fact has led some railways to make tests to determine the most economical as well as the safe height to keep the oil. In considering economy, however, the amount of oil used should be kept well above the danger point of hot bearings.

In a test on the eight identical armature bearings on the same car the amount of wear resulting was measured under use of varying amounts of oil. The amount of oil supplied per bearing varied from 1.96 gills to 0.42 gill per 1,000 miles. The wear on the bearings supplied with 1.75 gills or more of oil per 1,000 miles showed no appreciable wear, while the bearing with 0.42 gill showed wear of 0.038 in. after one month of operation, or 3,600 miles. In other words, one-sixth to one-quarter of its life had been used up.

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Cost of One Hot Bearing Would Buy Oil for Entire Life of Car

ANOTHER point that is sometimes not thoroughly appreciated is the total cost involved in a hot bearing. A careful analysis on one railway shows the average cost for a hot armature bearing to be $89. This amount includes only the actual cost of making repairs, and does not take into consideration the loss in revenue due to withdrawing the car from service, or the loss of good will from inconveniencing passengers and interrupting service. Other analyses indicate an average cost of $100 to $125 for a hot bearing.

The cost of $89 for one hot armature bearing would pay for 523 gal. of oil at 17 cents. Here is what this means. With an average consumption of 1 gill of oil per 1,000 miles per bearing, and considering a two-motor equipment with four armature bearings, four axle bearings, and eight journal bearings, this amount of oil would be sufficient to lubricate the car bearings while it operates over 1,000,000 miles, or through a period of 25 years—the life of the car, or more. Lubrication costs, viewed in terms of hot bearings, are startling. The point serves to emphasize the value of using good lubricating materials and plenty of them.

How Not to Repair Special Trackwork

THEY'RE digging up the intersection at X Street and Y Avenue again. That's the sixth time it has been opened in the past year, just to tighten up a few bolts, weld a little metal on the manganese inserts, weld on a few more plates, and patch things up generally so that the cars can get across the intersection without jumping the track. Once again the crossing will be placed in shape to serve for a few months more.

Every time the track is torn up the cars are delayed while the men working on the job climb out, and the men are delayed while the cars go by. And street traffic must go around the opening and the piles of earth and paving dug out of the track.

Anybody with half an eye can see that the hard centers are worn, battered and broken practically beyond effective repair. They have been welded and rewelded until they look like they had a severe case of smallpox. The body of the special work is worn so that no insert could be made to fit. The men don't even try to make them fit, but just weld in a little metal so they will stick together.

If the road were to be abandoned, this policy wouldn't be questioned. But there is every indication that street cars will continue to be needed indefinitely, and this intersection is where two important thoroughfares in a big city cross. How many more times the intersection can be patched up before it finally falls to pieces so that it has to be taken out is hard to tell, but judging from the past the evil day will be put off as long as possible.

The worst of it is that too much track repair work is done this way and the track superintendent thinks he is doing a good job and saving money for his company.

But if cost figures could be assembled it is probable that it would be found that enough has already been spent here to pay a large part of the cost of a new intersection. There comes a point in depreciation beyond which it is poor economy to continue to spend money in making further repairs instead of a replacement. Obviously, when it has become necessary to open up an intersection six times in one year, this point has long since been passed. This is true from the point of view of the track man alone, but in addition to that, were enough of an appropriation made to do a real job, the result would be reflected in lower maintenance of cars, fewer delays to the service and enhanced good will of riders and other users of the street.

Pittsburgh Company Sets Out to Sell Its Product

THE term "selling transportation," as applied to American electric railways, is apparently finding its most concrete expression in the recent establishment of a "commercial department" by the Pittsburgh Railways, to function along the lines of an executive organization and with broad scope and powers, as set forth elsewhere in this issue.

The fare schedules in the Greater Pittsburgh district are probably the most diverse in America because of the nature of the territory and the variety of communities served. No better example could have been found for the application of commercial principles because apparent inequalities will always exist under any fare plans that can be devised. It is therefore well that the solution of the many problems should be left to an organization which starts from the angle of more net from sales instead of more net from skimped service, and one that is freed of all production responsibilities.

Quite naturally, the commercial department absorbs the publicity and public relations work that is found today on many other electric railways as a sort of appendage to the general manager's or transportation superintendent's office. In Pittsburgh the temporary smoothing over of a complaint will go hand in hand with whatever fare and service changes can remove that complaint permanently. This means plainly that the commercial department is an executive organization responsible for many decisions and functioning in relation to the general manager, as does the sales manager of a department store, for example, to the general manager of that store. The latter does not set the prices for the sales manager. He merely demands that the net result shall be in black instead of red. So will it be in Pittsburgh. The commercial department is the one that within a wide range of discretion will set rates and standards of service. The transportation department's job is that of producing the goods requested with least expenditure in men and equipment.

The variety of things started by the commercial department in its first ten weeks of activity shows what it is to have an organization of genuine sales responsibility. This department must be ever on the *qui vive* for business, and it must have no more hesitation about trying new rates at frequent intervals than has the merchant who not only varies his prices with quality, quantity and the seasons, but also with the days of the week. It is just this flexible adjustment to its business opportunities that has been so sadly lacking under the rigid fare and service plans of this country. Now that one of our greatest city and interurban systems has shown that it means to use merchandising principles in selling rides, the industry may have some practical demonstrations of this much talked of theory that will be very helpful.

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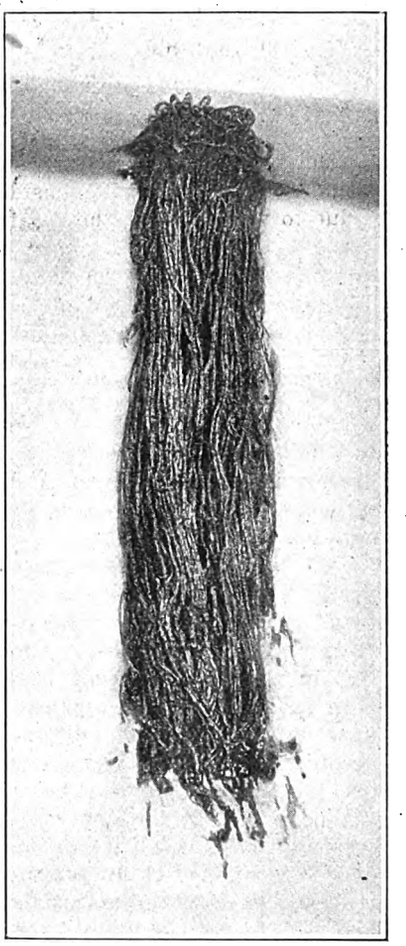
Packing Railway Motor Bearings for Oil Lubrication

Wool Waste Is Most Satisfactory for Packing, but Care Must Be Used to Insure Feeding the Proper Quantity of Oil—Essentials Are to Keep Shell Tight and Clearance Small—Proper Design of the Oil Grooves Is Necessary

By C. Bethel
Railway Motor Engineer Westinghouse Electric & Manufacturing Company



A Long Strand Wool Wick Such as This Should Be Prepared for Feeding Oil to the Bearing Window

RECENT tests, both in the laboratory and in service, made to determine the main factors affecting the operation of waste-packed bearings have had results defining quite clearly the factors necessary for successful bearing operation. When the bearing is correctly packed with a good grade of long strand wool waste, the oil level is kept within the correct limits, and reasonable care is taken to exclude dirt and to maintain the clearance, the useful life of the bearing can be greatly extended.

The condition of the bearings in a railway motor determines more than any other one thing the amount of general maintenance necessary. With bearings in good condition and with close clearances the motor maintenance resulting from abnormal vibration will be low. Taking advantage of all that is now known regarding the action of waste-packed bearings, a material improvement in bearing life should be obtained over average practice.

Modern waste-packed bearings are rugged and reliable; in fact, they are so simple that the underlying principles of their operation are likely to be overlooked. Although bearings are commonly regarded as performing satisfactorily if they run cool, this is not a reliable index of good bearing operation. Sufficient oil may reach the bearing to keep it from getting hot, but still a rapid wear of the bearing may take place. The mileage of railway motor bearings has been found to vary from 50.000 to 250,000. Some of this difference is, of course, due to differences in service, but most of it is due to variations in lubrication and bearing practice. The waste-packed bearing consists of a babbitt-lined bronze shell which is pressed into the motor housing and is provided with a window into which the waste is packed. This waste communicates with an oil chamber in the housing and carries oil by capillary action to the journal. This is the only source of oil supply.

A certain amount of wear will be present with the best of lubrication. This wear is an inverse function of the amount of oil supplied to the bearing. Therefore, first consideration should be given to the oiling of the bearing. The amount of oil required to lubricate the bearing properly depends on the size of the bearing and the work that it does. The amount of oil that the bearing actually gets depends on (1) the kind of waste used; (2) the height of lift, i.e., the distance from the oil to the window; (3) the kind of oil used, and (4) the quantity of waste carrying oil to the window.

Many tests made to determine the capillary characteristics of different grades of waste and other packing materials have brought out a number of interesting characteristics. For example, the ability of four common materials to lift oil is in the following order: (1) Lamp wick; (2) cotton waste; (3) felt, and (4) wool waste, the latter being the poorest in this respect. This

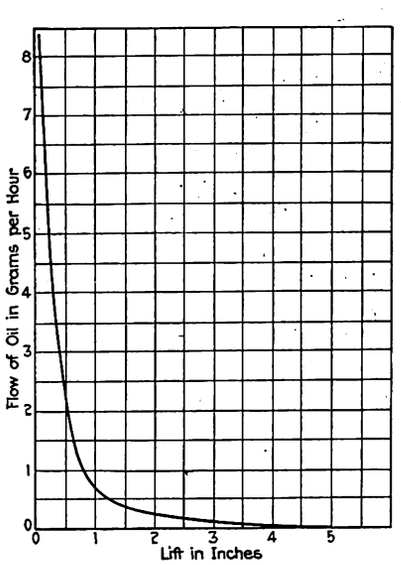


Fig. 1—This Curve for a 40-Hp. Motor Shows the Decrease of Oil Flow with the Lift

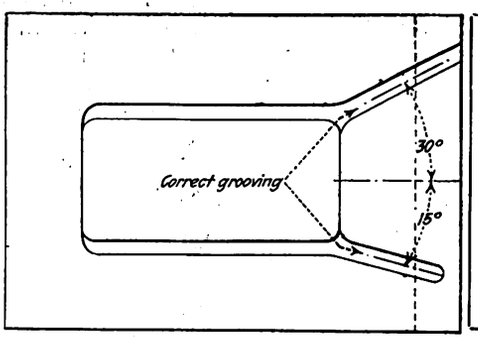


Fig. 2—An Arrangement of Oil Grooves with Edges of Windows Chamfered that Has Proved Satisfactory

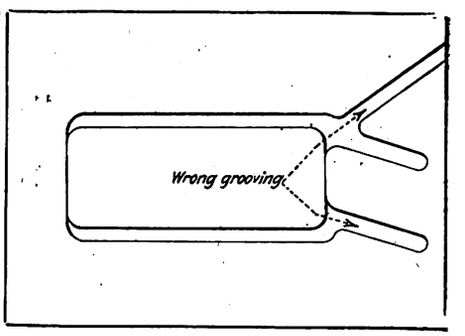


Fig. 3—With the Incorrect Grooving Shown It Is Not Possible to Drain the Chamfer Properly

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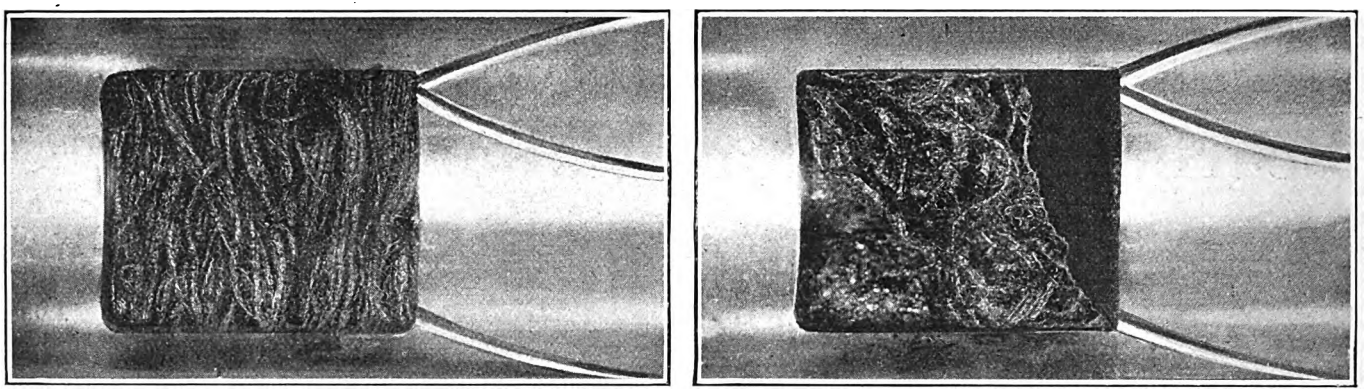


At Left—Section Through Bearing Showing Appearance of the Long Wool Strands When Correctly Packed. At Right—In an Incorrectly and Loosely Packed Bearing the Waste Is Seen to Be in Balls Rather than in Wick-Like Strands. Note that the Waste Does Not Fill the Window Completely

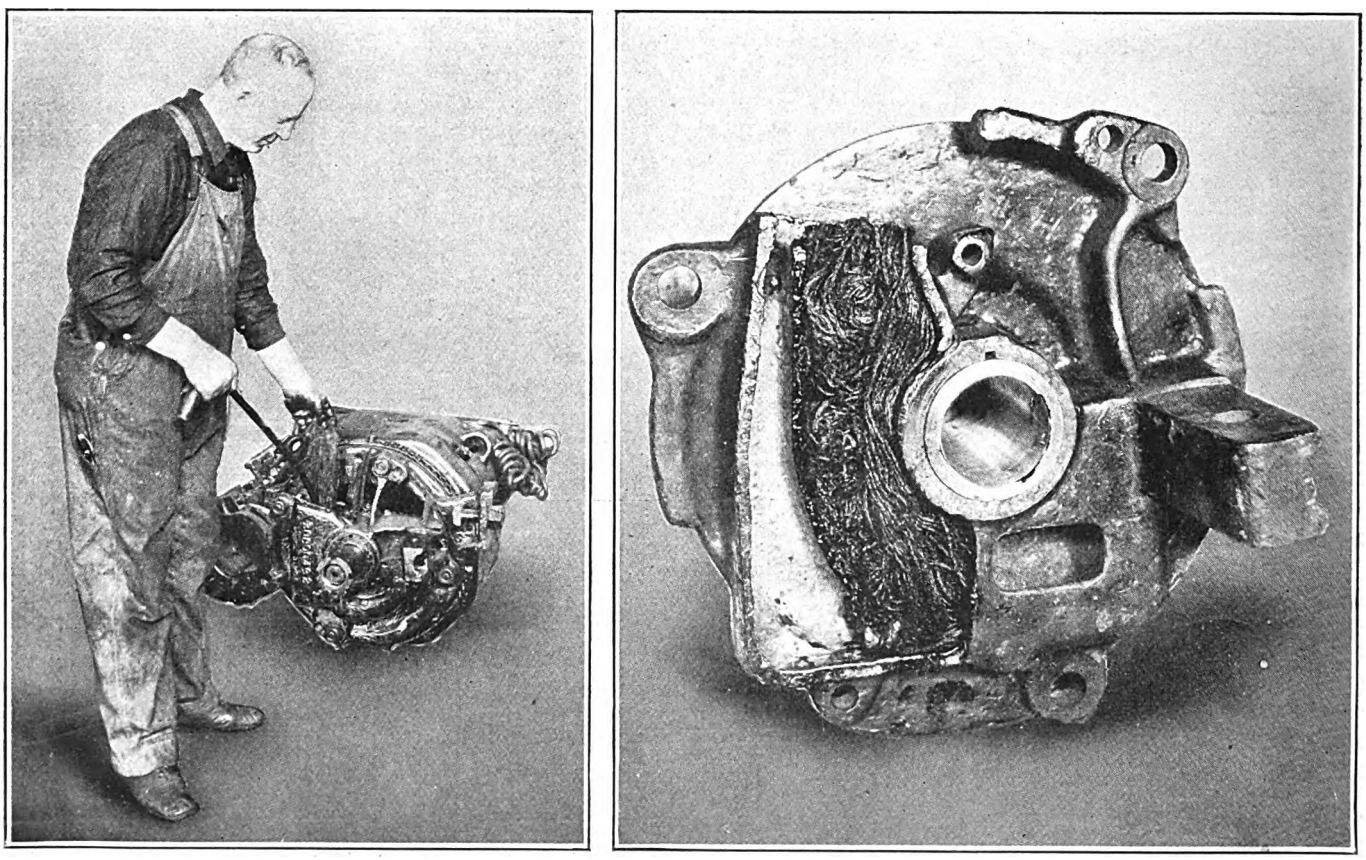
is shown by the comparative distances the oil is lifted after a considerable time, as shown in one of the accompanying illustrations.

Felt has been used successfully in some bearings, particularly where there is a positive, independent oil feed which keeps it well saturated. An example of such use is on electric locomotive jackshaft bearings. But in the usual type of bearing, where the packing both lifts the oil and applies it to the journal, felt is unsatisfactory, as it will glaze when the oil supply becomes lean. Cotton materials are unsuitable as a packing for bearings because they glaze so readily.

Wool waste is the only material that has been successfully used as a packing material. This is because of its mechanical characteristics. It does not glaze as readily as the other materials and it is not so inert, hence it is not so liable to be jolted away from the journal. Since wool waste is desirable on account of its mechanical characteristics, it is important that its relatively poor capillary properties be compensated for as far as possible by securing a long strand wool waste, free from adulteration.

The capillary characteristics of wool waste are shown by the curve in Fig. 1, where the quantity of oil lifted is plotted against the height of lift. This curve is for medium car oil operating at bearing temperatures (viscosity, Saybolt, 54 at 100 deg. C.). The important points illustrated by it are:

1. The maximum possible lift is 5 in.
2. Maximum lift for the minimum safe oil supply is about 3 in.
3. The minimum lift for reasonable economy in oiling is about ¾ in.
4. For further decrease in lifts the oil feed increases quite rapidly. The feed at ½-in. lift is twenty times that at 3-in. lift.



At Left—Packing a Railway Motor Bearing Correctly, Showing How the Wick Should Be Put in Place. At Right—A Correctly Packed Pinion End Housing. The Outer Shell Has Been Cut Away to Show the Wick in Place

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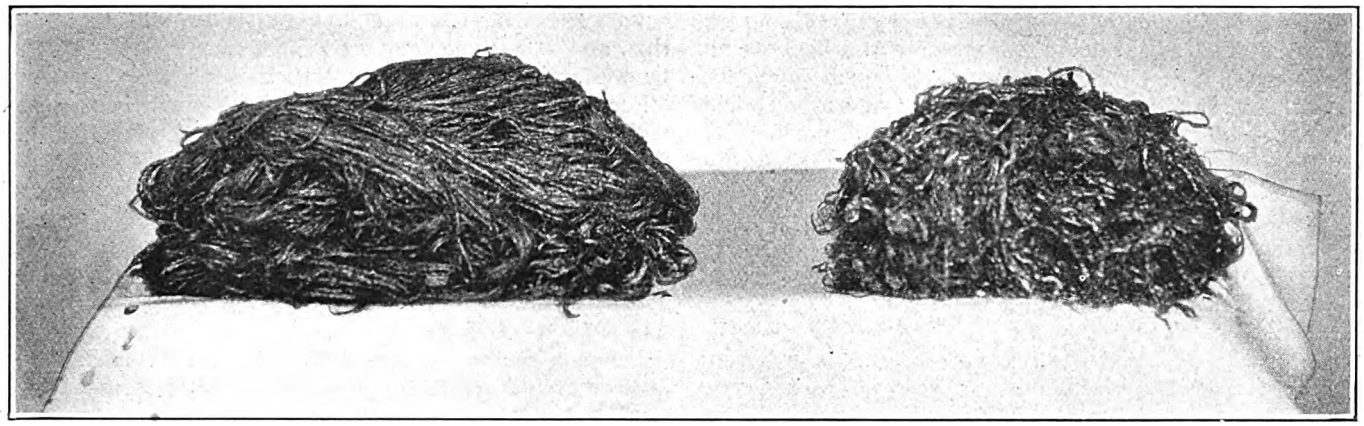


Amounts of Waste Taken from Bearing Housings—at Left, from a Correctly Packed Housing; at Right, from an Incorrectly Packed Housing

5. The correct lift for this grade of oil is from 1 to 2 in. For the pinion end bearing of a 40-hp. motor in average service this will give an oil consumption of approximately 1 gill per 1,000 miles.

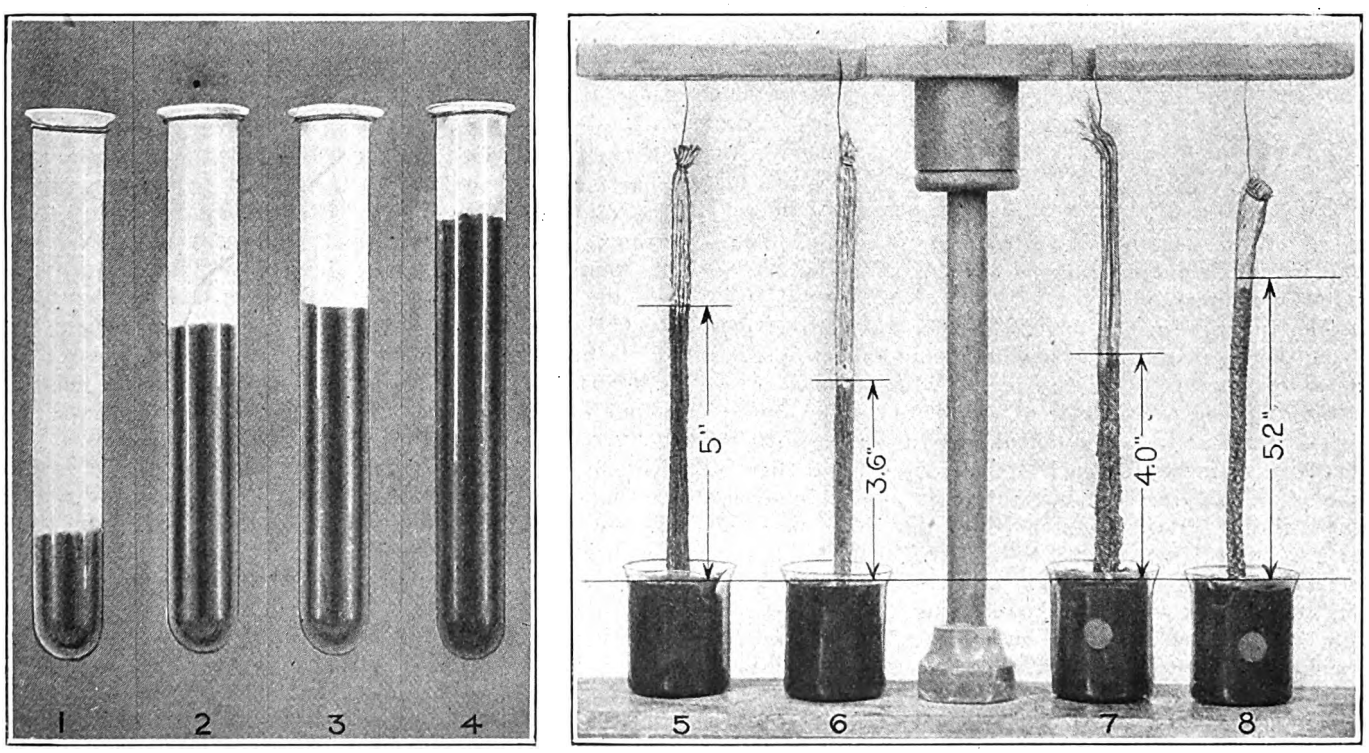
The curve shown represents conditions for a medium oil. Other tests show that viscosity is an important factor in oil feed. A heavy car oil gave a feed of only about one-half that of the medium oil. This indicates the importance of changing promptly from summer to winter oil at the right time, as otherwise a feed that is too lean will result in cold weather. Even then the oil may become very heavy in cold climates. In such cases a shorter lift should be used, ranging from about ½ in. to about 1½ in. It may even be advisable to use shorter oiling periods during the winter months to maintain these levels. These practices must be worked out for each case.

The quantity of waste used was found to be just as important as the quality, for the oil feed was very nearly proportional to the amount of waste in the wick. The amount of oil fed to the bearing also was found substantially proportional to the amount of waste in contact with the journal, showing that anything short of a full window is cutting down on the necessary oil supply, a point often overlooked.

These capillarity tests showed that another fundamental characteristic of waste-packed bearings is the time required to lift oil a given distance. This varies slightly with different materials. To obtain the maximum possible lift of 5 in. previously given for wool waste required sixty-six hours for the particular oil used. This explains why the oil feed is so low at the long lifts, and why it is important to prevent the oil level from running too low.

Method of Packing the Bearing Is Important

The importance of properly packing the bearing is not generally appreciated, and bearings often are put in service with imperfect packing. A number of points should be watched in packing a bearing correctly. A good grade of long strand wool waste should be used, and it should not be pushed into the housing in balls,



The Test Tubes Contain Amounts of Medium Grade Oil that Various Materials Will Lift Under the Same Conditions. At Right—The Actual Heights to Which a Medium Car Oil Rose After 66 Hours Immersion of the Lower End of the Wick

1 and 5, Wool strands. 2 and 6, Black felt. 3 and 7, Cotton wick yarn. 4 and 8, Lamp wick.

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but a continuous wick should be formed from the oil chamber to the journal. The window in the bearing should be filled completely with waste, which should be packed down firmly, and a separate wad of waste should be placed on top of the main body of the packing to keep out dirt. A number of these points are shown in the illustrations.

The first step in packing the bearing is to prepare a wick from a bunch of oiled waste, as illustrated. This wick should be long enough to reach from the bottom of the oil chamber up to and across the bearing window. After this has been placed in the housing the waste chamber should be filled up by tamping waste in behind the wick, using care to force the wick firmly against the window. In some housings, especially on the larger motors, and on the pinion ends of most motors, the window extends a short distance inside the

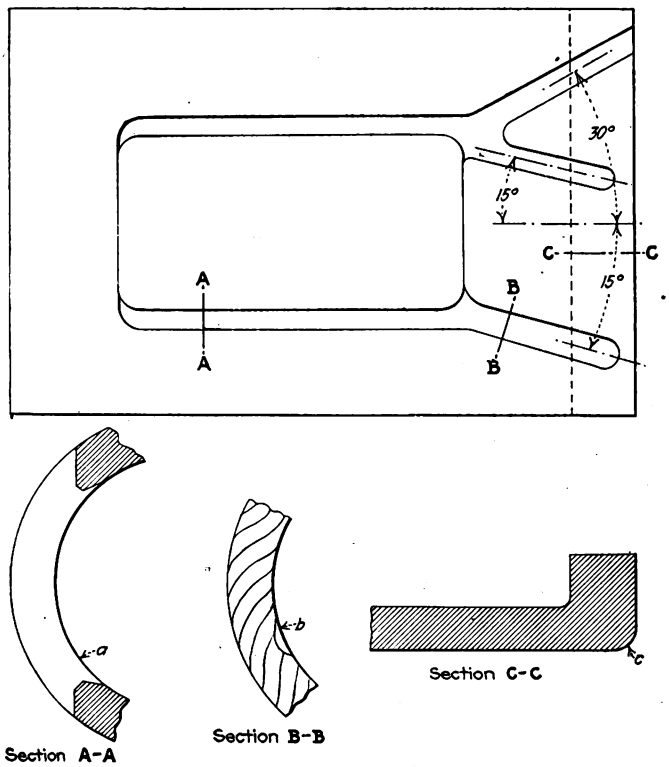

Fig. 4—This Design of the Grooves Has the Advantage that They Can Be Easily Cut to Drain the Chamfer

plane of the housing wall. In packing such housings the waste should be tamped inward so as to fill the window completely.

The function of the wick is to provide a direct path from the oil chamber to the window, and also to prevent areas of imperfect packing in the window such as are often obtained where balls of waste join.

The bearing inspector should be furnished with the limiting oil levels for each of his motors, and then oil should be supplied at such intervals as will maintain these limits. It is common belief that it is perfectly safe to run the motor until the oil level nears the bottom of the oil well. This is not the case, as reference to the curve of oil feed will show. True, the bearing may run without overheating, but unnecessary wear certainly will result. The difference between the minimum level specified and the bottom of the well is provided as a factor of safety—something to fall back on in case a motor is overlooked at the regular oiling period.

The oiler should gage the oil and then pour in enough to bring the level to the upper limit. A little experience will tell him how much to put in to do this, and usually one gaging is sufficient. The oil should be poured in through the filling hole, as when pouring oil on top of the waste any dirt present will be washed right into the bearing. Should the oil level in the housing become very low, however, the standard practice should be departed from and some oil poured into the waste chamber. This is best done by removing a part of the waste so as to get the oil as near the window as possible. If the regular procedure were followed a hot bearing might develop before the waste had time to raise the new supply of oil to the window.

When a motor has been dismantled for bearing replacements or overhaul, the bearing should be repacked with waste thoroughly saturated with oil and the journal smeared with oil before it is assembled again. This simple precaution will often prevent hot bearings, as the capillary action of the waste is often too slow to get sufficient oil to an initially dry journal to keep it from getting hot, especially if the motors go into hard service immediately.

Careful Design of Oil Grooves Is Essential

There is no such thing as a flow of oil in waste-packed bearings, as that term is understood for oil ring bearings. Only a very small amount of oil is wiped into the journal by the waste. When the journal first begins to turn, oil is carried only to that portion of the bearings which is spanned by the window, unless the journal has been previously smeared with oil. The oil then works very slowly out from the window. Starting with a dry bearing of a 40-hp. motor, it may take as long as fifteen minutes for the oil to travel from the window to the ends of the bearing.

A great problem is to keep the shell tight in the housing, and a sufficient length of the shell must be left to give the desired press fit. Therefore, oil grooves are used to aid in carrying oil from the window toward the ends of the bearing. Since the oil flow is rather meager it is important to obtain the correct location of the grooves to get the maximum aid in distributing the oil. If the grooves are not properly made and located they will prove a detriment rather than a help.

A good system of grooves is shown in Fig. 2. Notice that the top and bottom edges of the window are chamfered, as in Fig. 4, forming a trough in which the oil accumulates and feeds the oil grooves. The grooves should be cut from the chamfer so as to drain it completely. Otherwise imperfect lubrication will result. The grooves shown in Fig. 3 will not function properly because they do not lead from the chamfer. Tests have been made which show that grooves which are correctly cut as shown in Figs. 2 and 4 will deliver about four times as much oil to the bearing as can be delivered by the imperfectly cut grooves shown in Fig. 3. In cutting the grooves care should be taken to round off the corners as shown at *b*, Fig. 4. If sharp corners are left they will scrape the oil from the journal. As a rule, the window is close enough to the outer end of the bearing to render grooves unnecessary at that end.

A large radius at the collar end of the bearing is very essential to the lubrication of this end of the bearing because most hot bearings start at this end. If the corner is sharp there is no place for the oil to go when the wiper is pressing against the bearing flange; in fact, the oil must flow against a slight pressure. With a large radius, a place is provided for the oil to

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drain into without resistance and a more positive feed to the bearing flange is provided.

Bearings should be started in service with the minimum clearance that will permit the oil to flow freely between the journal and the bearing. Very little work has been done toward the determination of the thickness of oil films for waste-packed bearings, but experience has shown that satisfactory clearances between the journal and bearing, measured after the bearing is pressed into the housing, are 0.006 in. for journal diameters up to 3 in., 0.007 in. between 3 and 4 in., 0.008 in. between 4 and 5 in. and 0.009 in. clearance for journals between 5 and 6 in.

The importance of close bearing clearances, especially in maintaining the gear centers, cannot be overestimated. The main items of motor maintenance are due to mechanical failures or to electrical troubles induced by them. An analysis will show that vibration is the underlying cause of most of these failures, and that a main cause of this vibration is improperly meshed gears, due to worn bearings. This vibration increases at an accelerated rate as the bearings wear. If the bearing wear is reduced and close clearances maintained the upkeep of the bearings will be reduced, and the general motor maintenance will be lessened.

The maximum operating clearances depend upon the size of the motor. Take, for example, a 40-hp. motor with 3½ diametrical pitch gears. With a ⅛-in. wear of the axle bearing and a $\frac{1}{16}$-in. wear of the armature bearing there will be a spread of the gear centers approximately $\frac{3}{32}$ in., or about one-fifth of the gear mesh. Such clearances are quite common, and often they are greater, with correspondingly more severe vibration. Greater over-all economy can be obtained if the bearings on a 40-hp. motor, for example, are removed at clearances of $\frac{1}{16}$ in. and $\frac{1}{32}$ in. for the axle and armature bearings respectively. These clearances may be safely doubled for motors using 2½ and 2 pitch gears.

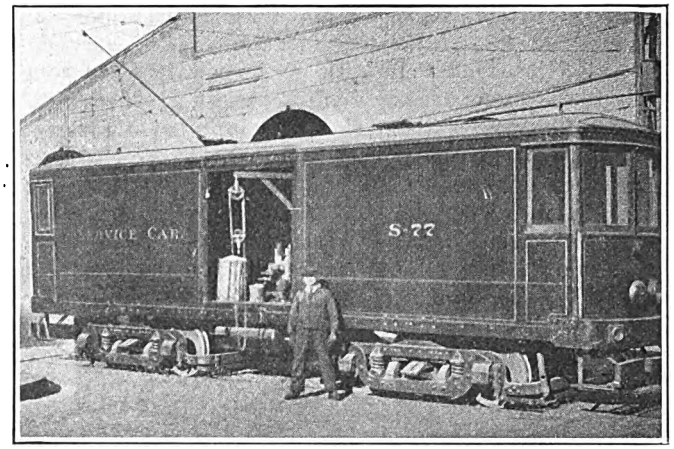
A large amount of bearing trouble could be eliminated and lower cost of bearing maintenance obtained if the job of packing and oiling the bearings were placed in the hands of skilled men, who could be held responsible for the condition of the bearings.

Well-Equipped Wrecker Proves Its Worth

AN EFFICIENT type of wrecking car is in use on the Union Street Railway, New Bedford, Mass. This car was specially built for the purpose and is equipped with the heaviest trucks and most powerful motors that the railway had available. Complete wrecking equipment, including a convenient work bench, is inside the car. A red band is painted on each tool to discourage removal from the emergency car for use elsewhere in the shops.

The car is equipped with a special derrick on the side, as shown in the accompanying illustration. This is used principally for swinging out pony trucks and placing them on the adjacent track. On the bumpers are several cast-iron sockets which serve as receptacles for the ends of push poles.

The crew comprises four men, including the master mechanic. A special bell call, No. 13 on the auto-call system in use in the shop, is used for emergency. Upon hearing this signal these men instantly leave all other work and proceed to get out the wreck car. There is an overall locker in the car so that men who respond to an unexpected call can don their overalls on the way to the job. Although the need is infrequent, the railway considers it an economy to maintain a thoroughly equipped wreck car.



Pony Trucks for Use in Case of Accidents Are Swung Off the Wreck Car by Means of a Derrick

Maintaining Automatic Sprinklers

Record of 95.7 per Cent of Fires Controlled in Sprinklered Buildings Can Be Increased to 99 per Cent with Proper Inspection and Maintenance

THE wide use of automatic sprinklers in all types of buildings has led the insurance committee of the Chamber of Commerce of the United States to include a leading article on the subject in its publication, *Fire Prevention Bulletin*. The following abstract gives information of value to electric railway men in the maintenance of sprinkler systems:

After a fire has been extinguished by sprinklers the control valve of the operating sprinkler system is closed and the water drained from the system. The sprinklers which functioned are then replaced and the valve reopened. A man should be kept at the closed valve until restoration of the protection, holding himself ready to turn on the water should fire again start.

It is advisable to force all air out of the piping when refilling it with water. This can be done by opening a small test valve which is usually found at the top of the sprinkler system. The valve should be closed when all of the air is exhausted and water begins to flow through it.

When continuous heating of buildings at all times, including idle periods, is not feasible, a dry-pipe automatic sprinkler system is often installed. In this type air replaces water in the pipes. It is under sufficient pressure to keep closed a device known as a dry-pipe valve. In the event of fire the air escapes through sprinklers which are opened by the action of heat upon their soldered links. When the air pressure is decreased sufficiently the dry-pipe valve opens and allows water to flow through the pipes.

Following a fire which has been controlled by a dry-pipe sprinkler system, the water valve is shut, the entire system drained and the fused sprinklers replaced. It is then necessary to reset the dry-pipe valve. This work should be done by a mechanic who is acquainted with the construction and operation of the valve. The system is next refilled with air to the original pressure

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and the control valve opened so that the sprinklers may be ready to function at any time.

The National Fire Protection Association has compiled a record of fires in buildings protected by automatic sprinkler systems. The list comprehends a period of twenty-six years and a total of 28,814 fires in sprinkled properties, as tabulated below:

RECORD OF AUTOMATIC SPRINKLERS

	Number	Per Cent
Extinguished fires	19,007	66.0
Checked fires	8,583	29.7
Satisfactory control	27,590	95.7
Unsatisfactory control	1,224	4.3
	28,814	100.0

A large portion of unsatisfactory controls is due to improper maintenance. The reasons for and extent of this unsatisfacory experience are summarized by the National Fire Protection Association as follows:

CAUSES OF UNSATISFACTORY CONTROL

	Per Cent
*1. Water shut off from sprinkler systems	29.3
*2. Generally defective equipment and unsprinkled portions	20.0
*3. Defective water supply	9.3
*4. Freezing of water in sprinkler systems	3.3
5. Slow operation of dry-pipe valves or defective valves	2.7
6. Slow or defective operation of high temperature automatic sprinklers	1.8
*7. Faulty building construction, sealed spaces, unenclosed floor openings, etc	5.1
*8. Obstruction to distribution of water from automatic sprinklers	5.7
9. Hazards of occupancy too severe for ordinary sprinkler system	5.7
10. Explosions crippling sprinkler systems	4.5
11. Exposure fires or conflagrations	5.8
*12. Miscellaneous	6.8

The items preceded by an asterisk (*) indicate the faults which may be corrected by property owners. Based upon the experience of this twenty-six-year period, these conditions are responsible for fully 75 per cent of unsatisfactory fire control by automatic sprinklers and, if remedied, the efficiency of performance of sprinkler systems should rise to 99 per cent.

Water shut off from sprinkler systems is by far the chief reason for unsatisfactory results. It is due mainly to indifferent maintenance, as indicated in a classification of 360 fires which were not controlled because water was shut off from the sprinkler systems. The causes for shutting off the sprinklers in 134 of these cases were unknown or were due to neglect or carelessness. In seventy-three cases the sprinklers were shut off to prevent freezing.

Whenever a sprinkler control valve is closed, shutting off water from all or part of a sprinkler system, some one should be stationed at the valve ready to open it in case of fire. In the event repairs are being made, it is not always necessary to keep water from the entire system while the work is being done. Temporary connections can sometimes be made which will supply water to at least a portion of the section which is undergoing repairs.

Some sprinkler valves are closed in the winter months to prevent freezing. In general dry-pipe valves should be used in such places. If any valves are closed for the winter months, they should be tagged and a record kept by the man supervising the system in order that they will not be forgotten in the spring.

Water control valves are often sealed. The seals should not be broken and valves closed without permission from some one in authority upon whom will rest the responsibility of seeing to it that the valves are opened again as soon as possible. On many properties inspections of all valves are made daily to insure that they remain open and in proper operating condition.

There are mechanical methods available for facilitating a constant check of sprinkler control valves. Some of them give an alarm whenever a valve is closed. One of these methods is the so-called central-station supervisory service which keeps the entire sprinkler system under constant supervision. Another system provides watchmen's stations at each sprinkler valve. These stations cannot be recorded if the valve is closed.

Such conditions as badly corroded or painted sprinkler heads should not be permitted. Inspection departments are usually glad to test suspicious sprinklers.

Among the sources of water supply are connections to public water systems, gravity tanks, pressure tanks and private pumps. The condition of the source or sources of water should be under constant observation in order that there may be no impairment of the supply. In general, tanks should be filled weekly. Pumps should be turned over periodically to determine their operating condition.

Buildings equipped with sprinkler systems containing water at all times should be heated throughout in freezing weather. Water in the ends of pipes near windows, especially if the latter are left open, is likely to freeze. This will burst fittings or the automatic sprinklers themselves, thereby crippling the system. In cases where dry-pipe sprinkler systems are used, care should be taken that they are absolutely free of water. Because of improper draining or condensation, small quantities of water sometimes remain in the pipes. A small drain can be opened which will permit the air pressure to expel the water. It is suggested that this be done by employees acquainted with dry pipe systems.

Alterations such as the installation of partitions, wide shelving, storage racks and platforms, benches, etc., may form serious obstructions to the proper distribution of water from sprinklers. This condition may be remedied by introducing frequent openings in the obstructing surfaces or by installing sprinklers below them. Alterations should be so made that water from the sprinklers can cover the entire area without hindrance.

Improper piling of stock is often a cause of insufficient water distribution. The full effective action of sprinklers requires about 24 in. of clear space below the sprinkler heads so they may form an unbroken spray of water from sprinkler to sprinkler and to the side walls and partitions.

This cause of unsatisfactory control is increasing in extent. An automatic sprinkler system is intended primarily to control fire at its place of origin, but this is not assured when individual sprinkler heads cannot completely distribute water over the entire area allotted to them.

SELF-INSPECTION SYSTEMS

Owners of property equipped with automatic sprinklers will find it advisable to establish some form of self-inspection for all fire protection equipment, including automatic sprinkler systems and apparatus used for manual control of fire such as hose equipment, hydrants, extinguishers, etc. Whatever may be necessary properly to establish such a system can be ascertained from such sources as the engineering departments of fire underwriters, inspection departments, independent inspection bureaus and insurance agents. Some automatic sprinkler companies have service departments which assist in maintaining sprinkler equipments.

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Correct Welding Procedure Retains Qualities of Manganese Steel

By Use of Arc Welding in the Field, Life of Manganese Steel Special Work Can Be Increased One to Five Years — Type of Welding Rod, Technique Employed and Speed of Cooling All Affect Physical Characteristics of Welded Material

By Howard H. George
Engineer Maintenance of Way Public Service Railway, Newark, N. J.

IT IS generally acknowledged that a good weld of any steel depends largely upon the skill and experience of the operator. This is particularly true of manganese steel, but the common difficulties are greater than with ordinary steel and there is the added trouble due to the effect of the heat in producing brittleness in the manganese casting. It has been found, however, that careful selection of the welding rod, manipulation of the arc and regulation of the speed of cooling of the weld will make repairs that have sufficient life to justify the use of the process in the maintenance of manganese steel special work.

The use of the electric arc for track welding goes back twelve or thirteen years. During this time its growth has been phenomenal. At first used only for welding splice plates or bars to the rails, its application soon spread to building up the heads of rails where cupped at the joints and then to the repair of manganese steel inserts in special trackwork, and also for welding breaks in solid manganese steel pieces. As usual with a new process, but little attention was given to the theory, and what was actually taking place under the arc was scarcely understood. The natural result was that many failures occurred in the early work, and many disappointing results were obtained.

As the process developed, more and more attention was given to analysis of questions such as the determination of what was actually occurring under the arc, the effect of the heat generated on the physical characteristics of the steel being repaired, the chemical and physical requirements of the welding rod and the comparative results obtained by different welding methods. The accurate determination of these and many other questions was found essential in order to improve the technique of arc welding. A comprehensive investigation of the arc welding process for rail joints is now under way by the welded rail joint committee organized under the direction of the American Bureau of Welding, and it is expected that this work will develop valuable data. The manufacturers of arc welding apparatus and also those manufacturing welding rods are now conducting independent investigations to determine what has been wrong with past practice and what should be done to correct these errors.

The industry must be prepared to make some radical changes in the near future in the method of application of the arc weld process now in general use, particularly with respect to joint work. This should not discourage the use of the process, which is merely going through the same form of development that has been experienced with practically everything connected with the operation and maintenance of the street railway. The changes resulting from the combined efforts of the various investigators naturally will be for better and not for worse.

Attention to Details of Process Important

Formerly, it was thought that all that was required in the welding process was to heat up the rail head or steel surface to be restored and fuse in with it some additional metal. It is now becoming generally recognized that successful welding requires a definite technique, including a certain polarity and a fairly definite manipulation of the arc. The temperature is also found to be an important factor. For a certain composition of rail steel or manganese steel casting, it is now understood that a reasonably definite chemical analysis of welding rod and, in the case of joints, of splice bars is essential. Also, in practice it is found that an electrode with positive polarity gives better welding characteristics and that the loss of carbon and manganese in the deposited metal is less. When welding with manganese steel either on manganese or on high carbon steel, it is advisable to form a rather wide deposit by a slight oscillation of the electrode so as to give a deposit approximately double the width of that obtained by drawing the electrode along a straight line. By this manipulation of the arc, the deposited metal is kept in a molten state for a somewhat longer period, allowing time for the escape of any gas which may be included in the deposit, and thus preventing the formation of blow holes. The manipulation produces a puddling effect and makes more certain the complete alloying in the deposited metal of the ingredients in the rod and its coating.

Welding Can Be Used for More than Temporary Repairs

Welding in the street with the manganese process has, up to the present stage of its development, generally been considered as a very temporary or emergency repair proposition. With the improved alloy steel rods now being developed, however, in many cases the results being obtained are considerably better than what might generally be considered as temporary repairs. This class of work is of double importance from an economical standpoint because of the great cost of special trackwork as compared with straight rail, and because of the delay sometimes experienced in securing delivery of replacement pieces. It is of course not practical to carry in stock sufficient renewal pieces to cover every emergency that may arise, by reason of the special

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character of the various special trackwork designs. Ordinarily, when a switch tongue breaks, it is possible to renew the tongue from stock because of the limited number of types of tongues which are usually found on any given property and which need to be carried in stock. But with a combination frog or solid manganese mate, for instance, this becomes an entirely different matter.

It obviously is impossible to determine definitely what added life can be secured from a special piece such as a frog or mate, where the manganese insert has been built up by arc welding. This depends on such factors as the skill of the workman, method and materials employed, the extent of deterioration of the piece at the time repairs are attempted, general track conditions, and care taken in subsequent grinding of the surface after welding. Many otherwise satisfactory welds on manganese inserts have failed prematurely either because of neglect to grind promptly or failure to see that this part of the work was properly done, thus imposing stresses in the welded metal considerably beyond its ability to withstand, and hastening its failure. While in some cases repairs with every appearance of a satisfactory weld have failed within a very short period, it is not believed that this is the general experience with welded repair work.

Considering the cost of replacing the special piece as compared with the cost of temporary repairs with the arc weld process, it is generally felt that if an additional year of life can be obtained the expense of making repairs is fully justified. This increase in life is not unusual by any means. As a matter of fact, even though the work was done during the experimental period when the present improved welding rods were not known, and when the operator was not as well informed as to the requirements for a successful weld as he is at present, this additional year of life has frequently been exceeded, and two years of additional life often has been obtained. This latter figure probably should be more correctly considered as representing the average increase to be expected. Numbers of cases have been reported where the increase in useful life due to welding has gone as high as five years, and with our increased knowledge of the process and improvements in welding apparatus and materials, it is even reasonable to believe that this will be a usual expectancy.

In some cases arc welding repairs would be entirely justified even though they lasted but a few weeks, for this would give the engineers sufficient time to secure a new piece from the special trackwork manufacturer and would enable them to keep traffic moving during the interval without excessive damage to the remainder of the track or to the equipment.

Repairs Should Be Made Promptly

It is desirable that repairs be made when the failure of the manganese is in its early stages and before the balance of the structure has been affected by the excessive pounding of the car wheels over the broken insert or casting. It is quite probable, for example, that in the case of filling blow holes or sand holes which are occasionally encountered in casting, sometimes discovered before the piece has been put in service and sometimes developing shortly afterward, the work is more or less in the nature of patchwork but generally there is sufficient actual fusion of the two metals to justify calling the operation a weld.

The nature of the problem will be better understood when it is explained that when the manganese content is increased above 2 or 3 per cent the strength and durability normally decrease while the hardness increases. Manganese frogs and crossings contain between 11 and 13 per cent manganese. Opinion varies as to the chemical analysis of the deposited metal as compared with that of the welding rod. The manganese content of the welding rods now commonly used probably will vary from about 10 to 15 per cent.

Tests made by one company indicate that, using bare electrodes, the loss in manganese will vary from 1½ to 2½ per cent. These tests indicated that while a coating stabilizes the arc, with most of the coated rods available on the market the manganese loss was at least equal to that secured when using bare electrodes, due to absorption of the manganese by the fluxing material. The conclusion reached as the result of these tests was that since experience dictates that the manganese content of the wearing surface preferably should exceed 10 per cent, it is desirable to employ electrodes in which the manganese does not fall below 12 per cent. It has been found possible to secure in the deposited metal manganese content equal to or greater than that in the electrode by coating the rod with powdered manganese. The use of such a coating obviously permits the utilization of manganese steels having a wider range in manganese content.

Effect of Physical Treatment on Strength of Metal

It is considered essential that the heat of the arc be kept at the minimum required to bring the metal to the point of fusion and that the overheating of the steel be minimized as far as possible. The following abstract from a report made several years ago by the metallurgist of one of the large manufacturers of manganese steel trackwork castings will emphasize the necessity for this:

> In its cast condition, manganese steel is extremely brittle, so much so that, when broken, a test bar of untreated manganese steel will give almost no angle of bend. In order to confer upon the metal the toughness which is so important a property in all its applications, the casting after it is taken from the mold is heated in an annealing-furnace to a temperature of approximately 1,050 deg. C. or 1,920 deg. F. After being heated to this temperature, the steel must be quenched in cold water, and it is important that it be put in the water as soon as possible without allowing it to cool off slowly. If it cools, even in the air, below a certain definite temperature, before being put in the water, the casting possesses very little toughness and is quite unfit for service.
>
> If the toughened steel is again heated to a temperature over 300 deg. C., it becomes extremely brittle, quite as much so as in the cast condition, and it will be brittle after heating to these low temperatures whether it is cooled fast or whether it is cooled slowly. If heated after toughening to temperatures between 300 deg. C. and 700 deg. C., the same is true, the steel being brittle even if cooled rapidly. If heated after toughening to temperatures between 700 deg. C. and 1,050 deg. C. the steel will be brittle if cooled slowly, and will be more or less tough if cooled rapidly, the toughness increasing as the temperature is raised from 700 deg. C. to 1,050 deg. C.

It is obvious, of course, that it is not practical to remove the piece and heat-treat it to give it the desired characteristic toughness. It is realized that the heat treatment of shop practice cannot be duplicated in the field, and that the next best thing is therefore to be desired. While in many cases the rapid cooling received by the arc-deposited metal in normal deposition is sufficient to give certain wearing qualities, it is nevertheless considered desirable, in the opinion of some engineers,

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whenever practicable to quench each layer deposited at frequent and relatively short intervals. The normal water toughening treatment amounts to raising the temperature of the metal until the desired molecular structure is produced, and then fixing it at that point by increasing the normal cooling rate. Likewise, in the case of welding manganese the metal heated to a high temperature by the welding operation is suddenly cooled from a temperature as nearly as possible equal to that for the desired structure. Naturally this localized control of the heat is not the same as where the entire casting is brought up to the required temperature and suddenly quenched in cold water. It undoubtedly results in zones of very brittle manganese steel which, sooner or later, are responsible for many of the failures which occur. It does, however, constitute the best known practice for field operations at the present time.

It is essential in trackwork where welding is to be continued to dry the surface where the arc is to be established, as otherwise difficulty will be experienced in establishing the arc. It is also considered essential that the surface to be built up should be thoroughly cleaned. The means used to accomplish this will vary with the condition of the piece, a wire brush being sufficient in some cases, whereas a portable grinder may be required in others. All grease or other foreign matter must be removed, however, no matter what means may be employed.

Portable Pneumatic Equipment Reduces Track Reconstruction Cost

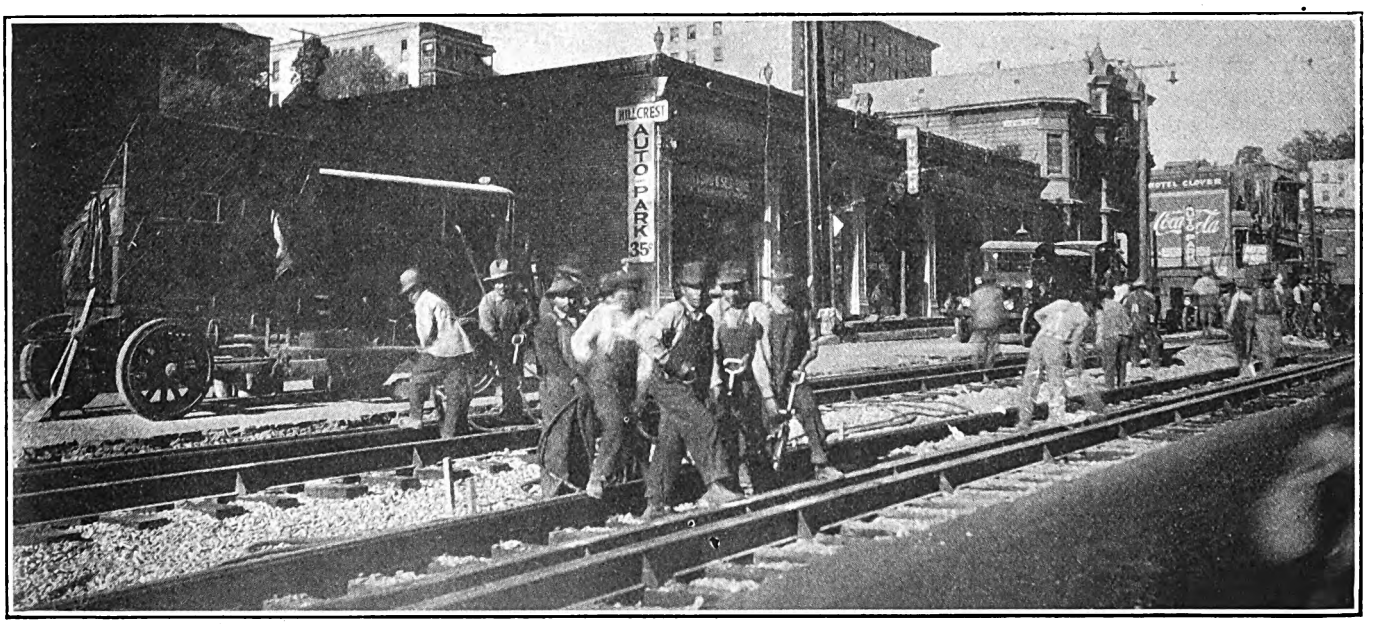
The Expense of Ballast Tamping and Pavement Cutting on the Pacific Electric Railway Has Been Cut in Half—Greater Rapidity Is Another Advantage—Better Work Is Done if the Men Are Allowed Intervals of Rest—The Apparatus Used in Los Angeles Is Described

By Clifford A. Elliott
Cost Engineer Pacific Electric Railway

FOR maintenance work on its tracks in paved streets the Pacific Electric Railway has used pneumatic tie tamping and pavement cutting tools for the last six years. The experience of this company indicates that the use of mechanical tools has reduced the expense of tamping and cutting by nearly half. Better results have been obtained and the life of the track has been prolonged. When working in congested streets the time saved has been an important item.

An illustration of rapid machine cutting work is furnished by a job done in January, 1924. This consisted of reconstruction of one of the company's double-track, combination-gage lines in the downtown congested district of Los Angeles, where a thirty-second car headway is operated. A total of 18,585 sq.ft. of 6-in. asphalt concrete pavement was excavated in twenty-one compressor days. It is estimated that under the handicaps connected with this job it would have required fifty working days to remove the pavement by old hand methods. Considering the traffic disturbances due to street cars and vehicles, this performance is considered very satisfactory.

When pavement was recently removed in order to lay a second track on Sixth and Front Streets (San Pedro), Los Angeles Harbor, 26,500 sq.ft. of paving was taken up in twenty-four working days. This involved 23,000 sq.ft. of 6-in. concrete base and 3-in. asphalt wearing surface, laid in 1916, and 3,500 sq.ft. of 9-in.



Three Air Compressors at Work Simultaneously in the Downtown District on Combination Gage Tracks, Where the Job Had to Be Done Without Interrupting a Thirty-second Headway

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Pneumatic Paving Cutters Opening Up Pavement of 6-In. Concrete Overlaid with 3-In. Asphalt

Cutting Up a 9-In. Solid Concrete Pavement with the Pneumatic Cutters

solid concrete pavement laid in 1920. It required sixteen compressor days on the concrete base, asphalt-wearing surface type and eight days on the solid concrete type. In the case of the less solid type pavement 1,000 sq.ft. of pavement was removed in six hours. On the solid concrete job 600 sq.ft. was cut out in nine hours.

It is estimated that in general four pneumatic cutting tools can accomplish in approximately forty minutes what it formerly required four men approximately five hours to do. This naturally has an important bearing on the ultimate cost of track reconstruction. Average figures show that pavement can be removed on the Pacific Electric lines approximately 50 per cent cheaper by machine than by the old hand methods.

Based on wages paid the Mexican labor used in operating these pneumatic pavement cutting tools, the company finds that in handling emergency or small repair jobs, and using its light duty machine, the cost averages 10 to 12 cents per square foot of pavement removed and made ready for wasting. Similar work handled by old hand methods costs from 20 to 25 cents per square foot. In handling the large reconstruction track jobs, when the heavy duty machines are employed, the average cost of removing pavement is about 8½ cents per square foot. For tamping ballast in track during reconstruction the labor cost per tie is 40 per cent less than by old hand tamping methods.

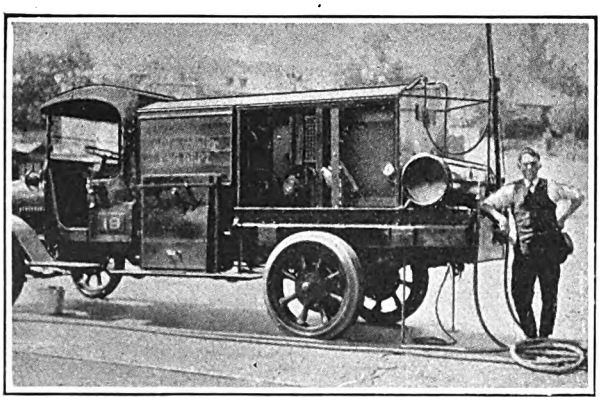
A gas-driven Ingersoll-Rand type 12x10 "ER-1" air compressor mounted on a trailer was used for the Sixth Street job. Cutting of the pavement was handled by two shifts, one nine-hour day shift and one nine-hour night shift. The average cost per square foot for the less durable type of pavement was 5 cents, while in the solid concrete type the cost averaged 16 cents per square foot. This was an unusual job because cutting is necessary only when new lines are constructed in city streets laid with solid concrete pavement. This type of pavement is not ordinarily used in and about the tracks by the Pacific Electric Railway.

The operation of the air compressor for a nine-hour working day or night shift on the above-mentioned job was arranged as follows:

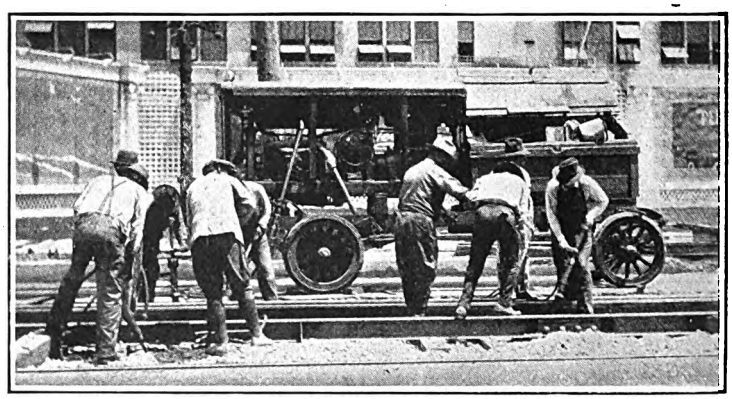
Four Mexican laborers operating cutting tools.
Two Mexican laborers as relief operators.
Two Mexican laborers as break-up or clean-up workers.
One mechanic operating air compressor.
One track foreman.
One flagman.

In organizing a paving cutting gang as outlined it has been found from experience that the laborers who operate the air guns are more efficient if they have, from time to time, a ten-minute or twenty-minute relief interval. For this reason the makeup of the paving cutting crew includes one laborer to act as relief for two air-tool operators. The relief man also handles the air hose, keeping it properly lined up or clear of traffic, for a given period of time before he takes his turn on the guns. This results in a revolving task for three laborers assigned to two air guns.

For light work the company uses an Ingersoll-Rand Imperial type four-tool, electrically driven air compressor. A direct-current 25-hp. motor operating at 500 volts furnishes the power. The air capacity is 120 cu.ft. per minute.



Supporting Rods at the Rear Steady the Truck When the Compressor Is in Operation



This Gas-Operated Compressor Used for Heavy Track Reconstruction Supplies Air for Eight Pneumatic Tools

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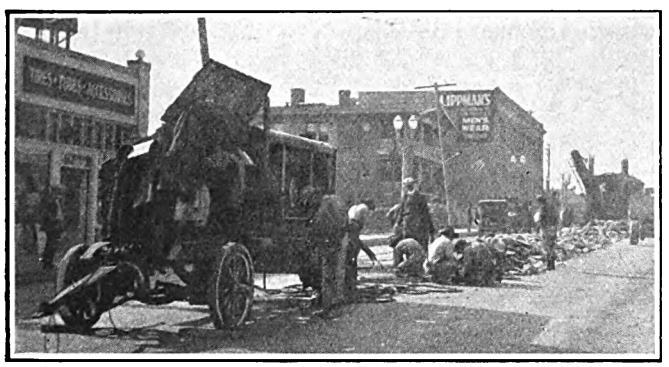
This apparatus has been mounted on a 2½-ton motor truck. The layout on the truck, so far as the motor base and housing is concerned, is in accord with the Ingersoll-Rand standard mounting, but on the forward section of the truck the railway has provided tool cabinets for storing the pneumatic tools and the accessories of the machine.

Some features to improve the efficiency of the apparatus were added at the company's shop. Since the equipment is operated both day and night the truck has been wired and provided with electric lights. The current for the operation of the machine is taken from the trolley wire and a collapsible wooden pole has been designed and mounted on the rear of the truck. The pole is jointed and adjustable to any desired angle, corresponding to the distance of the machine from the track. When the pole is not in use it may be dropped to a position on the roof of the compressor. An adjustable clamp is used to connect the negative return wire to the rail. This clamp firmly secures the cable so that the vibration of passing cars will not interrupt the operation of the machine.

To reduce the vibration of the truck when the compressor is in service the rear of the body is supported



Steam Shovel Loading Broken Pavement When a Second Track Was Being Laid on Sixth Street

from the pavement. Two 1-in. iron rods extend from the base of the chassis to steel plates 4 in. x 4 in. and 1 in. thick resting on the pavement. Round holes are drilled partly through the plates. The rods rest, therefore, in a sort of ball joint, which gives solid support to the frame. As it is always essential to have the compressor level these rods take the place of jacks. This is particularly useful when the machine is working on a narrow street where the pavement slopes sharply.

For large construction and reconstruction jobs in paved streets the company has also another specially constructed air compressor. It is electrically driven and takes current from the trolley. This machine has sufficient capacity for operating twelve pneumatic tools. That is, twelve tie tampers may be operated simultaneously, but only six pneumatic cutting tools may be operated at one time. If the cutting of pavement and tamping of ballast are being performed at the same time the machine will operate two cutters and four tampers. The apparatus is mounted on a trailer and hauled from place to place by motor truck.

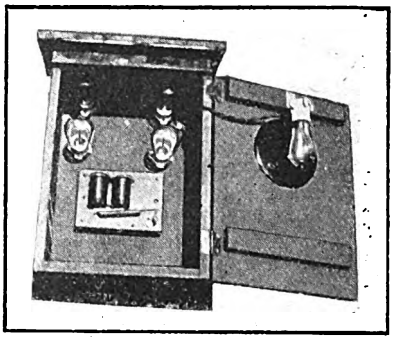
Another machine used is a gasoline-engine-driven compressor of 60 hp., mentioned above. This requires 25 gal. of gasoline and 1 gal. of lubricant per working day of nine hours. The outfit is mounted on a trailer and its capacity is eight pneumatic air tools working continuously. No tests have yet been made to determine how many tools of different kinds can be operated simultaneously by this compressor.

In calculating the cost of the work handled by these machines, depreciation, repairs, insurance and rental of the equipment are taken into consideration. It is estimated that the heavy duty, electrically operated compressor uses 14.92 kw.-hr. per hour. The cost of power per hour is also figured in the cost of the work where these types of machines are used.

Signal for Special Locations

BY H. J. CHARTERS
Portland Railway, Light & Power Company, Portland, Ore.

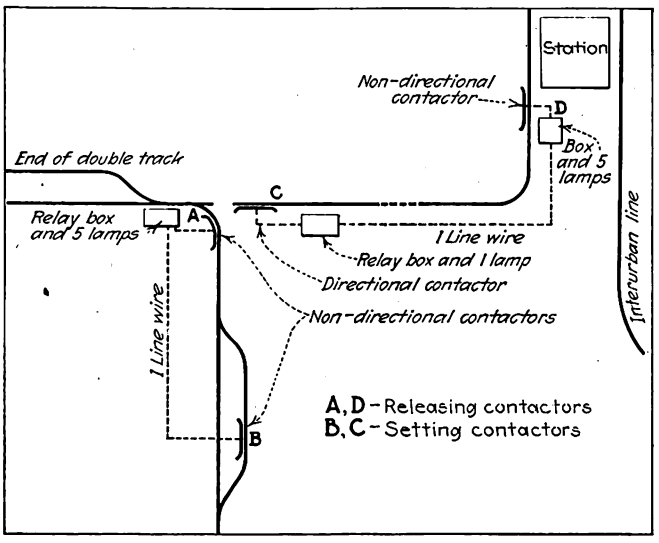
THIS company has developed a simple signal which is used for a number of purposes, such as the following: To indicate to the crew of an interurban train that a connecting city car is approaching; as a one-way block; as a terminal signal for use on the single track which extends beyond the end of a double track or beyond the last passing track on city lines. The device consists of a pick-up relay in series with five 36-watt Mazda lamps, of which one is mounted directly behind a 6⅜-in. ruby lens. This gives an indication which is visible even when on a bright day the sun is shining directly against the front of the box.



Signal and Relay Box Open for Inspection

The general principle of the relay is given in the smaller diagram showing the circuits. When a car passes under a setting contactor, a momentary current is sent through the relay winding, bringing the holding circuit into operation by closing the contact between *B* and *C*. Current continues to flow until a car passing under a releasing contactor shunts out of circuit the relay winding, which has 50 ohms resistance, releasing the armature and opening the holding circuit. A spring between the armature and the magnet core assists the former in dropping promptly.

Applications of this signal are given in the larger diagram. In this diagram the normal limits of a one-



Track and Signal Layout Showing Two Special Applications of Portland Railway's Signal

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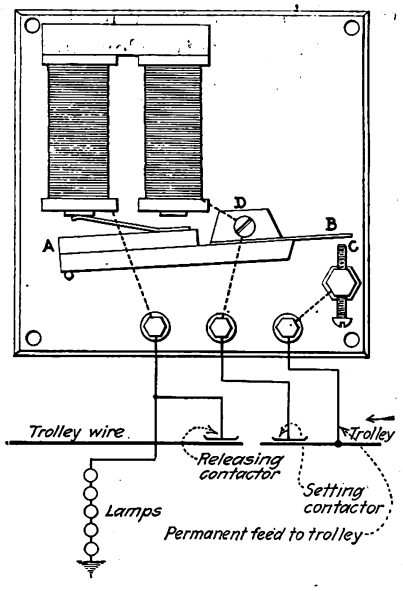
way block are indicated by the setting contactor *B* and the releasing contactor *A*. Contactor *B* is placed to provide an overlap, as indicated. A car setting the signal from *B* will travel the length of the siding before passing onto the single track. Thus, if two cars enter the block from opposite directions at the same time, the one entering from *A* will have time to come into sight of the other car around the curve before the latter car has left the siding. The car on the siding can then wait until the other one passes, avoiding possible delay by one car having to back into the clear. Another application of the signal, shown in the same diagram, is to notify interurban crews that a city car is within a distance that will justify waiting for possible passengers. A relay and signal box containing one lamp is located at *C*, this lamp being connected in series with five in the signal box at *D*, the distance between the two signals being about ½ mile. A directional contactor at *C* causes the relay to close, lighting both signals. When the car passes *D*, a releasing contactor contact is made, opening the circuit. In this case the last connecting city car at night carries signs stating that it is such, and interurban crews have instructions to call the dispatcher in case the connecting car has not appeared up to their leaving time. In connection with this signal, non-directional brush type contactors are used in most cases, but when necessary, United States Signal Company No. 5 switches are used to give directional selection. These simple lamp circuit signals cause little trouble. Their purpose is to prevent delays incidental to cars having to back into the clear. Under these conditions the burning out of lamps does not involve dangerous operation, the speeds of the cars not being high.



Circuits of Pick-Up Relay Used in Portland, Ore.

Pins Indicate Accident Locations

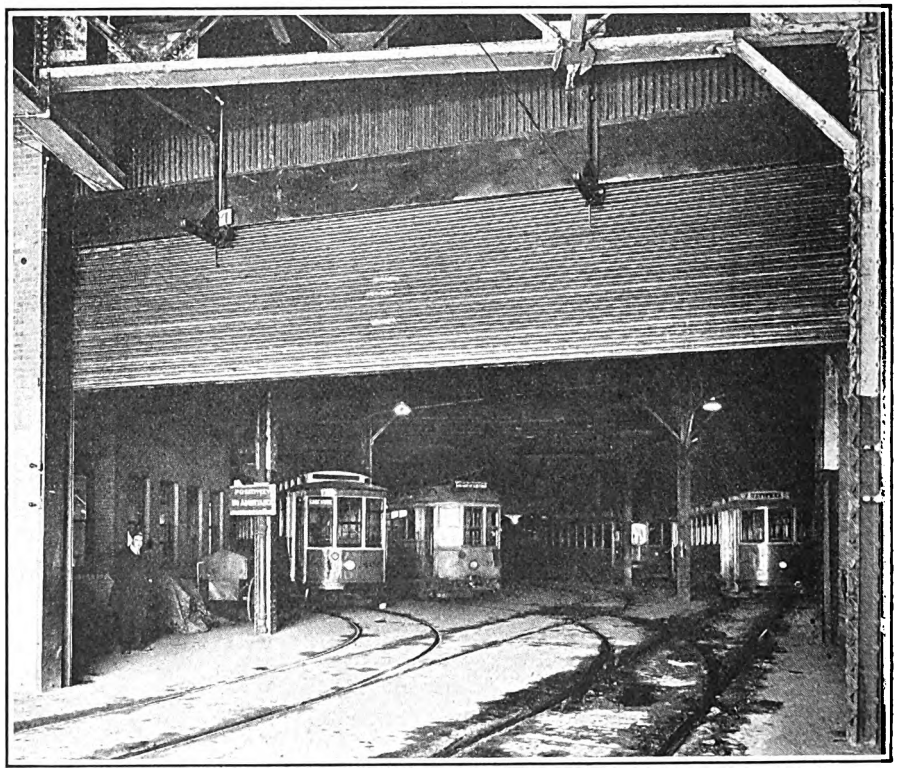
LOCATIONS of accidents on the Worcester Consolidated Street Railway are plotted for the general manager by means of colored pins stuck at the proper points on a large map showing the track layout of the entire system. Five different colored pins denote different kinds of accidents, such as automobile collisions, boarding and alighting accidents, car collisions, etc. When an accumulation of pins occurs at some point the attention of the management is drawn to the number of accidents occurring there and investigations are made with a view to remedying the situation.

Rolling Door Worked by Electricity

A ROLLING door recently installed at the entrance to the Main Street carhouse of the Worcester Consolidated Railway, Worcester, Mass., has proved very satisfactory. The track layout of this carhouse is such that all cars enter and leave through a comparatively narrow doorway, and it is therefore possible to close it off entirely by this rolling door. The door, which was made by the Kinnear Manufacturing Company, is electrically operated. It will open or shut in fifteen seconds. Push-buttons located in the dispatcher's office alongside the doorway control the operation. The control will either open the door, shut it or stop it instantly in any position. This is important to avoid accidents.

In order to prevent cars running into the closed door, bright red electric lights have been placed on both sides of it. These go on automatically when the door is closed and warn motormen to stop. When the door begins to descend, a hinged section of the overhead contact wire drops down to allow a space for the door. When the door is rolled up to open the passageway for the cars, this hinged section snaps back in place through the action of a trip on the door.

This building is used not only as an operating carhouse but also as a repair shop. It is said that many tons of coal have been saved in the carhouse since the installation of this door last fall. The shop men working around the cars have now discarded the sheepskin coats formerly worn and the quality of the work performed has improved.



Through the Installation of This Rolling Door at the Carhouse Entrance a Considerable Saving of Coal Has Been Effected

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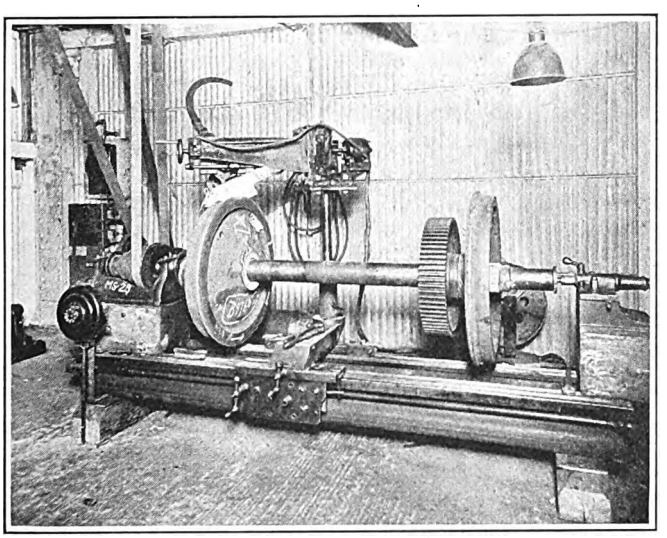
Comprehensive Shop Welding Program Makes Big Savings

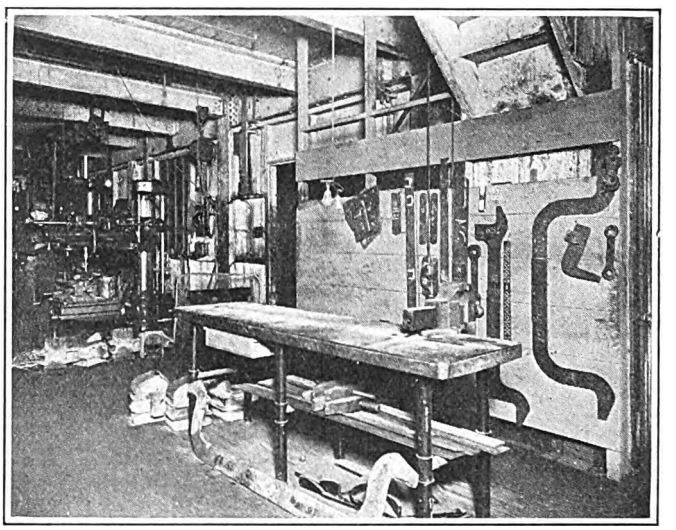
Reclamation of Trucks, Motor Cases and Worn Steel Wheels and Axles in Shops of Springfield Street Railway and Worcester Consolidated Railway Has Materially Reduced the Waste Coincident with the Scrap Pile

BY THE installation of complete modern electric welding equipment the Springfield Street Railway and the Worcester Consolidated Railway, which are under the same management, have reduced to a small amount the quantity of material being sent to the scrap pile and have effected large financial savings. The efficiency of this reclamation program is increased by the use of American high-speed drill presses and a Lucas horizontal boring machine. The welding facilities at the Worcester shops are more elaborate than those at Springfield and much of the work is therefore done at the former place.

Rehabilitation of old trucks is accomplished in an interesting manner. The truck is entirely knocked down, wheels and axles are removed and reclaimed according to a process that is described in another paragraph of this article, motors are removed, and the armatures and fields taken out and sent to the armature room. Worn motor cases are built up by welding. The procedure in the case of an individual broken part that has to be taken out of service is similar to that employed when the entire truck is overhauled.



Flanges Are Built Up on Worn Steel Wheels at Worcester by Means of an Automatic Welder Placed on the Carriage of an Old Lathe



. Templates Are Used in Marking Holes to Be Drilled in Welded Truck Parts and the Work Is Done on a High-Speed Drill

The method of reclaiming the equalizer bars of the truck is typical. These are first sent to the welding room, where all the bolt holes are completely filled in and worn parts built up by the electric welder. This process requires about two hours. They are then sent to the grinding table, where a man with a portable electric grinder smoothes them down. Fifteen minutes is required for that part of the job.

Next these pieces are taken to the marking table. Here there are steel templates for every important part of the truck frame. The templates are made with ½-in. holes in the exact position of the holes required in the truck member. Around each hole in the template is a 2-in. square of ¼-in. steel. The template is laid on the welded piece and a hand punch inserted in one of the holes. With a tap of a hammer the layout man then punches the precise center of the hole to be drilled in the piece. After the location of all holes to be drilled has been thus punched, the template is removed and the size of the hole is marked in chalk. The arrangement of templates hanging on a wall beside the layout table is shown in an accompanying illustration.

After being welded, ground down and punched the pieces are taken to the drill press. For drilling, an American high-speed drill is used. With this machine all the necessary holes in the equalizer bar of a truck frame can be drilled in ten minutes. One man operating this high-speed drill is able to do more work in less time than was formerly done by two men operating old-fashioned drill presses.

Having the various machines used in this process located in the proper relation to one another is an important factor in the efficiency of the operation. At the Worcester shops the welding room, the grinding and layout tables and the drill press are so placed that little time is lost transporting pieces from one to the other. The machines are all near together and the path of the piece under repair is continuous from one to the next.

At Worcester the practice is to build up the flanges on steel wheels as fast as they wear down, until the tread of the wheel has been worn to the predetermined limit marked by a shallow cut on the wheel surface.

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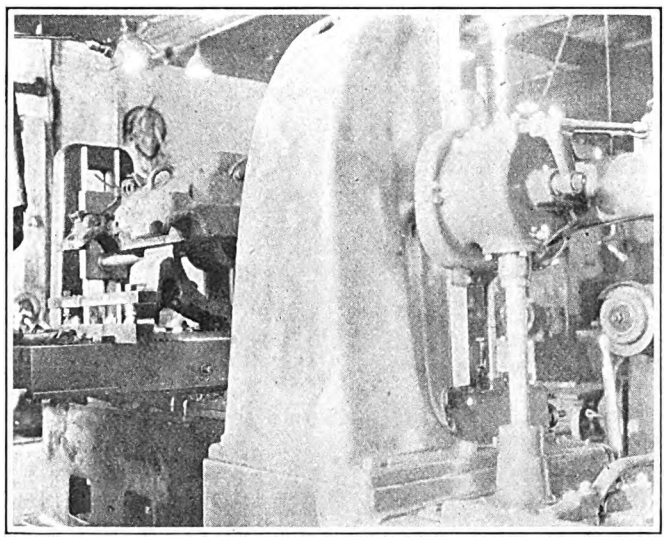
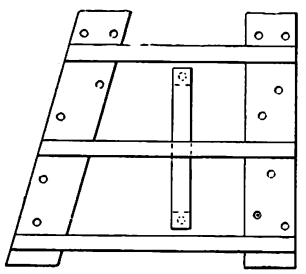


A Horizontal Boring Mill Used to Drill Holes in Welded Motor Cases

All worn steel wheels are repaired by means of an automatic welding machine. An accompanying illustration shows this machine at work. A pair of wheels mounted on the axle are set up in the bed of an old lathe. The axis of the lathe has been raised by the insertion of cast-iron blocks so that wheels of the largest size can be accommodated. The welding head is mounted on the lathe carriage, which has been equipped with ball bearings to permit easier movement. Height adjustment of the welding head to suit wheels of different sizes is easily made. By the adjustment of this head worn axles can also be built up in this machine.

The lathe is operated at a speed of one revolution in fourteen minutes by an electric motor running at 1,500 r.p.m. Gears from an old air compressor are used to accomplish this reduction in speed. It requires about eight hours to build up the flanges on a pair of steel wheels and two hours more to turn them down to the proper contour.



This Jig Is Bolted to the Pole Pieces of a Motor Case When the Case Is Being Redrilled

It is estimated by the company that this process adds 50,000 miles to the life of the wheel and has reduced by 30 per cent the expenditure for steel wheels. An annual saving of nearly $6,000 has been accomplished. Wheels are scrapped only after a personal inspection has been made by the master mechanic. It is now planned to reclaim many old wheels which were taken off and stored for scrapping prior to the installation of the automatic welding apparatus.

Welding is done at these shops in individual rooms specially built for the purpose. There are at present two automatic welding rooms and three for ordinary arc welding. One man, however, operates both of the automatic machines and has spare time besides. The doors of the welding rooms are heavily curtained and the insides are painted with G.E. No. 881 ultra-violet ray protective paint. An overhead trolley system with traveling chain hoists is used to transport heavy material to and from the welding rooms. It is felt that safety from eye injuries to other workmen and better quality of work by the welders result from having individual welding rooms.

Another important phase of the reclamation program being carried on by the railway is that of modernizing motor cases. In particular it was desired to convert the old type No. 101 motor cases to the more up-to-date 101-B2 type. The holes in the old cases were filled in by welding and rebored with 1¼-in. diameter instead of 1-in. as before. The old 1¼-in. hole for the armature housing was filled in and two new ones built up by bending a piece of ¼-in. iron to circular shape and filling with welding metal.

All bearing fits and housing fits were filled in and then rebored. Gear case supports were built up by welding. New fields and rewound armatures were installed where needed. This reconstruction included the elimination of the old mica brush-holder insulators and made possible the use of a more modern type of brush-holder.

Many motor cases have been reclaimed also by the Springfield Street Railway in its own shops. After the holes in the old cases had been filled with welding metal and all worn parts built up the contact surface of each half of the motor shell is carefully planed down. No equipment is available for doing this in the railway shop at Springfield, and such work is therefore sent out to a near-by machine shop.

A novel jig is used in the process of reboring these motor cases. This consists of two pieces of ¾-in. sheet steel held together by other steel cross members, as shown in the accompanying sketch. The various pieces are riveted together. Holes have been made in the heavy steel to correspond with the holes to be drilled in the case. On account of the thickness of the material used in this jig no reinforcing plate is required around these holes.

The method of procedure for this work differs materially from that employed in reclaiming truck parts at Worcester, as already described. By means of the center strip the jig is bolted firmly to the pole pieces of the motor case. The case is placed in a Lucas Precision horizontal boring machine, as shown in the illustration on this page, and the holes bored. About three cases, or one and a half motors, can be drilled in a day on this machine. More than 400 motors have already been overhauled in this way and put in good, serviceable condition.

Ciment Fondu Proves Unsuccessful for Grout

A RECENT inspection made by the Boston Elevated Railway of paving laid on Main Street, Charlestown, Mass., and grouted with Ciment Fondu indicates that the grouting in between the blocks has disintegrated. When this paving was laid in September, 1923, the railway did not have on hand a sufficient quantity of Ciment Fondu to use it for the concrete paving base. It was, therefore, used only to cover the granite block surface.

When the grout was mixed it was bluish black in color and oily or greasy in appearance. It flowed and worked liked ordinary cement. Equal parts of cement and sand were used in the mixture. The work was completed at 3 p.m. and by 8 o'clock the following morning the pavement had the appearance of having set for three or four days. It was then firm enough to receive vehicular traffic.

An inspection was made of this paving on March 29, 1924, after it had been in service for 187 days. It was

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found that the grout had entirely disappeared from the face of the paving blocks and from the joints between the paving blocks to a depth varying from ½ in. to ¾ in. After the dirt which filled these joints had been removed it was found that the grout was chalky white in appearance and was easily scored with a pointed tool. It did not seem to possess the degree of hardness of ordinary portland cement grout. From the tests it would appear that this French cement is not adaptable for grout paving.

In another instance, however, the railway reports that it proved more satisfactory. A small amount was used during the construction of a sewer, where on account of the tides and the inability of the contractor to keep the ground water below the level of the manhole inverts it was impossible to use ordinary cement because every tide washed it out from the joints. A small amount of Ciment Fondu was successfully used on three of the manhole inverts because this cement sets so quickly that a fairly firm set was secured between tides.

Compromise Joint Plates Made by Welding Shims to Angle Bars

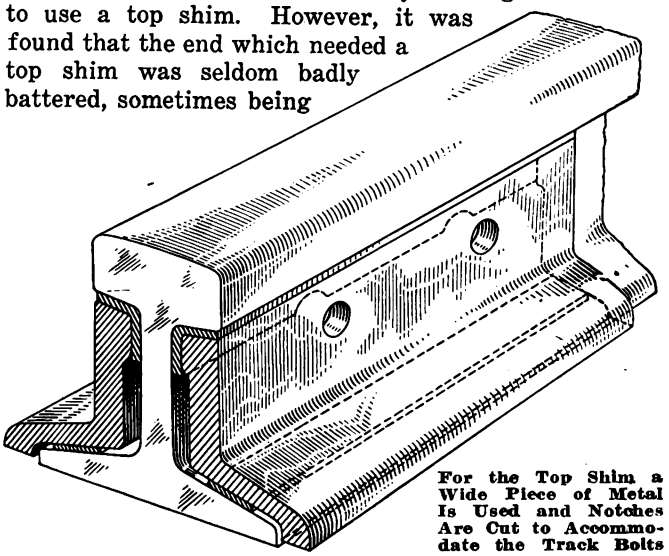
The Great Variety of Rails Which Were Used on a Small Railway Made a Difficult Repair Problem

BECAUSE of battered joints it became necessary a short time ago to repair 3 miles of track on a small Southern railway. A miscellaneous assortment of material, including many kinds of rail, had been used in the original construction of this line, which had been sponsored by real estate men more interested in the development of a tract of land than in the construction of an electric railway. The great variety of rail sections made joint repairs a difficult problem and the method finally decided upon was the use of compromise joint plates made by welding shims to angle bars.

Although approximately four out of five of the joints were composed of rails of different sizes, and a great improvement could have been effected by taking up, sorting out and relaying the rails, it was felt that such a method would be too expensive. So many kinds of compromise joints had to be made that it was out of the question to buy angle bars to fit. Moreover, it was found virtually impossible to weld such bars satisfactorily to the rail. In many cases on low T-rail, and in all cases where the bar was too small for the rail, the top edge of the angle bar was hidden beneath the ball of the rail. The plan of turning the angle bars bottom side up and welding them in that position was thought to be unsatisfactory, because the fit was likely to be very poor with such a great variety of rails in use. To take up the rails and cut off the worn ends would have been very expensive. Moreover, with so many different sized rails in use, satisfactory joints could not have been made after the rail ends were cut off. But by using the rail in the same length as it was originally made and bringing the joints even by the use of shims a smooth running surface was attained at moderate cost.

In order to make the joints tight in repairing these 3 miles of bad track, shims of various sizes were used on top of or underneath the angle bars, or sometimes at both the top and also the bottom. The material used varies in thickness from $\frac{1}{16}$ to $\frac{3}{16}$ in., and in width from 1¼ to 1½ in. The top shim was welded to the angle bar after the joints had been made up, except in cases where the shim was wide enough to reach down on the inside and be held in place by the track bolts. In that case openings were cut in the edge of the shim the same distance apart as the bolt holes, as shown in the accompanying illustration, and after the bolts were in place no movement of the shims was possible. The lower shim usually was welded either to the underside of the angle bar or to the base of the rail. Long shims used on the bottom were sometimes not welded but were cut about 4 in. longer than the angle bar and the ends bent over after the joint had been made up. In this way they were prevented from working out endways when the track bolts loosened.

At first thought it might be considered better practice to build up the head of the rail by welding rather than to use a top shim. However, it was found that the end which needed a top shim was seldom badly battered, sometimes being entirely uninjured. There was often a difference of $\frac{3}{16}$ in. in the thickness of the balls of adjacent rails. It was therefore decided to bring the rails into line by the use of shims rather than by extensive welding. In some instances the use of a top shim was avoided by cutting down a large angle bar to exact size with a blow torch.



For the Top Shim a Wide Piece of Metal Is Used and Notches Are Cut to Accommodate the Track Bolts

On open joints the welding was usually done during the heat of the day, the angle bars being left loose until the joint closed up. A week or so later the joints were tightened again. Special attention was given to hammering the weld during the application of the metal, thus hardening it and giving a better running surface.

Where the angle bars were worn only on the top in the center, welding metal was added to correct this defect before the bar was used, so that the finished joint would have no tendency to sag.

Joints repaired by this method five years ago have remained in good condition on open track with the bolts being tightened only three times. It was expected when this work was originally undertaken that it would be at best only a makeshift job. Accordingly, only the worst battered joints were built up with the electric welder, because the company had no grinder, but as the work progressed, the results were much more satisfactory than could have been anticipated. The car wheels make but slight noise in passing over these joints, and the cars ride very smoothly. The use of this method has been extended, and the cost of fixing joints is less than it would be for labor alone to take up and re-lay the rail.

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Commercial and Research Department Feature Pittsburgh Organization

A Distinct Sales Organization with Executive Powers Has Been Formed to Cover Fares, Service and Relations with the Patrons—Research Department Will Be Source of Data for All Other Departments

ON FEB. 1, 1924, the receivers of the Pittsburgh Railways were discharged, the property was returned to the Philadelphia Company and the railway reorganized along lines that would make it correspond more closely to a truly commercial organization of modern type. The two features of immediate import are the new commercial and research departments, the first to sell the goods ordered from the transportation department and the second to serve as the data reservoir of the company at large. The commercial department will be broader in scope than the pioneer American one of the Chicago Rapid Transit Company, while the research department is practically new in American electric railway organization.

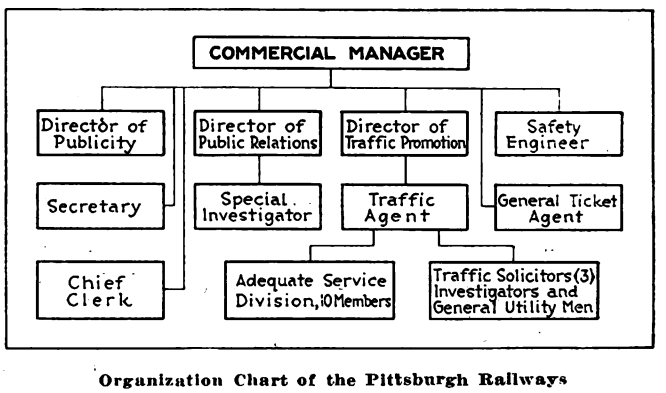
These changes are in accord with the ideas of Thomas Fitzgerald, general manager, who has long been on record as a believer in the doctrine that the words "public service" as applied to a railway mean the serving of the public to the utmost degree consistent with financial stability. This doctrine he put into specific form some four years ago (see ELECTRIC RAILWAY JOURNAL, May 15, 1920) when he suggested that the correct basis for rewarding a mass transportation concern is to pay it a profit in proportion to its popularity as a common carrier. The commercial department is the tool for making this modern conception of service effective.

W. H. BOYCE COMMERCIAL MANAGER

No understanding of the commercial department would be complete without some sketch of the experience of the personnel. W. H. Boyce, commercial manager, is no stranger to the industry. For many years he was general manager of the Beaver Valley Traction Company, also a subsidiary of the Philadelphia Company. His work in the Beaver Valley in public relations, in safety pioneering and in fares is nationally known. Few managers have so largely enjoyed the confidence of regulatory bodies. One marvels at the celerity with which changes in rates have been granted to the Beaver Valley Traction Company, no matter how novel the kind of fare was at the time. Short-haul fares, weekly passes, emergency ticket rates, off-peak reductions on special days have been granted practically over night because of the commission's experience that the applicant had at heart both the public and the investor's interest. This background is already proving invaluable in the larger sphere of the Greater Pittsburgh district.

As detailed on the "Personal Items" page of the April 5 issue, the commercial manager is assisted by a staff of men who are already familiar in detail with the Pittsburgh system. F. R. Cogswell comes by the place of director of traffic promotion through his intimate knowledge of Pittsburgh routes and travel habits. J. B. Donley, director of public relations, knows the press and the various city departments, whose cooperation is so desirable, as only a native can. C. C. Gillette as traffic agent supplements Mr. Cogswell in this wise:

Cogswell says that there is business to be obtained at such and such a time over such and such a route provided the transportation department has the men and cars available. Whereupon it is Gillette's part to determine whether suitable facilities can be provided by the transportation department, whether sufficient



Organization Chart of the Pittsburgh Railways Commercial Department

power is available, whether freight will not interfere, etc. From this it will be seen that the commercial department acts precisely like the sales organization of a private concern, sales and manufacturing functions being entirely distinct.

Other commercial department duties disclosed in the organization chart reproduced herewith are those relative to adequate service, traffic solicitation and investigation. J. E. Davis, as chief of complaint adjustment work with the title of special investigator, has put this work on a much higher plane than hitherto, as may be guessed from reading the details of his formal and professional education.

In addition to the general ticket agent, W. G. Stern, the commercial department will soon be expanded in certain other directions, close to public relations work, as will be revealed in due time.

CONSTRUCTIVE WORK DONE FROM THE START

For several years preceding the reorganization, Arthur W. Thompson, president, had spoken before numberless civic bodies on the now effective traction agreement that would make the Greater Pittsburgh municipalities a real partner and co-manager in the enterprise of mass transportation. Through this work the general public attained a high degree of understanding and interest in the traction problem. It follows that when the new management took hold the

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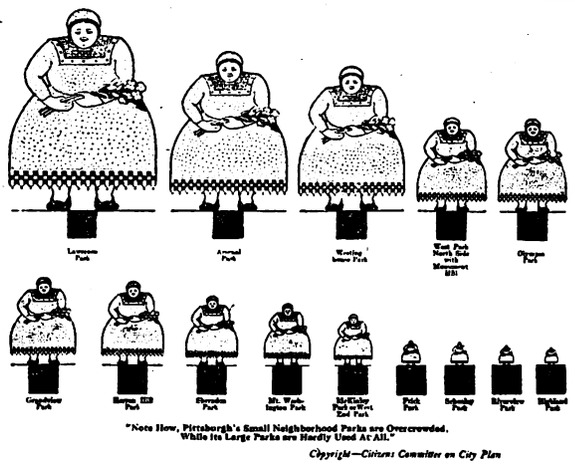
public expected to see some tangible proofs of the company's sincerity. New cars were ordered and other improvements begun as had been promised, but naturally enough there was a keen desire for immediate action in regard to fares and service conditions.



"Note How, Pittsburgh's Small Neighborhood Parks are Overcrowded, While its Large Parks are Hardly Used At All."

Copyright—Citizens Committee on City Plan

We Can't Take the Parks to the People

But We Can Take The People To the Parks

THE Chart above, from the splendid "Parks" report of the Citizens Committee on City Plan, shows how few Pittsburgh people are getting enjoyment from their largest and finest Parks.

This Committee has found that only two-fifths of the people live within a 15 minute walk to the parks.

We cannot bring the Parks to your door; but we can take You and Your Family to the gates of the Parks, if you will take advantage of the following

Lower Trial Fares

Available on Sundays

From APRIL 13th *to* JUNE 29th *Inclusive*

On Sundays only from April 13th to June 29th inclusive the limits of the present "special" transfer issued on a 10 cent cash fare will be extended to the limits of the first fare zone, so that one 10c fare will take you from any part of the first fare zone across the downtown section to any part of the first fare zone on the other side. On routes which do not reach the downtown district, suitable transfers will be issued to permit this trip.

The regular limits of this "special" transfer issued on a 10c cash day fare, considering Downtown Pittsburgh as a center, are as follows:

North Side District—East Ohio Street and Herr's Island Bridge; Lowrie and Gardner; Spring Garden Ave. and Wickline St.; Rhine and Buente St., East St. and Steps near Suffolk St., Lanark and Fineview; Perrysville and Lafayette; Irwin Avenue Loop; Brighton Road and Island Avenue; California and Sedgwick; Pennsylvania and Beaver; Columbus and Fulton.

West End District—West Carson Street and Corliss; Steuben and Wabash; Main and Wabash.

South Side & South Hills District—Grandview and Oneida; P. R. of W. and Westfield; West Liberty Ave. and Brookside Ave.; P. R. of W. and Reflectorville; Chalfont and Gearing; Beltzhoover and Charles; Warrington and Arlington; South 18th St. and Monastery; East Carson and South 25th St.

East End District—Second Ave. and Bates St., Frazier Street Loop, Forbes St. and Carnegie Library, Fifth and Bellefield Aves., Center Ave. and Bigelow Boulevard; Liberty Ave. and 38th Street, Penn Ave. and 38th Street; Butler and 38th Streets; Wylie and Erin Street.

YOU Don't Have to Walk to the Parks or Stay at Home. Ride the Trolleys to the Beautiful Open Spaces of Our Great City. These Routes Will Take You There Direct or by Transfer.

RIVERVIEW Route..... 8	GRAND VIEW Route.....40
FRICK WOODS Routes... 63, 64, 67	HIGHLAND PARK Routes..... 71, 73
SCHENLEY PARK Routes 63, 64, 67, 68, 71, 72, 73, 75, 76, 79, 80	NORTH SIDE PARKS Routes.... 2, 3, 4, 6, 7, 8, 10, 13, 14, 15 18, 19

You Patronage Will Help to Make These Trial Fares Permanent

PITTSBURGH RAILWAYS COMPANY

Commercial Department

"Live In and Expand Your Business in Greater Pittsburgh"

Announcement of Special Sunday Fares to Take People to the Parks

In appreciation of this feeling, the commercial department has been inaugurating various forms of relief as rapidly as the condition in each case can be analyzed and the necessary material aids (such as the printing of new transfers) arranged. The transfer situation has been especially complicated because of the topography of Greater Pittsburgh, intercompany relations and the necessity of dealing with a very large number of political units ranging from Pittsburgh City, with more than 600,000, to boroughs with only a few hundred inhabitants.

One of the first jobs, therefore, has been to liberalize the transfer situation so that there would be more consistency in the privileges granted both ways and to remove various inequalities that gave residents of one area much less freedom than their neighbors. As it would be a futile task to describe these transfer reliefs in detail, it will suffice to say that several score have already been granted. Each additional privilege has brought many hundreds of persons into a friendlier state of mind toward the company and produced a willingness to be forbearing as regards other changes that will require more time and involve greater revenue.

It may be remarked in passing that some of the transfer reliefs are of the sort on which it is possible to double back. This does not cause the commercial department any deep concern, as both the traffic records and common sense indicate that the preponderant majority of the riders have no interest whatever in doubling back. In other words, the management does not wish to disoblige 100 legitimate users of a transfer because of five illegitimate users; neither does it believe that it pays to set two transfer checking watchmen for every transfer misuser.

At any rate, the revenue returns so far do not show that the finances of the company have been impaired by restoring privileges of pre-war days. Few passengers were paying an extra fare, since most persons had adjusted themselves more or less willingly to the more stressful conditions.

Another step that has been accepted as evidence of good will is the readjustment of certain zone limits. In the case of a Carnegie line, a new transfer privilege has cut down the charge to Pittsburgh by a full one-zone fare. At McKeesport, a zone limit was extended to bring riders directly into the heart of the business and amusement center. The old limit did not force an extra fare from the riders, but did cause them considerable annoyance in bad weather or when laden with shopping bundles. Likewise, other zone boundaries have been shifted so that the limits would come at natural traffic points. In these and other fare studies the department has been aided by Walter Jackson as consultant.

A scanning of the passenger regulations showed some that could be placed on a "dealer and customer" rather than a monopoly footing. The basic token fare of 8⅓ cents is sold three for 25 cents. It may happen, sometimes, that a patron brings two others along and wishes to pay for all three without the extra motions of handing a quarter to the conductor, getting three tokens back and then dropping them into the box with due ceremony. The direct action of dropping the quarter into the box is now permissible, the customer's convenience being held superior to a microscopic accounting error in the relative number of 10-cent cash and 8⅓-cent token riders.

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A more common occurrence is the absent-minded passenger who drops too much money in the box. In this instance the management feels that its conductors certainly can be trusted a half dollar's worth anyway; hence the new regulation that conductors may refund at once any excess up to and including 50 cents. The only stipulation is that they turn in the forgetful customer's name and address.

Mr. Boyce had gratifying success with this plan on the Beaver Valley. The daily Pittsburgh records show that the new rule is much appreciated by conductors as well as riders. It goes without saying, also, that the passenger is glad to get his money at once without being expected to visit the railway office.

PITTSBURGH RAILWAYS COMPANY

ISSUED BY THE COMMERCIAL DEPARTMENT SO THAT YOU AND THE PUBLIC MAY KNOW

At the request of the Women's Community Association of the 27th Ward, the Brighton Road Short Line will be extended to the terminus of the Through Line at Wynhurst and California Avenues (High Bridge) on Thufsday, February 14th.

This extension doubles the rush hour service between Woods Run Avenue and High Bridge; present service from the city is maintained by use of additional cars.

W. H. Boyce,
Commercial Manager

PITTSBURGH RAILWAYS COMPANY

ISSUED BY THE COMMERCIAL DEPARTMENT SO THAT YOU AND THE PUBLIC MAY KNOW

EFFECTIVE SUNDAY, APRIL 13th, 1924

and continuing on SUNDAYS ONLY until June 29th, 1924, the limits of the 5¢ area transfer (sometimes called 10¢ special) will be regarded as the end of the first fare zone.

By this it is meant that for a 10 cent cash fare a passenger may ride from one side of the city to the other by the use of this transfer.

The purpose of this extension for a trial period is to give patrons an opportunity to visit parks and points of interest in sections of the city other than near their homes, and thereby stimulate the Sunday traffic on street cars.

PITTSBURGH RAILWAYS COMPANY
COMMERCIAL DEPARTMENT

PITTSBURGH RAILWAYS COMPANY

ISSUED BY THE COMMERCIAL DEPARTMENT SO THAT YOU AND THE PUBLIC MAY KNOW

The Board of Directors of the Pittsburgh Skin and Cancer Foundation have arranged for a public meeting at Carnegie Lecture Hall, Friday, April 11th at 8:30 P. M.

At this meeting able speakers will discuss the aim and object of the Pittsburgh Foundation.

Attendance at this meeting will signify not only acceptance of our obligation to do our part in helping to stamp out this scourge, but also our appreciation of the efforts of this public spirited Board of Directors in behalf of the communities afflicted

PITTSBURGH RAILWAYS COMPANY
COMMERCIAL DEPARTMENT

Three Samples of the "Blue Letters" Issued to Employees of the Various Pittsburgh Subsidiaries of the Philadelphia Company

SPECIAL INTERURBAN THEATER AND PITTSBURGH SUNDAY FARES

Two other instances of early constructive work on the part of the commercial department are the reduced fares put on for interurban and city riders during slack periods.

On the two interurban lines round-trip theater-time tickets are being sold at one and one-third times the one-way rate, provided the inbound trip is started at approximately 6:30 p.m. from the farther stations and return is made the same night. So far the desired publicity and personal co-operation with Pittsburgh theater interests has not been worked out to obtain full benefits from these tickets, but in the meantime the patrons of these lines have something pleasant to say about the "commercial department," whose title appears on all announcements of the character described.

Beginning April 13 the company is trying a "Sunday only" liberalization of the 10-cent crosstown fare. Ordinarily, this special transfer is good within a rather restricted distance on each side of Pittsburgh center. The Sunday rate carries the user all the way up to the limit of the one-fare zone if so desired. This rate will be in effect on all Sundays to June 29, inclusive. It is hoped that riding to the parks, to the churches and to family reunions will be especially stimulated. Sunday traffic in Pittsburgh is so far below everyday riding that a trial of this kind is quite logical.

As for the probable popularity of the Sunday reduction, one instance is of interest. A woman called up the commercial department to make sure that the 10-cent special really would enable her to reach a favorite church on the other side of town. She was delighted to learn that the 10-cent fare would cover the trip and added that this meant three companions as well. The oddest part of the story is that the limits of the week-day 10-cent special actually were liberal enough to make the same trip any day, but owing to absence of publicity she did not know this to be the case. As regards the Sunday innovation, the people of Pittsburgh have not been left in doubt, for the company ran half pages in the dailies for three days before the new privilege became effective. This particular advertisement stressed Sunday travel to the parks, but in other seasons the emphasis will be on travel to indoor entertainments or other edification.

"SO THAT YOU AND THE PUBLIC MAY KNOW"

Not the least interesting example of the commercial department spirit is the style in which the different regulations are placarded and otherwise made known. Every effort is made to get away from the unconsciously arbitrary wording of so many railway announcements. A feature in harmony with President Thompson's policy on the other subsidiaries of the Philadelphia Company in Pittsburgh is the broadcasting of a "blue letter" from the commercial department to the officers and petty officers of the affiliated companies, aside from the railway circulation of the same letter. The purpose of this outside circulation is to help these hundreds of men to give a satisfying answer to the inquiry of friend, neighbor or stranger on these changes.

An important point about the "blue letters" is that credit is given to the customers for changes in regulations. Some of these blue letters are reproduced herewith, omitting a small picture of a street car which is printed on the blue letter just under the company name. In this simple way it is brought home to the man who reads the letter, whether at home or on the carhouse bulletin board, that the management is not above ac-

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cepting suggestions from its customers and its employees and that when such suggestions are found acceptable due acknowledgment will be made.

How Press and Public Show Approval

Up to the present the transfer reliefs seem to have made the strongest impression on the public at large. An editorial approval was one of the first signs, and this has been reinforced by many letters, telephone calls and personal visits from individuals. It is remarkable, also, how large a proportion of the comments that reach the department in these several ways is of a constructive nature. Very few demand an immediate return to a 5-cent fare and the additional ideal of a seat for every passenger every time. The average person is shown to have a pretty clear grasp of the company's financial problems as a whole. If he suggests a transfer here or a lower fare there it is generally with an argument that his personal observation indicates that the company would make more money thereby. He has got over the idea that more money isn't a necessity.

Many of these suggestions are being considered carefully, for it is realized that the person who travels a given territory day after day has a viewpoint that may escape the professional operator. In any event, the collective wisdom of the riders and of the platform men is worth seeking and trying.

It is true that none of the innovations hitherto made affects the majority of the riders. They are but the forerunners of bigger and better events. For such greater changes it is necessary to build up a foundation of public confidence. This is just what is being achieved. Each change or experiment is along the line of the public's desires. The change may not be important enough in itself to show a tangible financial result up or down, but it makes a new group of friends in a new part of the territory.

Nor are these friends being made only through the changes described. The handling of complaints by personal calls from men of culture and refined address and the department's courteous request that telephone complainants give their name and address to permit the immediate mailing of refund tokens are policies bound to have a happy cumulative effect. Many persons are satisfied to turn in a complaint and let it go at that. Laborers and other patrons of limited means are exceptionally pleased when they find an investigator calling in person because adjustment by telephone or letter was not practicable.

Research Department to Be General Data Source

The research department, now being organized, with A. C. Spurr as research manager and A. H. Leschke as research engineer, as yet is not quite so advanced in staff and scope as the commercial department. Hence, a full description of its work is impossible. The general plan is that this department shall serve as a study and statistical organization for the other departments of the company. For example, as motor-bus operation is a live topic, this department is gathering all pertinent data for submission to the motor-bus committee so that the latter can get at the subject without using time in digging for details. Such information is gathered partly from the printed page, partly by correspondence and partly by direct visits. A feature emphasized by Mr. Fitzgerald is that this department will have many opportunities to relieve the different departments of the disturbance of routine that arises when some particular report must be prepared in a hurry. Instead of pulling men away from their daily jobs, the required material can be requested from the specialists who know just where to look for the facts—whether outside or inside the company—and how to put them together to greatest advantage. Such a central bureau in the course of the year will save a great deal of repetition of labor.

The relationship of the research to, say, the commercial department can be illustrated by just one item. The research department and not a clipping bureau reads the local newspapers that come to the office. Therefore, they are read with intelligence and between the lines. In this way the commercial department will be kept apprised of developments in building, in future exhibits, conventions, etc., and all other items that will assist the creation and increase of riding travel at a profit to company and community alike.

Benefits of the Hospital Association Are Extended

PLANS extending the benefits and activities of the Illinois Traction System Hospital Association to all the properties of the Illinois Power & Light Corporation have been completed by trustees of the organization. The name of the Illinois Traction System Hospital Association has been changed to Illinois Power & Light Hospital Association.

The Illinois Traction System Hospital Association was organized in July, 1907, by employees of the Illinois Traction System, now one of the properties of the Illinois Power & Light Corporation. It was formed for the hospital care and treatment of employees of the big interurban system, the workers paying each month a small assessment for dues. Deficits were made up by the company.

In July, 1910, it was decided to extend the scope of the hospital association's activities by adding death benefit and total disability features.

The employees who were members of the hospital association were eligible to join the fund providing they passed the required examination.

The first assessment or dues for employee members amounted to $536, but the Illinois Traction and its subsidiaries added to the fund and made it possible to pay $800 for the first death in July, 1910.

The management then announced that as soon as the dues or assessments amounted to $800 it would make up the difference and make it possible to pay $1,000. The first $1,000 was paid in June, 1913. The death benefit and total disability fund has been paying $1,000 for death or total disability from that time to date as the assessments or dues amount to more than $800 each month.

The assessments and dues for the hospital association as well as the death benefit and total disability fund are based on the monthly wages of each employee. Therefore, each contributes to this fund according to the amount of wages he receives, the higher salaried man, of course, paying the larger amount, but all receiving equal benefits.

To make all of this possible the Illinois Traction and its subsidiaries, since the beginning of the association, have contributed more than $80,000.

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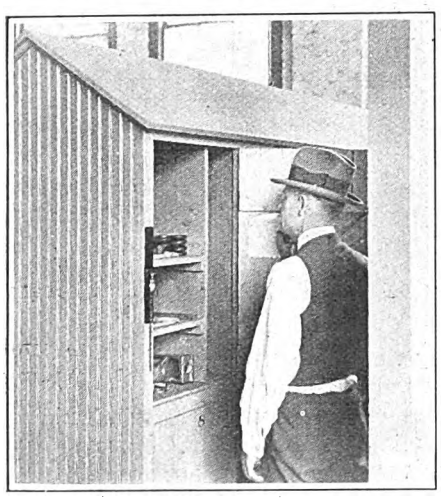
Equipment Maintenance Notes

Saving Expense of Night Storekeeper

IN THE shops of the carhouses of the Los Angeles Railway a system is in use which makes it unnecessary for each night mechanic to draw his necessary supplies from the storeroom. This saves the expense of a night storekeeper's salary. Each night mechanic has a separate locker and is assigned to definite work. For example, one man may have charge of a certain amount of brake repair. His locker is then kept supplied with material necessary in his work. A card form is kept in a holder inside the locker door and the mechanic notes on this card the materials he uses. Next morning the day storekeeper makes the rounds of the lockers and replaces the articles which the card shows were used on the previous night. The storekeeper removes the card for his records and places a new blank in the holder.



Lockers Where Night Mechanics Keep Materials for Their Work

Form 6065-P

MATERIAL USED AT DIV. NO 4

LOCKER NO. 7 DATE Feb 25/24

ARTICLES	CAR NUMBERS USED ON												NUMBER USED	CHARGE TO ACCT
4 8M BOLTS	481	B	462	B	474	B	819	U						
4 61B BRAKE SPRINGS	651	C	649	C	728	P	716	P						

ABOVE MATERIAL USED BY J. R Smith

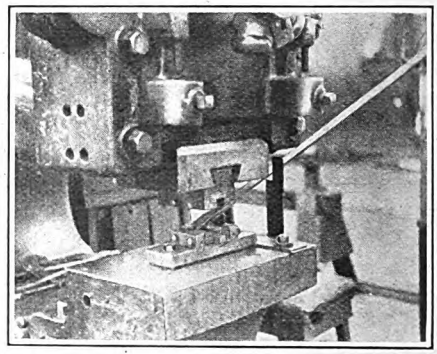
Card Used to Inform Day Storekeeper What Supplies Were Used the Previous Night

Forming Controller Tips on Power Punch

AT THE Harvard shops of the Cleveland Railway use is made of a 200,000-lb. power punch to cut and form the burning tips used on controllers. The dies and fixtures are so arranged that it is possible to cut the tips with the proper bevel at the ends. After a sufficient number are cut, a curved piece is inserted in the die, which forms the individual piece to the proper curvature and at the same time offsets the end which fits under the controller segment.

On the base of the punch is mounted a grooved die into which the cutting and forming die fits. The rear portions of these dies are used for the "cutting off" operation, the copper bar being held in the proper position by two guides mounted on the base of the punch and by an elongated floor rest at some distance from the machine. In this operation it is necessary to turn the material over after each cut in order to give the proper bevel to each end of the tip.

For the curving and offsetting operation a concave die with a shoulder is fitted in the slot in the die holder attached to the base of the punch, while a convex die is fastened to the punch head. The tips are placed on the concave die and are formed and offset by the pressure applied by the punch.

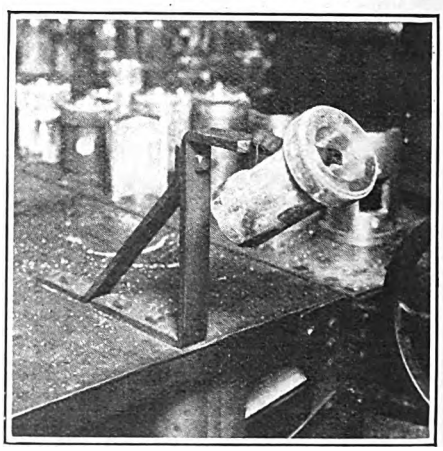


Cutting Controller Burning Tips on 50-Ton Mechanical Punch; 3,000 Are Cut and Formed in 12 Hours

With this adaptation it is possible for one man to finish 3,000 controller tips in 12 hours. Formerly the offsetting operation was accomplished on a milling machine, on which only 75 of the tips were finished in the same time.

Testing Bearings for Loose Babbitt

A COMMON method of determining whether the babbitt lining of bearing shells is adhering properly is to suspend the shell and strike it a sharp blow. When bearings are well babbitted a clear metallic tone will result. The quality and clearness of the tone depend to a considerable extent on the method of suspending the bearing.



Armature Bearing in Position for Testing for Loose Babbitt on Brooklyn-Manhattan Transit System

In order that uniform results may be secured when testing

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Dick Prescott Hears Half a Conversation

And a Visitor "Listens In"

"MR. MULLANEY, we're not going to be able to get that car ready for the transportation department today," said Steve White over the telephone in answer to the gruff inquiry from Thomas Mullaney, the general foreman of the Consolidated's shop.

The carpenter foreman's tone was not apologetic. In fact, it was just a little belligerent, and there was evidence of exasperation in the expression on his face. Steve's tone and expression made Dick Prescott feel uncomfortable, but they had been talking when the telephone bell rang and Dick therefore remained standing in the carpenter shop office.

So tense was the situation that neither he nor Steve was aware of the presence of the rather reserved looking gentleman who stopped in the doorway as though to ask a question, and remained waiting for Steve to finish talking. Neither Dick nor the second listener could hear the other end of the conversation, but that emanating from the little office was extremely significant.

"Yes, Mr. Mullaney, I know you said you wanted that car out today, and we did all we could to get it out, but one of the boys made a mistake in getting a piece of work done in the mill." . . .

"That's true, there's been a lot of mistakes made, but part of them have been due to the hit-and-miss way we're trying to do our work." . . .

"You bet I do, Mr. Mullaney, and I'm not the fellow that's trying to pass the buck. I know I'm responsible for what goes on over here, but I've got to have some help in the office or I can't do a bit better than I've done. I'm getting to the place where I'm ready to throw up my hands." . . .

"No, I don't want to do that, Mr. Mullaney, but I can't stay here much longer and keep on taking the responsibility for slips when I know the trouble is not with me." . . .

"I think I do watch things as closely as I possibly can under these conditions, but one man can follow only so much, and some of these things are bound to go wrong unless we get a little more system for handling our work." . . .

"Not at all! I don't want to load the shop up with any more red tape than necessary, but we'd save a lot of worry and mistakes if we planned our work a little ahead." . . .

"That's all true, Mr. Mullaney, but conditions are a lot different than they were 30 years ago, and unless we make some improvements we're going to keep on having trouble. If you'll notice, the transportation department isn't doing things like it did 30 years ago. All this talk about selling transportation, and these new ads they're running in the papers about giving service and calling the car riders customers and all that stuff, are a lot different than 30 years ago. That's one of the things that's giving us trouble. The transportation department is trying to keep all the cars it can in service and we don't have as many in the shop as we used to. That's why we've got to change our methods to keep up with the new conditions, or we're going to keep on having the same troubles we've been having right along." . . .

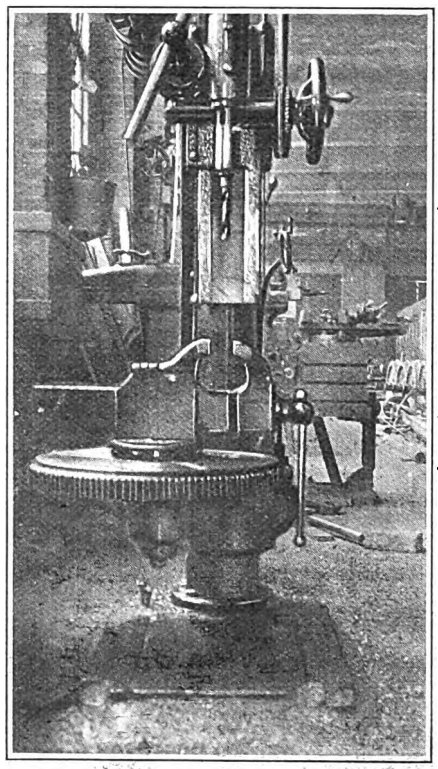
"Sure I will. I'm glad to hop to it and do all I can. In the meantime, I'll kind of lay out what I think we ought to do in the carpenter shop and mill. I've been thinking a lot about these old machines over here ever since we got up that dope for the ELECTRIC RAILWAY JOURNAL the other day, and I think we could speed up a lot and save our costs by putting in a few new machines and replacing some of these old types. I'll get my figures together and be ready whenever you want to call a meeting."

Steve White hung up the receiver, heaved a sigh of relief, and then on swinging around in his chair, noticed for the first time the gentleman who stood in the doorway, showing no outward evidence of the effect of the statements he had just heard.

bearings in this manner a special bracket has been arranged on a bench in the babbitting department of the East New York repair shops of the Brooklyn-Manhattan Transit System, on which the bearings are placed. The accompanying illustration shows an armature bearing in position for testing. The end of the bracket is rounded and is covered with several layers of canvas. With this method of suspending the bearing uniform results are obtained.

Vise Handy on Drill Table

MANY small parts are drilled in an electric railway shop, and if each one has to be clamped in position for drilling considerable time is taken. As a result it is quite common practice for the operator to hold the piece on a block with his hand while drilling. This, however, sometimes leads to accidents and is tiring to the operator where a considerable amount of drilling is done.



Vise Mounted on Table of Drill Press in Shops of the Philadelphia & West Chester Company

A vise mounted on the table of the drill press is found to be a great time saver in the shops of the Philadelphia & West Chester Traction Company, Upper Darby, Pa. The vise is bolted to the center of the table so that it can be rotated independently and also can be moved as the table is swung about. This enables it to be placed in any position convenient for

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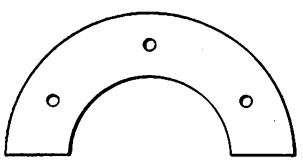
drilling and small parts can be clamped in the vise and held firmly in an instant. More accurate drilling also results.

Cast-Iron Axle Collars Replace Fiber

THE Worcester Consolidated Street Railway, Worcester, Mass., has tried the experiment of substituting a cast-iron piece $\frac{5}{8}$ in. thick, shaped as shown in the accompanying sketch, as a substitute for the fiber piece of the same shape attached to the axle bearing collar on Standard 050 trucks. This piece is riveted to the axle bearing collar with $\frac{3}{8}$-in. rivets. Steel was tried at first, but cast iron was found to give equal service and is cheaper. The increased life of this cast-iron wearing plate as compared with the fiber previously used has resulted in a material saving.



Form of Cast-Iron Axle Collar

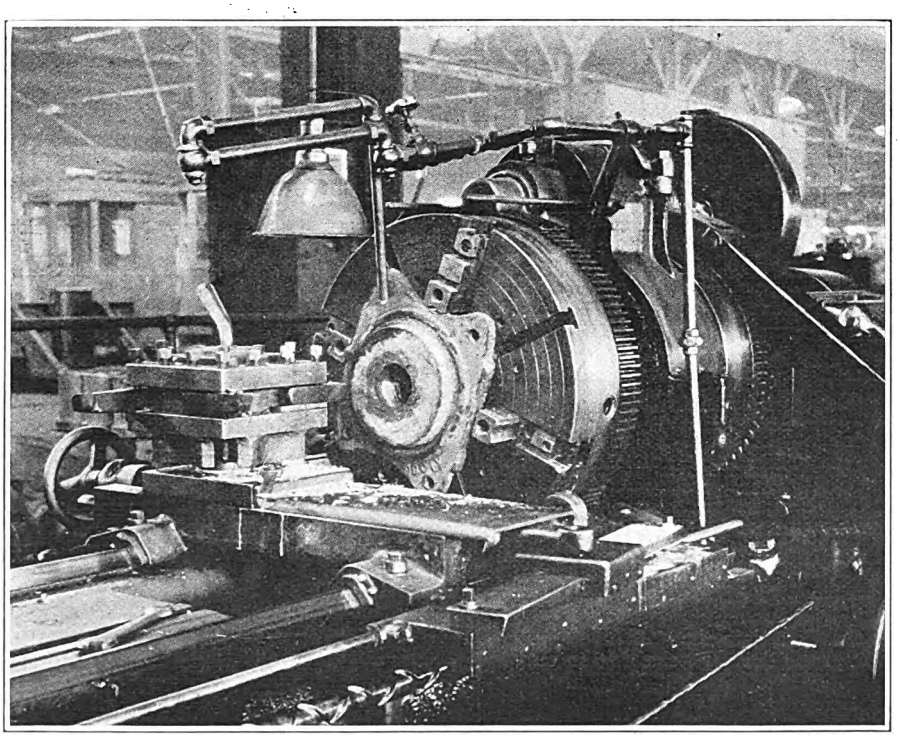
Multiple Tool Post Expedites Turning

A SWIVEL tool post capable of holding four cutting tools is used by the Pittsburgh Railways on a 16-in. lathe when facing center bearings.

In finishing such a casting it is necessary to use more than one cutting tool because of the curvature of the bearing. Rather than change tools in the ordinary tool post, the proper tools are mounted on a swivel post.

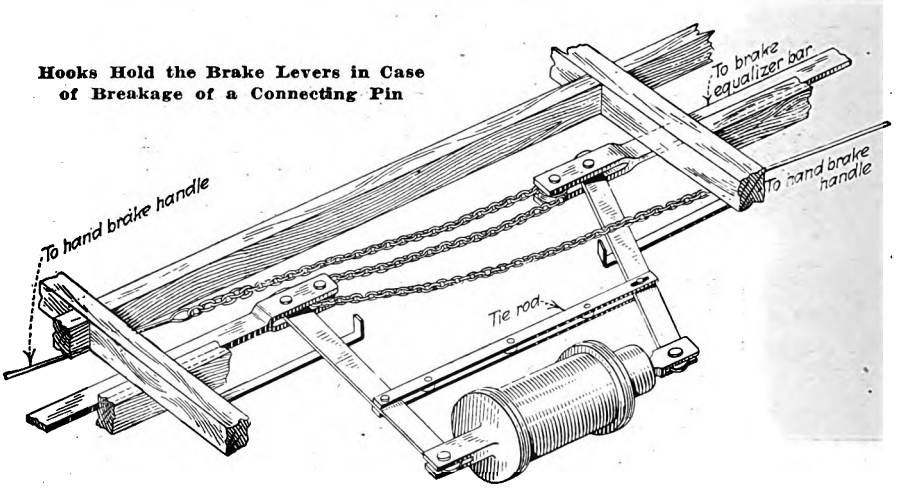
The swivel post is about 6 in. square with a tool groove around the sides. Set screws projecting through the upper edge into the groove hold the $\frac{5}{8}$-in. tool steel at each corner. The post is mounted on a swivel which takes the place of the compound. It is locked in place at any desired position.

This device is also used in turning operations as it reduces to a minimum delays caused by necessity to replace dull cutting points. In this use the tool post is simply turned around to the next position and the machining continued with another tool already in place.



Multiple Tool Post on Engine Lathe Used in Facing Center Bearings

Hooks Hold the Brake Levers in Case of Breakage of a Connecting Pin



Safety Hooks on Brake Rigging

TWO metal hooks attached to the underframes on double-truck cars are used by the Union Street Railway, New Bedford, Mass., as a safety precaution in case of the failure of some part of the brake rigging. This device, shown in an accompanying illustration, is somewhat similar to that used by the Holyoke Street Railway, which was described on page 111, ELECTRIC RAILWAY JOURNAL, Jan. 19, 1924. A point of difference is that hooks made of steel strips are used instead of chains. A hook of this kind will hold the brake lever in case of breakage of a connecting pin or rod at one end of the car and prevent the brake rigging at the other end being rendered useless. Another point of difference between the practice at New Bedford and that at Holyoke is that only a single tie rod is used between the brake levers.

Novel Line Truck for Small Road

A LIGHT line truck particularly well adapted to the needs of a small company has recently been built according to plans which were prepared by the Nashua Street Railway, Nashua, N. H. A 1-ton Ford truck was purchased, and the body was built by the railway. As shown in the illustration, the sides have been equipped with hooks to carry extension ladders, poles and long-handled tools on the outside. On the inside of the truck are carried short-handled tools, tackle, etc. The method of operation when making repairs to the overhead lines is to remove the ladder from its supporting hooks, place it against the side of the truck, fasten it firmly into position and

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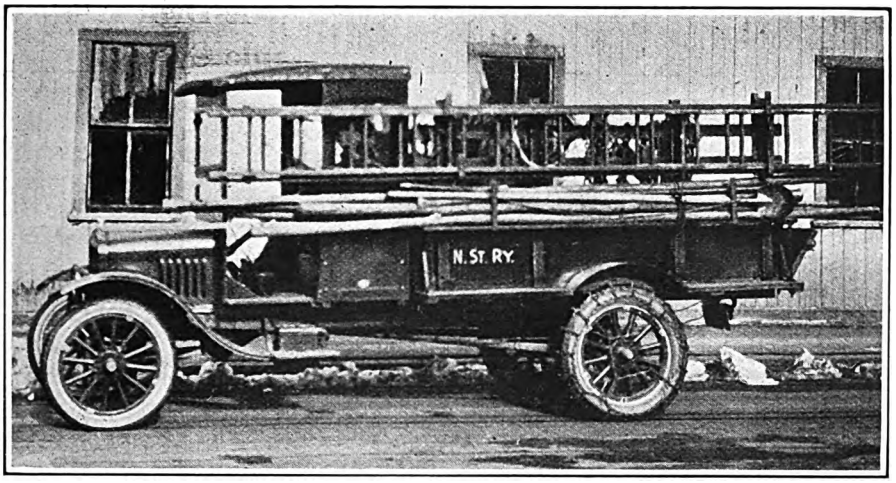
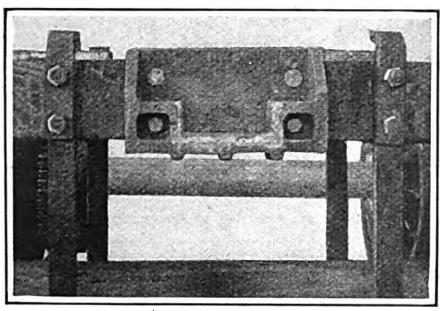


When Making Repairs to the Overhead Lines the Ladder Is Taken Off the Hooks of the Nashua Line Truck and Fastened in a Vertical Position

then extend it upward to a position where the workman can readily reach the overhead line. A convenient feature of this truck is that the sides can be removed altogether and the body used for the transportation of flat material.

Wearing Plate for Motor Suspension

THE accompanying illustration shows a wearing plate welded in position to the face of the casting used on the truck to support the nose of the motor. This method is used in the shops of the Philadelphia & Western Railway. The wearing plate is ⅝ in. x 2 in. x 6 in. and is scarfed all around the edges to provide space for the welding metal. This provides a satisfactory means of bringing the nose suspension to its original height, and by welding the plate in position there is no danger of its working loose.



Wearing Plate Welded to the Truck Motor Suspension Casting

Oilers Increase Life of Bearings

THE installation of vacuum oilers on motors used by the Worcester Consolidated Street Railway and the Springfield Street Railway was begun in 1921 and has been extended continuously since that time. At Worcester 568 have already been installed and 732 more have been ordered from the Railway Improvement Company. At Springfield 560 have been installed and 476 more have been ordered. The chief advantage of these oilers has been their ability to lubricate the older types of motors which previously had an unsatisfactory oiling system.

At the present time the railway is oiling cars equipped with Ransom oilers on a 3,000-mile basis, whereas formerly it was necessary to lubricate them on a 1,000-mile basis and at times even on a 500-mile basis. Aside from the efficiency of the oiler for lubricating, this apparatus has also the advantage of keeping dirt and grit out of the bearings. Both of the foregoing tend to increase the life of the bearing, although no data are available to show just how much this increase amounts to.

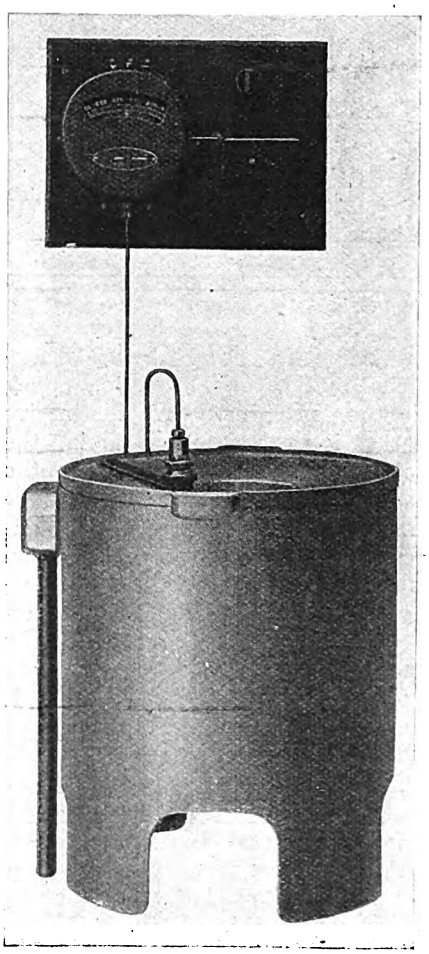
New Equipment Available

Babbitt Pots with Automatic Temperature Control

AN ELECTRIC melting pot for melting and maintaining at working temperature soft metals and alloys such as solder, babbitt, lead and zinc is one of the recent developments of the Westinghouse Electric & Manufacturing Company. This melting pot, which is made in two sizes, of 150-lb. and 750-lb. capacity, has thermostatic control that is claimed automatically to keep the temperature of the molten metal at any desired point between 450 deg. and 950 deg. Fahrenheit. A small electric motor controlled by a thermostat throws the snap switch on or off as the temperature of the metal reaches the high or low limit set by the operator, and an even working temperature is assured without further attention.

The heating element and all its conections are mounted on the melting crucible, which can be easily lifted out of its outside casing to make the element accessible. The outside casing surrounding the crucible is lined with an adequate layer of heat insulating material to reduce radiation losses and insure cool shop conditions. The control panel, which may be mounted in any convenient position, consists of magnetic contactors and suitable relays for opening and closing the line circuit. An instrument panel, which is set up adjacent to the pot, contains the thermostat with temperature regulating pointer, the push button switch for turning the current on or off, and a red signal lamp which serves as a warning in case the heat is left on accidentally.

One of the advantages of the electric melting pot is in connection with



New Automatically Controlled Electric Melting Pot

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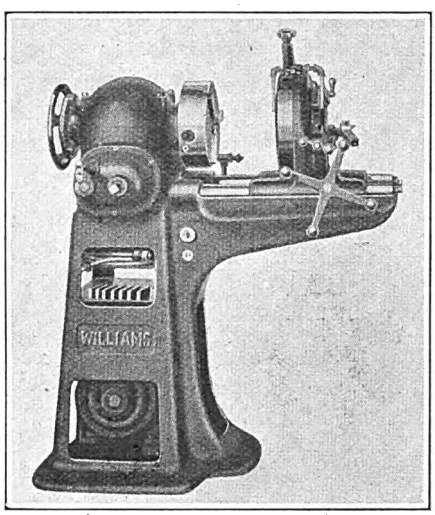
the use of lead base babbitt. This metal is greatly affected by either overheating or pouring too cold and therefore can only be used where it can be poured at a constant, accurate temperature. With the temperature control possible through the use of electricity for heating, the pouring temperature can be so closely regulated that the use of lead base babbitt is made possible.

Portable Machine Cuts, Threads and Reams Pipe

A NEW portable pipe threading, cutting-off and reaming machine has been brought out by the Williams Tool Corporation, Erie, Pa. It has a handy self-contained grinder and is arranged for either motor, belt or hand drive. The motor-driven machine has a standard 1-hp. motor mounted on a hinged table in



Portable Pipe and Bolt Threader

the base, the power being transmitted by belt to the driving pulley of the machine. A distinctive feature is the method of raising the motor to release the belt and stop the machine by use of a demountable hand crank. Automatic belt adjustment is provided. The machine can be converted to belt drive by removing the motor belt and driving directly from either a line or a countershaft.

The capacity of the machine is such that it will cut either right or left-hand threads on pipe ¼ in. to 2 in., and on bolts from ⅜ in. to 1½ in. inclusive. The machine will ream the inside and chamfer the outside of pipe from ¼ in. to 2 in. The longest thread that can be run at one chucking is 10½ in.

The spindle has two speeds. These are obtained by means of a set of sliding gears. A neutral position is provided so that the spindle may be started and stopped without shutting off the current. All gears are made of steel, machine cut, heat treated and run in oil. The shafts are equipped with long babbitted bearings provided with a self-oiling system.

The front gripping or driving chuck is of the three-jaw, universal, self-centering type. The carriage ways are of extra heavy seamless steel tubing, ground to size and polished. The way nearest to the operator has gear teeth milled on its surface, which engage a pinion shaft for operating the carriage. The die head and carriage are cast in one piece, which prevents the head getting out of alignment. The carriage has six babbitt-lined bearings on the ways.

The cut-off attachment is mounted on the rear of the die head and is operated by a screw and hand wheel. A V-block equipped with hardened tool-steel facings steadies the pipe when it is being cut off. On the cut-off attachment is pivoted the reamer holder, which is operated by a lever. The tool bit used for reaming and chamfering is ⅛ in. square.

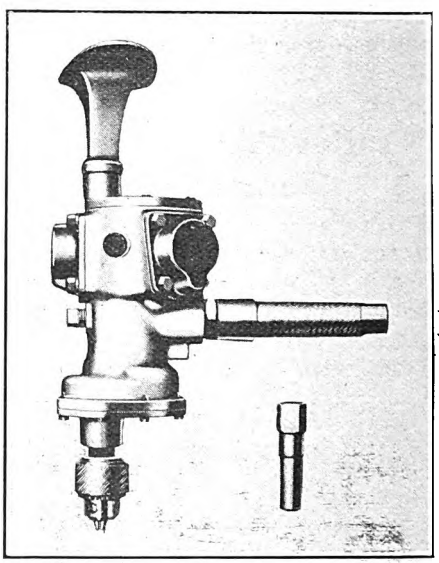
A geared rotary oil pump, located on the rear side of the machine, is driven from the intermediate shaft. The oil is pumped from a reservoir in the base of the machine through a strainer to the pump, being forced from there through a flexible hose to the die head where a three-way valve enables the operator to regulate the flow of oil. After flushing the dies and cut-off tool the oil drains back into the oil or chip pan under the die head, where it is strained before it flows back into the reservoir for reuse.

A feature of this portable machine is a high-speed emery wheel running at about 1,100 r.p.m., mounted on the pulley shaft at the rear of the machine. The wheel, which is 6 in. diameter with ¾ in. face, is driven direct from the motor. The design is such that when the operator uses the emery wheel no other part of the machine is running, giving full power to the motor for grinding.

The weight of the machine complete with motor and all standard parts is 520 lb. A special die cabinet cast in the top of the pedestal provides a safe and convenient place for storing dies and for holding any other small tools which are used on the machine.

Pneumatic Drill Has Renewable Cylinders

A NEW size, light-weight non-reversible pneumatic drill has recently been placed on the market by the Ingersoll-Rand Company of New York. It is known as size D and is suitable for drilling holes up to ⅝-in. diameter and reaming up to ⅝-in. diameter. The drill may be fitted with either breast plate, feed screw or grip handle, making it adaptable for a wide variety of work. The salient features of this device are the light-weight aluminum case with steel bushings cast in all the bearing holes and in the throttle hole, cast iron cylinders which are renewable and interchangeable, and a special three-cylinder motor. The renewable cylinders are a valuable feature, as any cylinder can be re-



A New Light-Weight Pneumatic Drill Made by the Ingersoll-Rand Company

placed easily and the motor made as good as new at slight cost.

The total weight of the new device, including breast plate and chuck, is 14 lb. Its over-all length is 15 in. At 90 lb. air pressure it operates at 700 r.p.m. The three-cylinder motor has the rotating parts all accurately balanced, reducing vibration and wear and tear on the machine. The drill is said to be very economical in regard to the air consumption and cost of maintenance.

The construction of this machine is very similar to that of the No. 6 and No. 600 drills which the same company brought out some years ago and which were suitable for drilling up to ⅜-in. diameter. Every part is readily accessible for inspection and their success led to the new size with larger bore and stroke.

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Association News & Discussions

Accidents Analyzed and Elimination Discussed

Mr .Storrs and Commissioner Higgins Contribute Papers at Conference on Motor Vehicle Traffic at New Haven—Analysis of Connecticut Company Automobile Accidents Throws Light on Relation of Traffic to Accidents

AT A Conference on Motor Vehicle Traffic, called by Yale University and held at the Sheffield Scientific School, New Haven, Conn., on April 9, 10 and 11, two papers were read that dealt particularly with problems of transportation by public service vehicles on streets and highways.

In the first, L. S. Storrs, president of the Connecticut Company, discussed the effect of congestion in downtown districts, due to automobiles, on the movement of passengers by street cars, and gave an analysis of accident statistics involving a car and an automobile. In the second paper Chairman R. T. Higgins of the Public Utilities Commission of Connecticut spoke on automotive public service vehicles, with reference to state regulation.

Mr. Storrs pointed out that automobiles owned in Massachusetts, Rhode Island and Connecticut equal one-third of the total number registered in the world, outside of the United States. Increasing congestion works a hardship on operatives by limiting the range of their movement between home and shop; it limits the supply of labor to industry, and it discourages shopping in the business centers of our cities.

Street cars are now carrying more people than at any time in the past, and there is a demand for constantly increasing facilities. The substitution of cars of larger capacity is only a palliative. The real need is for more cars, but their addition, with the increasing number of automobiles, will make the congestion on our streets still more acute.

In New Haven, 86 per cent of the passengers entering and leaving the central area are carried on street cars comprising 27 per cent of the total vehicles. The other 14 per cent use private automobiles, comprising 73 per cent of the vehicles. The accident hazard due to this congestion has received close study. While the monetary loss is of small importance as compared with loss of life or personal injury, it means an average expense to the electric railways of the United States of 4.6 per cent of the passenger revenue, or $44,000,000 a year. In Connecticut it is below the average, being but 3 per cent, or $400,000 annually.

The total number of accidents on about one-third the mileage of the country decreased from 1920 to 1922, while those involving automobiles and street cars increased 13 per cent. In Connecticut those not involving automobiles decreased from 4,889 in 1918 to 4,279 in 1923; the automobile cases increased from 3,505 to 5,258 for the same years.

Analysis of Accidents

Efforts to reduce accidents have taken the form of education of employees and, with the co-operation of the authorities, of school children, track relocation, cutting banks and brush at obscure road crossings, and introducing light-weight cars capable of stopping in a short distance.

By requiring reports on all cases, even the most trivial, the company has records of eight times as many accidents involving cars and automobiles as were listed by the Motor Vehicle Department, to which only those involving personal injury or material damage must be reported.

The following is an analysis of the 5,258 reported in 1923:

Accident	Number	Per Cent of Total
Automobile turning out from curb, hit by trolley	693	13.3
Automobile coming out of intersecting street at motorman's right	281	5.5
Automobile coming out of intersecting street at motorman's left	298	5.5
Automobile hit in rear, trying to pass moving car, same direction	522	10.0
Automobile colliding head-on with car	340	6.5
Automobile hitting standing car, excluding head-on	698	13.2
Automobile sidewiping car, same direction	624	11.8
Automobile sidewiping car, opposite direction	506	9.7
Automobile struck backing out of driveways or buildings	92	1.7
Automobile struck in rear by trolley, due to sudden stopping	375	7.1
Automobile ran into moving trolley car, same direction	224	4.2
Automobile parked, hit by car	588	11.2
Automobile hit at grade crossings	17	0.3
Total	5,258	100.0

The preponderance of accidents due to carelessness on the part of the automobilist is noteworthy. The largest number are those occurring when automobiles were pulling out from the curb, probably due to the frequent neglect to give a signal. On wide streets this type of accident practically vanishes.

Vehicular congestion in the central portion of our cities leads to numerous minor accidents, mostly to pedestrians; it affects all residents who have occasion to visit the business districts, and warrants most careful consideration by expert examiners.

A survey in St. Louis showed 9,842 vehicles entering the business district daily, while parking area is available for only 2,500. In Chicago 51.3 per cent of vehicles entering the Loop district are autos carrying 18.9 per cent of the passengers. Two per cent are street cars carrying 74 per cent of the passengers. Figures for New Haven have been given, from which it appears that 86 per cent of passengers are being inconvenienced for the other 14 per cent who average not over 1.75 per automobile.

Commissioner Advocates Bus and Truck Regulation as Means of Reducing Accidents

Mr. Higgins pointed out that the automobile has established its permanency in the transportation field, in recognition whereof the Connecticut Legislature in 1921 declared motor vehicles operated in such manner as to afford transportation similar to that afforded by street railways to be common carriers and subject to public regulation.

Under this act bus routes have been established totaling 672 miles, mostly in suburban and interurban territory. Operation has been authorized of 239 cars, touring and bus types, in addition to 53 buses operated by street railway companies.

It would be unwise seriously to impair the usefulness of railroads and railways, which have demonstrated their necessity in the activities of our country, by allowing destructive competition. But the public service motor vehicle will become a still more important agency in intrastate, and somewhat in interstate, transportation of freight and passengers, because of improvement in mechanism and flexibility of service.

They should then be under public regulation and control. At present only the jitney is under such control, while the numerous freight trucks are without any public regulation.

Under its broad jurisdictional powers the commission has prescribed rules, the violation of which may be followed by revocation of certificate. This circumstance has been a strong incentive to careful operation. Since the law went into effect, July, 1921, there has been but one fatal accident, and that one not due to the jitney operator.

Motor vehicle transportation should come under state control, and even where interstate traffic is involved the control should be by co-operation of the regulatory bodies of the two or more states interested.

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American Association News

Introducing Traction Tom

BY LABERT ST. CLAIR
Director of Advertising, Committee of One Hundred, A.E.R.A.

TRACTION TOM, a new figure in the electric railway field, is being introduced to the industry by the advertising section of the American Electric Railway Association.

Tom has been given a permanent assignment as the representative of all the electric railway employees in the United States to tell the public something about the traction business in the language of the worker behind the guns. He is to appear on posters, in newspaper ads and other channels.

Samples of posters and newspaper cuts already have been sent to all electric railway companies in the country and manufacturer members of the association. They are ready for distribution. A series of newspaper advertisements is being prepared and will be ready within another week.

Tom is the outgrowth of the poster series called "The Men Behind the Electric Railways," recently distributed by the Committee on Co-operation of Manufacturers. That series proved a popular one, some 200 electric railway companies using it, and reports from them indicate that the public read the posters with interest.

In creating Traction Tom an effort has been made to reflect in his face the spirit of courtesy and enthusiasm which is manifest in progressive electric railway employees throughout the country. It is the conviction of the manufacturers' and the publicity committees that Tom's friendly countenance will carry the real message of the electric railways to the riding public and arouse a keener appreciation of the work that the employees are doing in providing safe, comfortable rides for customers.

Tom's introductory remarks, through *Truth*, a clip-sheet issued by the association, epitomize fairly well his purpose. This is what he says:

"I am Traction Tom. I speak for the 500,000 workers in the United States who draw pay, directly or indirectly, from the electric railways.

"We are a very important part of a great industry that is on the come-back road after some hard knocks.

"We are out to boost the electric railways because they are necessary and because without them our jobs just wouldn't be."

It is hoped that in addition to using the standard material which is prepared by the association's advertising section companies will localize Tom to the fullest possible extent. The best good can be obtained from using him by tying him up locally with current events through his comments on them. Tom really should be made a sort of browsing salesman for local electric railways, and the closer he gets to home with his comments the more valuable he will be.

Here's a sample of one of the newspaper ads now being offered by the advertising section, which shows the chatty sort of text that Tom's face seems to fit:

"I Liked That City—The Cars Wait for You"

"I was down in Memphis, recently, and an old friend of mine told me how her mother always swore by a certain big city in the eastern part of the United States.

"For a long time the old lady never mentioned any specific reason for liking the town, and, finally, after she had bragged and bragged about the place, my friend asked why she liked it.

"'Well,' she explained, 'the street cars always wait for you there.'

"Probably the old lady, like many persons, thought many electric car men run away from customers purposely.

"They don't. In fact, if they did and the boss found it out, their jobs wouldn't be worth much. Sometimes my buddies overlook folks and pull away from them. But none of them ever does it purposely.

"If you ever think they do, write the boss. He and the rest of us will appreciate it.

"But please make all the haste you can. We men have to keep a certain schedule with our cars just like steam railroad engineers, you know. TRACTION TOM."

Full details regarding Traction Tom and how to use him will be supplied by the association if you will just drop it a line.

Heavy Traction

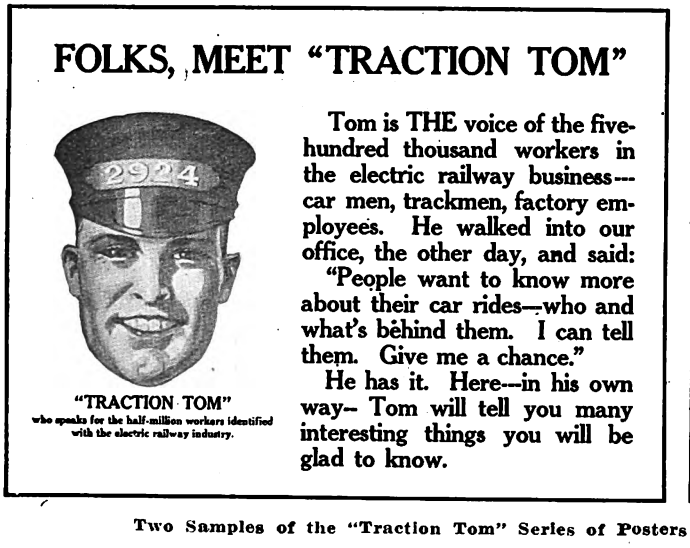
A MEETING of the heavy traction committee of the Engineering Association was held at New York on April 15. The sub-committee on revision of the bibliography on heavy electric traction, H. F. Brown, chairman, reported that it had been decided that the bibliography should be held to a selected list of publications. Professor Warner, who is in charge of the revision, has done some considerable preliminary work. A proposed classification of the index was presented for consideration of the committee, and a number of changes were suggested. The entire matter was referred back to the sub-committee with instructions to proceed along the line of its report.

Mr. Armstrong was appointed chairman of a sub-committee on branch-line electrification, to obtain data on self-propelled cars, Diesel-electric, gas-electric, and battery locomotives.

A report of the sub-committee appointed to study train operation, with particular reference to articulated trains, was presented by its chairman, Mr. Sinclair. A drawing has been prepared showing the various articulated trains built or proposed.

Mr. Daus, chairman of the sub-committee to study methods of connection between cars, has prepared a questionnaire on methods of coupling, including air and electric circuits. It is the intention to send out this questionnaire to all railways operating trains.

Members present were J. C. Davidson, chairman; A. H. Armstrong, H. F. Brown, Morris Buck, A. H. Candee representing H. W. Cope, A. H. Daus, J. H. Davis, J. V. B. Duer, Norman Litchfield, J. O. Madison, J. J. Sinclair, L. S. Wells, C. R. Harte, sponsor, and G. C. Hecker of association headquarters.



Two Samples of the "Traction Tom" Series of Posters Put Out by the Advertising Section of the A.E.R.A.

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The News of the Industry

Engineers Report at Detroit

Underground Lines Suggested for Use Downtown with Super-Highway System of Suburban Feeders

Daniel L. Turner, consulting engineer, and John P. Hallihan, engineer in charge for the Rapid Transit Commission of Detroit, recommend underground lines in downtown Detroit and surface lines on private right-of-way in suburban districts. This plan is suggested as the backbone of the future transit system. Based on the engineers' report the commission has also recommended a system of 217 miles of super-highways with a width of 204 ft. The report of the engineers containing these recommendations has just been made public. It follows a report on financing rapid transit, which was published in this paper Dec. 8, 1923.

The present report submitted by the engineers relates to the district outside the built-up portion, referred to as that part between the 6-mile and 15-mile circles. The subway system for the city of Detroit will be covered in a report to be issued later. The suggestion for the proposed super-highway system has been discussed and considered with the officials of the communities that it would affect directly.

The engineers point out that Detroit is now being strangled because of lack of streets. It is believed by the engineers that by 1950 Detroit will probably extend out 11 miles from the present center. The proposed super-highway system is designed to serve an area more than three times that of the present city and that area is almost entirely outside of the Detroit of today. The super-highway district is definitely outlined. In the 204 ft. super-highways there will be a central space of 84 ft. for the exclusive use of rapid transit lines on rails. Tunnels underneath the rapid transit tracks and the express motor lane will give access to either side of the street for pedestrians as well as motor vehicles. The rapid transit and express motor services will not be subjected to any crossing interferences.

At a rapid transit station, the rapid transit and motor express lanes would be elevated to permit tunnels for intersecting traffic. The upgrade would aid in retarding rapid transit cars as they approached a station, while the down grade on the other side would aid in accelerating the cars. Passengers alighting from rapid transit cars would descend a stairway at the station, pass to the tunnels underneath and reach the side of the highway. Rapid transit lines would dip under or cross over the intersecting line. As such lines approached the built-up sections of the city they would dip underground and thus reach the heart of the city.

A plan is being drawn up by P. J. M. Hally, counsel for the commission, and a bill is to be submitted to the Legislature which would create a transportation district and permit the levying of an annual tax of one half mill, which would provide from $1,250,000 to $1,500,000 annually for the purpose of acquiring the right-of-way for the super-highways.

The super-highway, it is claimed, will also supply rapid transit on rails in the future at the cheapest cost to the community, even including the cost of the right-of-way necessary. The cost of constructing the permanent way of a four-track rapid transit line on the super-highway, but exclusive of real estate and equipment, it is estimated, will be about $1,100,000 a mile, whereas a subway would cost about $5,500,000 a mile. At the start, the report states, only two-track lines will be required. They will suffice until the city has spread out beyond the 10-mile limit.

The report further states that inside the city, where existing streets control, only underground or elevated lines can be considered, with the underground line preferable.

Fifty Buses for Cleveland

A fleet of not less than fifty buses is to be operated by the Cleveland Railway to supplement electric railway service in Cleveland. Announcement to this effect was made by John J. Stanley, president, on April 16, when the company formally asked the Ohio State Public Utilities Commission for a certificate of convenience and necessity, as required by the Ohio state law.

The application of the railway followed dismissal by the commission of the request of the Cleveland People's Motor Bus Company for similar permission. A hearing on the Cleveland Railway's application has been set for May 29.

The buses will be of the double-deck type. They will be used over five routes, part of which will parallel railway lines. The rate of fare will be at least 10 cents, according to the company, and may be double the present railway fare in Cleveland, which is 6 cents cash, with a 1-cent charge for transfer.

"It is the idea of the company to attract to the motor bus automobile riders and not street car riders," said Joseph H. Alexander, vice-president of the company. "We hope to induce people to ride the buses instead of driving their own automobiles to business. Our bus plans call for quality service."

The routes will run from the suburbs of Lakewood, East Cleveland, and Cleveland Heights, along boulevards and some along streets now covered by street car tracks. They will all end at the Public Square.

Legislature in Review

Some Outstanding Accomplishments of New York Body Reviewed Briefly —Tax Committee Bill Killed

The Legislature of New York State, in annual session adjourned April 10, will be remembered for having passed a 25 per cent income tax reduction law good for 1924 only, for having enacted a home rule enabling act for cities made mandatory upon it by constitutional amendment, for the passing of a compromise transit bill affecting transportation in the city of New York, for having committed the state to a policy of the ultimate expenditure of $300,000,000 for grade crossing elimination and $100,000,000 for the construction of new buildings and improvements by the issue of bonds, if constitutional amendments passed at this session are approved at a subsequent legislative session and receive the favorable vote of the people, and for having consistently refused to adopt a system of public utility regulation and plan of municipal operation of as radical a nature as was ever presented to a legislative body.

The general amendments to the transportation corporations law intended to simplify the procedure of forming utility corporations and functioning under the statute, introduced during the closing days of the session by Senator Fearon, failed to be reported for consideration, but it was anticipated that this subject would go over for another year and the bill was introduced to show progress of the committee and get something tangible before the public so that the interests affected would have opportunity to study the proposed law.

Home Rule Act Passed

The home rule enabling act was finally passed as a new consolidated law instead of being made a special act. It will give to municipalities a certain degree of regulation over public utilities, and the fear that the courts might interpret this power so as to give New York City power to intervene in transit matters is responsible in no small degree for the final compromise reached in relation to this subject.

Among the bills in the Governor's hands as thirty-day bills may be mentioned:

The Garnjost bill (Assembly Print No. 1650), amending Section 53-a Public Service Commission law by providing for the electrification of railroads in the cities of Yonkers and Mount Vernon.

The McGinnies bill (Assembly Print No. 1863), making an addition appropriation of $3,500,000 toward the construction of the New York-New Jersey vehicular tunnel.

The Davison bill (Assembly Print No. 2241), adding new Section 26-b general corporation law, by providing preference in payment of judgments recovered in actions for torts against public service corporations shall be given in liquidation of affairs of the corporation.

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The Russell bill (Senate Print No. 546), extending for one year from date of passage of bill the operation of the street railway line of the Nassau Electric Railroad known as the Park Avenue line without exchanging transfers.

The Fearon bill (Senate Print No. 1280), amending the railroad law and stock corporation law, authorizing a domestic railroad corporation to increase or reduce its capital or capital stock pursuant to Section 37 stock corporation law.

The Davison bill (Assembly Print No. 2304), amending the tax law, in relation to the payment and distribution of corporation franchise taxes.

The Legislature amended the workmen's compensation law reducing the non-compensated period after accident from seventeen to seven days, increasing the death benefits for accidental death and increasing the number of payments during the healing period after injury.

Noticeable among the recommendations of the Governor which was killed was the proposition to create a disinterested commission of experts to study the entire tax system of the state, to devise ways and means of relieving public utility corporations from unequal assessments and to suggest a plan which would provide a staple source of revenue for the support of the schools. As a substitute for this, the Davenport-Sheridan tax committee was continued, with an additional appropriation of $25,000.

I.R.T. Will Reduce Wages Five per Cent

Announcement was made by Frank Hedley, president of the Interborough Rapid Transit Company, New York, N. Y., that because of increased expenses in operation and loss of passenger revenue a 5 per cent reduction in wages is proposed for July 1. This reduction would bring the wage scale back to that in operation two years ago. At that time the men accepted a decrease of 10 per cent. Last June the wages were increased 5 per cent. According to Mr. Hedley this increase of last June amounted to an increase in operating expenses of about $1,250,000 for the year. Notification of the wage reduction was made in a circular to the men which said that the company could not buy its supplies cheaper, could not get further reduction in rental and could not borrow more money while its business was in the present condition. No statement has been made through the brotherhood of the Interborough employees.

Final Hearing on Fares in Connecticut on June 2

Another snag in the fare settlement in Connecticut was struck at the resumption of the hearing before the State Public Utilities Commission in Hartford on April 14. At the conclusion of the hearing officials of the Connecticut Company were ordered to report the details of operation expenses to the commission not later than May 12. A final hearing will be held at Hartford on June 2 after an allowance of three weeks for those opposing the fare increase to study the data.

Meanwhile fares will remain as at present, with tokens at the rate of three for 25 cents for all lines in the State except those in Bridgeport. There the rate of two rides for 15 cents will be continued under commission order until the entire question of fares for the State has been decided. Attorney Watrous for the Connecticut Company wanted the fare in Bridgeport to be raised at once to three rides for 25 cents.

Edward G. Buckland, vice-president of the New York, New Haven & Hartford Railroad, which owns $40,000,000 of stock of the Connecticut Company, asked that the Connecticut Company be permitted to earn a fair return upon the value of its property devoted to the service of the public. The earnings of the Connecticut Company are given elsewhere in this issue.

Capital Traction Employees Receive a Two-Cent Increase

The board of arbitration, by a vote of two to one, has granted the employees of the Capital Traction Company, Washington, D. C., an increase of 2 cents an hour. William Knowles Cooper, chairman of the board, and Stanton C. Peelle, the company's representative, voted for the increase, while Representative Tague of Massachusetts, for the men, dissented on the ground that the advance was not sufficient. The men had petitioned for a flat increase to 70 cents an hour. The agreement fixes the following schedule for the Capital Traction: First three months, 52 cents an hour; next nine months, 56; thereafter, 58 cents. At the present time both the employees of the Washington Railway & Electric Company and the Capital Traction Company are receiving 50, 52, 54 and 56 cents. It was roughly estimated that the increase would add between $65,000 and $70,000 a year to the company's payroll expenses. No action has been taken yet on the scale of the Washington Railway & Electric Company's employees.

Two Bus Ordinances Offered in New Orleans

Commissioner Paul H. Maloney of the Department of Public Utilities of the city of New Orleans, La., has offered two ordinances to the Commission Council calling upon the New Orleans Public Service, Inc., to operate a bus service on the streets not now served by railway lines in the upper and lower sections of the city. This is in keeping with the recommendations contained in the Beeler report, which has not as yet been adopted by the Commission Council. The delays incident have occasioned the residents of that area, a thinly-settled portion of the city, great discomfort and inconvenience to reach the street cars.

The officials of the company are reported to have expressed themselves as ready and willing to meet the requirements of the city, in so far as single-deck buses are concerned, but allege that the spreading branches of the big oak trees, in the outlying districts, may make it impractical and hazardous to use double-deck buses on the routes. They assert that the buses will be in readiness for operation within sixty or ninety days.

Ninety-Cent Rate Asked

This Is Maximum Rate Requested in New Cleveland Contract Dating from May 1

Motormen and conductors of the Cleveland Railway, all of whom are affiliated with the Amalgamated Association, have filed a formal demand for an increased wage.

The men are now getting 55 cents an hour for the first three months' service, 57 cents an hour for the next nine months, and 60 cents an hour after the first year. They are asking 85, 87 and 90 cents an hour. The highest previous wage scale paid by the company in 1921 was 70, 72 and 75 cents an hour.

In addition to the wage increase the men also make the following demands:

Workday in the week as near as possible straight eight hours.

Pay on regular runs based on eight hours, minimum.

Time and a half over nine hours.

Sixty per cent of runs laid out inside nine hours.

Thirty per cent inside twelve and a half.

Ten per cent inside fourteen.

Fifteen minutes' extra pay for twelve-and-a-half-hour completion.

Thirty minutes' extra pay for thirteen hour completion.

Forty-five minutes' extra pay for thirteen-and-a-half-hour completion.

Hour extra pay for fourteen-hour completion. (Many runs are now divided between morning and evening rush travel.)

Union to have voice in altering schedules to shorten runs and hours.

Eight-hour runs and time and a half on all Sundays and holidays.

Eight-hour runs at ten-hour pay at night.

Regular crews to get time and a half for extra runs.

Six-hour minimum pay for "trippers."

Breaks or layoffs in regular runs to be paid for as platform time up to one hour.

Allowances for reporting, whether or not assigned to duty.

Thirty minutes' extra pay for making out each accident report.

One day off in eight with pay.

Two weeks' vacation each year with pay.

Five cents an hour extra for instructing new crews.

Company to furnish change for conductors.

Passengers who report trainmen to be compelled to make deposit to reimburse him for time lost in investigation if charges against him are not sustained.

Heating of all cars from Oct. 15 to April 15, instead of from Nov. 1 to April 1, as at present.

Ten minutes' layover at end of every trip and comfort stations at end of every line.

Trainmen under suspension to be relieved of punishment if asked to report during time of suspension.

Pay for the ten minutes time for reporting required of all crews before starting day's work.

John J. Stanley, president of the company, said to grant the demands would increase the payroll $5,000,000 a year and necessitate a 10-cent fare.

The present agreement between the company and the union calls for arbitration of the men's demands. Apparently because the men did not get all they asked for a year ago, they are also asking to have the board of arbitration changed from a three-men body to one composed of five men, two to be named by the company, two by the union and the fifth to be appointed by the Governor of the State in case the four cannot agree. Under the present plan the umpire is appointed by the local federal judge.

The present agreement expires May 1. A prolonged dispute appears likely over the question of changing the composition of the board of arbitrators from three to five members.

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No Opposition to Buses in Rensselaer

An informal hearing was held at the City Hall in the city of Rensselaer April 15 at which General Manager Murphy of the United Traction Company appeared and explained the route on which the United Traction proposed to substitute bus transportation for trolley service. The company proposes to abandon railway service on the Broadway-Akin Avenue line in that city. This hearing was called by the Common Council to get an idea of sentiment before the introduction of any ordinance.

No opposition developed at the hearing to buses being substituted for trolley service.

The Capitol District Transportation Company, Inc., Albany, N. Y., was recently formed to operate stage or omnibus routes in Albany, Rensselaer and Saratoga counties. It has a capital of $100,000. The directors and subscribers are Leonor F. Loree, New York City; William H. Williams, Lyon Mountain, N. Y., and Harry B. Weatherwax, Albany, N. Y. The attorney is John E. MacLean, 598 Broadway, Albany, N. Y.

This is a subsidiary of the United Traction Company formed to make application for the operation of buses and trackless trolleys in Rensselaer and Cohoes. The attorney is attorney for the United Traction Company and the Delaware & Hudson Railroad.

Detroit Will Try Trackless Trolley

The Department of Street Railways, Detroit, Mich., will carry on experiments with one of the latest models of trackless trolleys which is expected to arrive in the city shortly.

The type of trackless trolley which is to be tried out is of large capacity, carrying approximately as many passengers as one of the one-man cars now in use on certain lines in Detroit. It has been announced that several of these cars will be purchased if the trials prove such equipment to be adaptable to Detroit's needs and conditions. They will be for use in the outlying districts.

Subsidiary Bus Company Formed

A certificate of public convenience was granted recently to the Valley Motor Transportation Company of East Liverpool and Steubenville by the State Utilities Commission at Columbus, Ohio. The Valley Motor Transportation Company is a subsidiary of the Steubenville, East Liverpool & Beaver Valley Traction Company. The commission extends to the company the right to establish and operate bus lines in East Liverpool and Steubenville.

The company at the present time is maintaining bus service on the old River Road line between the Diamond and the Mulberry Street junction and also along the Lincoln Highway between Pleasant Heights and Stop 55. A bus is also operating on the La Belle View line in Steubenville. The company began the operation of buses on the Pleasant Heights and River Road lines immediately upon settlement of the car strike about a year ago, when it took over cars which had been purchased by the Ceramic City Motor Car Company.

Washington Fare Measure to Be Included in Appropriation Bill

Although hearings have not been concluded by the Senate District of Columbia committee on the bill seeking to force a 5-cent fare in Washington, Senator McKellar, author of the measure, has practically abandoned his effort to secure action on a separate measure and has served notice that he will make an attempt to have the proposal attached to the District of Columbia appropriation bill as a rider. The appropriation bill is expected to reach the Senate about May 1.

The McKellar 5-cent fare bill is opposed by the Capital Traction Company, the Washington Railway & Electric Company and the Public Utilities Commission of the District.

In testifying before the Senate committee, Senator McKellar took the position that the franchise contracts of the two corporations provide for a 5-cent fare. He says that the return allowed by the Public Utilities Commission is based on excessive value.

Officials of the two companies have shown that the income of both railways had decreased steadily since the war ended. While the Capital Traction Company last year earned 7 per cent, plus, on its fair value as fixed by the Public Utilities Commission, the Washington Railway & Electric Company fell far below this figure. The two corporations combined earned less than 6 per cent on their combined fair values.

The present fare in Washington is 8 cents cash, or six tokens for 40 cents.

Operators Tell About One-Man Cars to Help Dayton

City Attorney J. B. Harshman of Dayton, Ohio, has returned to Dayton from New York City, where he went to inquire into the use of one-man cars. Upon the application of Attorney J. Sprigg McMahon, of the law firm of McMahon, Corwin & Landis, representing the railways in Dayton, the depositions of a number of the electric railway operators in the East were taken. Among those who were examined were C. W. Kellogg of Stone & Webster; C. E. Morgan, Brooklyn; E. M. Walker, Schenectady; John E. Duffy, Syracuse. E. J. Murphy, chief statistician of the American Electric Railway Association, corroborated the testimony of the railway officials. An ordinance intended to prohibit the use of one-man cars in Dayton was passed some time ago, but enforcement of its provisions has been delayed. It is said now that the situation will probably be solved by an arrangement being put into effect under which both one-man and two-man cars will be permitted to operate under a definite arrangement which will fix the hours of use of each class of vehicle.

Jitneys Cease Operation in Houston

In accordance with the terms of an ordinance jitneys ceased operation in Houston on March 31. Prior to that date a petition had been filed by several jitney drivers seeking to enjoin the city from enforcing the ordinance, but the city attorney answered by filing a general demurrer which was sustained by the district judge. The attorneys for the jitney drivers gave notice of an appeal to a higher court, but as yet no date has been set for the hearing.

The Houston Electric Company began its increased service on March 28, and on the morning of April 1 was fully prepared to handle the additional traffic. The company is now operating three 29-passenger Yellow Coach buses in all-day service and six during the rush hours over the route of the former Austin jitney line.

The only changes necessary in the operation of the railway system to care for the jitney riders, and to prevent congestion in the downtown district, was the addition of extra cars, rerouting of three lines in the business section, and the use of street collectors.

Eastern Massachusetts Carries Dash Signs to Attract Business

The Eastern Massachusetts Street Railway, Boston, Mass., has been carrying dash signs on its cars for the purpose of attracting more business to the railway. The posters are 21 in. x 13 in. in blue, red, maroon and green type, carrying such messages as "Park your worries at home," "Travel by trolley," "Snow ahead—store auto and use trolley," "The street car stops near all the shops," "Shop by trolley and keep out of the auto jam," and "Travel by trolley for convenience and economy." The publicity campaign was started just before Christmas. Each of the signs was carried about two weeks, with two signs on each car.

The effect on riding is not known as yet; however, a large number of favorable comments from people in the territory have been received by the company, a fair indication that the dash signs have done some good.

Conferences on Wage Matter Scheduled in East St. Louis

Officials of the East St. Louis & Suburban Railway and its East St. Louis Amalgamated employees will confer regarding a new wage scale to take effect when the present contract expires on May 1. A decision to ask for an increase in wages was reached at a meeting on April 10.

The present wage scale in East St. Louis provides a maximum of 56 cents an hour for suburban men, 54 cents for city men and 58 cents for operators of one-man cars. Men employed three months or less get 45 cents; for the next six months, 48 cents, and at the end of nine months 53 cents. After a year they receive the maximum pay for regulars. Conductors and motormen in St. Louis are paid a maximum of 67 cents an hour.

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News Notes

Providence Council Opposed to Fare Increase. — The Common Council of Providence, R. I., recently concurred in a resolution directing the city solicitor to appear before the Public Utilities Commission to oppose any increase in fare for the United Electric Railway until the fare zones are extended to the city line. In the annual report of the company it was intimated that the railway would soon petition for increased fares.

Offices Moved.—The Chicago Surface Lines, Chicago, Ill., is moving some of its offices from the eleventh floor of the Illinois Merchants Bank Building to the fourteenth floor of the newly completed section of the building. After April 14 the executive offices will all be on the fourteenth floor and the address will be 231 South La Salle Street.

Fares Lowered.—The new management of the Hornell Traction Company, Hornell, N. Y., has reduced the fare from 8 cents to 7 cents. Some time ago it was announced that the line would probably discontinue service because of financial difficulties. Later it developed that the bondholders voted to have the interest of the company turned over to Raymond Page and W. C. Whitaker. One of the first things the new management did was to reduce fares in the hope of regaining patronage.

Committee Appointed to Formulate Plan.—Another step in the solution of the Spartanburg traction muddle was taken on April 9 with the appointment by the Chamber of Commerce of a committee of prominent unbiased citizens to study the situation and advance a plan that would be acceptable both to the city and the South Carolina Gas & Electric Company. The Chamber of Commerce officials believe that the present inadequate transportation facilities are a distinct disadvantage to the growth of the city.

Bus Line to Replace Railway.—Announcement has been made that the Public Service Railway, Newark, N. J., plans to tear up its tracks in Scotland Road, south of Central Avenue, Orange, and operate a bus line between Morris Avenue and the carhouse at Washington and Dodd Streets, that city. It is expected track removal work will start as soon as definite assurance is received from the county that the freeholders are going to pave and take over the road between Morris Street and Central Avenue. The bus line is to be started within the next month.

Debut of Surface Service Magazine.—Because the company feels that there has been developed a widespread and genuine interest in the activities of the Chicago Surface Lines it has started the publishing of a company pamphlet called "Surface Service Magazine," which will aim each month to discuss public questions and will disseminate news and comment of special local interest. The publication will broadcast the work of all departmental units in the belief that it will help toward making the Chicago Surface Lines a model for the transportation world. The première contained some twenty pages, including stories on "Measuring Power Consumption," "Strong for Accident Prevention," and "Caring for the Eyes." In addition the readers were given a few laughs in the selection of some real jokes.

Fares Increased in Texas Towns.—The City Commission of Denison, Tex., has granted the application of the Texas Electric Railway, which operates local service in Denison, for authority to increase the fare charged in Denison from 5 cents to 7 cents. The application set forth that the company found it impossible to maintain efficient service with a 5-cent fare. The company will sell four fare tokens for 25 cents and will grant one-half fare for all students where books of tickets are purchased. A similar increase was granted by the City Commission at Sherman, which is also served by the Texas Electric Railway.

Six-Cent Fare Extended.—The City Council of Richmond, Va., has again extended the 6-cent fare privilege to the Virginia Railway & Power Company for its Richmond lines. Ordway Puller, chairman of the Council committee on streets, promised action on the franchise of the Virginia Railway & Power Company within the next sixty days. The franchise requested by the company would combine all of its various contracts with the city, expiring at various times during the next ten years, under one agreement. Mr. Puller said he would at a later date issue a detailed statement explaining why there has been delay.

Baseball and Transit Guide in One.—Dates for New York City baseball games are included in a pamphlet recently issued by the Interborough Rapid Transit Company, New York. The pamphlet, called "Ride on the Open Air Elevated," contains a map which is designed primarily as a guide for patrons on elevated lines. Some valuable pointers on both local and express service are included as special features of the "L" service. When the reader wearies of traveling from Brooklyn to the Yankee Stadium or the Polo Grounds he can look over the schedule of the Yankees and Giants "at home."

Co-operation Brings Better Traffic Results.—Co-operating with the police department and practicing double-berthing instead of single-berthing at the corners, the Grand Rapids Railway, Grand Rapids, Mich., has succeeded in cutting the rush-hour time through the business section of the city from thirteen to eight minutes, according to L. J. DeLamarter, vice-president and general manager. Loading platforms at several corners have greatly aided in the time saving, particularly since the platforms have been lengthened to accommodate two cars. The double-berthing enables two cars to move forward at the same time. As a further help police have been permitted to wave on cars against the traffic lights when such move will expedite keeping the street clear. This is practiced especially when cars turn on to the avenue from side streets.

Rate Case Closed.—The rate case of the International Railway, Buffalo, N. Y., before the Public Service Commission on the application of the city authorities of Buffalo for a return to the 5-cent fare, has been closed and the evidence is now being considered by the Public Utilities Commission. At the final hearing before the commission counsel for the International Railway asked dismissal of the city's application and approval of the company's request for an 8-cent city fare. A 7-cent fare with four tokens for 25 cents is now being charged in Buffalo.

Commission to Settle Dispute.—The State Corporation Commission of Virginia has been asked to settle the dispute between the city of Norfolk and the Virginia Railway & Power Company over lines operating in Edgewater, a suburb of Norfolk. The city contends that the line is essential, but the company claims that it cannot be made to pay and should be abandoned. About a year ago the commission was asked to settle the controversy, and recommended that an attempt to reroute the line be made. For the last ten or twelve months both parties have discussed the matter but without reaching any agreement satisfactory to both, and the result is that the commission has been asked to take a hand again.

Wages to Be Arbitrated. — Having failed among themselves to reach an agreement on the wage question, the Trenton & Mercer County Traction Corporation, Trenton, N. J., and its employees have submitted the wage matter to arbitration. Albert S. Richey, Worcester, Mass., has been selected to represent the company, while James H. Vahey will appear for the men. Messrs. Richey and Vahey will choose a third arbitrator. The agreement between the company and men expired on April 1. As a result of conferences issues covering most of the working conditions have been adjusted, but the wage question remains unsettled.

Given a One-Year Permit.—The Atlantic Coast Transportation Company has been offered by the Asbury Park Board of Commissioners a one-year permit to operate buses at that place. To secure the permit the transportation company must agree to a 7-cent fare with transfers, conduct a ten-minute schedule and agree to permit the city to sanction the type of bus, which must be uniform. The Atlantic Coast Transportation Company, which is operated by the Atlantic Coast Transit Company, is capitalized at $100,000.

B.-M. T. Publishes Map for Guidance.—A new map and guide to all Brooklyn-Manhattan Transit lines has been published by the Brooklyn-Manhattan Transit Corporation. It was distributed for the first time at the opening night of the Brooklyn Industrial Exposition on April 5 to visitors at the B.-M. T. booth. The map and guide will be placed conspicuously in all the company's cars. The map is folded so as to be convenient to carry in pockets or handbags. The subway lines are printed in black and the elevated lines in red. On the reverse side of the map is a complete guide with the names of the stations and hours of service.

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Financial and Corporate

St. Louis Net Higher

Increase of $296,653 for 1923 Shown Over the Result for 1922—Congestion Becoming a Problem

Net income of the United Railways, St. Louis, Mo., for the year 1923 increased $296,653 over the year 1922. For 1923 the net was $809,745. For 1922 the net was $513,092. Gross operating revenue increased $489,889, from the sum of $19,963,555 in 1922 to $20,453,445 in 1923. It is explained in the printed report of the company for the year that all of the underlying bonds, aggregating $6,100,000, matured Oct. 1, 1923, and that the St. Louis & Suburban Railway general mortgage bonds matured April 1, 1923. It is further explained that the St. Louis Transit Company bonds mature Oct. 1, 1924, and the default in payment of the underlying bonds created a default in the United Railways general mortgage bonds due July 1, 1934. No interest has been paid on any of the bonds since Oct. 1, 1923, but interest has been accrued on the books to Dec. 31, 1923, at the rates provided by the mortgages or extension agreements.

No payments were made during the year on the liability of $2,396,321 for mill tax due the city of St. Louis, this amount being the balance of judgment obtained by the city against the company for mill tax to Dec. 31, 1918. The interest on this judgment, however, has been accrued on the books to Dec. 31, 1923, and the current mill tax has been paid regularly.

Provision for depreciation, renewals, etc., aggregated $1,500,000 for the year 1923, this amount having been fixed by a ruling of the Missouri Public Service Commission. Charges against the depreciation reserve during the year aggregated $788,998 and consisted principally of reconstruction of track and roadway, and retired equipment.

The surplus of the company as of Dec. 31, 1923, stood at $4,275,573, made up of a balance of $3,377,773 and $897,800 of additions during the year. The balance sheet of the company shows among the assets $5,341,150 of United States government bonds and treasury notes.

Rolla Wells, the receiver, points out that the total taxes and street paving costs for the year 1923 amounted to $2,287,048, or 0.781 cents per revenue passenger. In his review of the affiairs of the company the receiver explains quite fully the improvements carried out. Thus during the year 26.82 miles of track was reconstructed or renewed, fifty new cars were built, 113 cars were remodeled, shops and shop equipment were improved and the power supply augmented.

Mr. Wells says that the difficulty of operations in so-called "congested districts" has become more acute. He says that both the efficiency of the service and the expense of the company have been affected by allowing automobiles to be parked indefinitely in those districts, the lack of proper regulation of so-called service cars, the increasing number of passenger automobiles and freight trucks, and especially the permits granted by the Board of Public Service to buses to operate over certain of the heaviest lines of the street car traffic. Thus he says that the number of reveue passengers in 1923 (although seriously falling off in the latter part of the year) was 2.31 per cent greater than in 1922, and the largest in any year in the history of the company. On the other hand, for the purpose of improving the service, the car-miles increased 3.22 per cent, but due to the congestion mentioned the car-hours increased 4.35 per cent and the average miles per hour decreased 1 per cent.

During 1923 the work of equipping passenger cars with Economy watt-hour meters was completed. This work was begun in 1922. Mr Wells says that the results have been very gratifying. The total cost of installation (including equipment for testing and maintenance) was $105,944. The saving in power consumption per car-mile measured at the cars was 8.6 per cent and at the power house primary switchboards 5.8 per cent. On the latter basis the gross saving in cost of power was approximately $112,690. Liberally deducting a depreciating charge of 10 per cent on equipment and 7 per cent interest thereon and all costs for operating meters, maintenance, wages of instructors, inspectors, and clerks, the net saving for the year was approximately $78,293.

With respect to the valuation, Mr. Wells says that on June 4, 1923, after more than four years of work on the valuation of the property in charge of the receiver, the Missouri Public Service Commission handed down its decision and order, fixing as of Jan. 1, 1919, the value of the property of the United Railways (including property of the Florissant Construction, Real Estate & Investment Company) at $52,838,110, and that of the Missouri Electric Railroad at $781,949. Petitions by both the city and the company for a rehearing are still pending before the courts, but developments since Mr. Wells made his report appear to indicate a settlement out of court.

STATEMENT OF EARNINGS OF UNITED RAILWAYS, ST. LOUIS

	1923	1922
Revenue from transportation	$20,220,765	$19,740,118
Revenue from other railway operations	232,679	223,437
Gross operating revenue	$20,453,445	$19,963,555
Current operating expense and depreciation	$15,123,183	$14,895,508
Taxes	1,832,602	1,845,722
Total operating expense, depreciation and taxes	$16,955,785	$16,741,231
Income from operation	$3,497,659	$3,222,324
Non-operating income	225,700	202,830
Gross income	$3,723,359	$3,425,155
Interest and miscellaneous charges	2,913,614	2,912,063
Net income for the year	$809,745	$513,092

TRAFFIC STATISTICS OF UNITED RAILWAYS, ST. LOUIS

	1923	1922
Revenue passengers	292,671,781	286,076,475
Transfer passengers	155,343,193	152,261,868
Total passengers	448,014,974	438,338,343
Percentage of revenue passengers using transfers	53.08	53.22
Average fare per passenger (including transfers)	4.50c	4.49c
Average fare per revenue passenger	6.89c	6.89c
Passenger car-miles	45,652,714	44,229,300
Revenue passengers per car-mile	6.41	6.47
Total passengers per car-mile	9.81	9.91

Tidewater Line at Birmingham Sold Under Foreclosure

Sale of the Tidewater line to the National Power & Light Company for $750,000 and the assumption of bonds and debts amounting to $1,675,000 was made by J. S. Pevear, special master, on April 15. The sale followed the negotiation of an agreement between representatives of the company and the members of the City Commission at Birmingham, Ala., permitting the rerouting of the line with a considerable amount of track abandonment. The purchase is presaged on the agreement being carried into effect by the city by April 19. The property was bid in for the National Power & Light Company by F. B. Odlum, acting for L. B. Hatch, who purchased the properties of the Birmingham Railway, Light & Power Company for the same concern.

Elimination of seventy-two railroad crossings at grade was effected by the track abandonment consented to by the members of the City Commission at the conferences. Changes agreed to by the City Commission, it is stated, will permit the Tidewater line to be made an integral part of the railway system and will enable the company to operate the portions of the line retained under the agreement on a self-sustaining and perhaps a profitable basis.

Operation of the Tidewater line has been in the hands of the Birmingham Railway, Light & Power Company and later in the hands of the receivers for several years. The line, according to officials of the company, has just about broken even on operation expenses, but has lost about $40,000 a year in depreciation of tracks and equipment. Lee C. Bradley and Mr. Pevear, co-receivers, stated to city officials that unless an agreement could be reached that would enable the reorganized company to take over and operate the useful portions of the line on a self-sustaining basis the entire line would have to be junked. The City Commission originally declined to consent to the changes asked, which are in the main the changes which were consented to in the agreement just adopted. Commissioner William L. Harrison wrote a letter offering the line to Henry Ford, but was later advised that Mr. Ford was not interested. The agreement was reached when the company representatives met the city's terms on through service,

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additional paving, the $75,000 payment for franchise revisions and track changes, and consented to retain certain trackage on the western end of the line which had originally been included in the plan for abandonment.

Stockholders Seek Dissolution of Northumberland Property

Stockholders of the Sunbury, Lewisburg & Milton Railway, Sunbury, Pa., have voted to petition the court for a decree of dissolution of their corporation. With this action consummated, the property, which consists of a railway between the Sixth Street Junction, in Northumberland, of the Sunbury & Northumberland Street Railway and a point at the western end of the classification yards of the Pennsylvania Railroad, also in Northumberland, will be turned over to a trustee for sale. This line has been operated under the same management as the Sunbury and Selinsgrove lines.

The question of providing transportation for about 4,000 Pennsylvania Railroad employees, between the west end of the yards and the trolley junction, has not yet been solved, although a proposal has been made for establishing bus service between the two points.

U. S. Supreme Court Acts in Clark Case

The United States Supreme Court has declined to review the decision of the Court of Appeals of Franklin County, Ohio, which awarded a verdict to Augusta M. Slaymaker and the Columbus Railway, Power & Light Company against E. W. Clark & Company, and others. Without comment, the Supreme Court on April 14 denied a petition for certiorari which would have brought this case on appeal before it.

Deficit in Honolulu in 1923

The Honolulu Rapid Transit Company had a deficit in 1923 of $33,585. The total revenue from all sources in 1923 was $988,928, compared with $989,521 in 1922. Operating expenses in 1923 were $618,708 as compared with $602,757 in 1922. Passengers carried showed an increase of 5½ per cent over 1921 and an increase of 2 per cent over 1922. The report of the company for the year refers to the bus service started in the Kalihi district on Aug. 16, 1923. From that period up to Dec. 31, 1923, operations resulted in a deficit of $2,038. The improvements and extensions carried out during the past year under the program laid out in 1922 for the expenditure of $500,000 included track work, power installation, construction of six new cars and other miscellaneous improvements and additions.

	1923	1922
Total revenue from transportation	$978,433	$973,129
Total revenue from other railway operations	10,495	16,392
Gross revenue from operations	$988,928	$989,521
Total operating expenses.	618,708	602,757
Net revenue from operations	$370,220	$386,764
Total deductions	403,805	351,216
Surplus	*$33,585	$35,548

*Deficit

President Castle said that the year 1923 had been a disappointing one in many respects. With the acceptance of the new franchise in February, 1922, the company was faced with the need of extensive and immediate improvements to its system. Already more than $550,000 had been expended on improvements to track and equipment, new capital expenditure which has been financed in part by a stock issue of $500,000. All of this work had not brought in corresponding increase in revenue. The present rate of return could not be maintained on a 5-cent fare upon present patronage. The results of operation in 1923 compared with 1922 are shown in the accompanying table.

Net Income of Connecticut Company Smaller in 1923

The net income of the Connecticut Company, New Haven, for the year 1923 was $1,025,247. This is a decrease of $285,168 over 1922. Figures to this effect are contained in the statement of the affairs of the New York, New Haven & Hartford Railroad for the year ended Dec. 31, 1923. That company owns the entire $40,000,000 of capital stock of the Connecticut Company and $1,000,000 of debentures and $4,568,916 of the company's notes. This stock is in the hands of federal trustees, who under decree of the federal court shall exercise their best efforts to complete the sale of shares before April 1, 1925.

In commenting on the affairs of the Connecticut Company E. J. Pearson, president of the New York, New Haven & Hartford Railroad, says that while there has been a constantly increasing patronage of the cars in Connecticut, the percentage of increase in passengers has not been equal to the percentage of the reduction in the rate of fare made effective April 1, 1923. Mr. Pearson explains that it was necessary on June 1 to make effective an increase in rates of pay to all classes of labor, and the increased payrolls together with a decreased gross revenue resulted in a decrease in net for the year, the decrease becoming greater as the winter period approached. It was, therefore, necessary to announce an increase in the rate, effective Feb. 10, 1924, to three tokens for 25 cents, referred to previously in the ELECTRIC RAILWAY JOURNAL. The operating ratio in 1923 was 79.32 per cent, an increase of 2.11 per cent over 1922.

INCOME ACCOUNT OF THE CONNECTICUT COMPANY

	1923	1922
Total operating revenues.	$14,717,233	$14,477,611
Total operating expenses..	11,673,454	11,177,594
Net operating revenue....	$3,043,779	$3,300,017
Tax accruals.....	576,672	558,808
Operating income.....	$2,467,106	$2,741,209
Non-operating income.....	62,618	44,831
Gross income.....	$2,529,724	$2,786,040
Deductions from gross income.....	1,504,477	1,475,625
Net income.....	$1,025,247	$1,310,415

Franchise and Financial Details Paramount in St. Louis

The directors of the United Railways, St. Louis, on April 8 ratified the appointment of an enlarged reorganization committee which will take up immediately the problem of refinancing the local railway, now in the hands of Receiver Rolla Wells. The new body will begin where the old committee of three members left off.

The head of that committee was Frank O. Watts, president of the First National Bank, St. Louis. He will be chairman of the new committee which is to have five members. Others on the new committee are to be J. K. Newman, president Newman, Saunders & Company, New York; A. L. Shapleigh, president of the United Railways Company (both members of the old committee); William P. Gest, president of the Fidelity Trust Company, Philadelphia, and J. Sheppard Smith, vice-president of the Mississippi Valley Trust Company. Mr. Gest was chairman of one of the protective committees for holders of St. Louis Transit Company 5 per cent bonds. In Mr. Smith the Mississippi Valley Trust Company will for the first time be represented on the organization committees. That institution is interested in a fiduciary capacity in the securities of both the United Railways and the St. Louis & Suburban Company.

Mr. Watts has said that no fixed plan can be announced at this time, as the ideas thus far developed by the reorganization committee must be submitted to the United States District Court, to the state commission and to the city administration.

As has been indicated previously it is contemplated that the $30,300,000 outstanding general mortgage 4's due in 1934 will remain outstanding, as the reorganization committee has been advised by counsel that there will be no permanent default in these bonds if certain legal requirements are met. Those requirements seem comparatively easy of performance. The financial plan will, therefore, be confined to the Transit 5's, Suburban general 5's, and to the preferred and common stocks. Necessarily, the receiver's certificates, the underlying bonds and other temporary or past due obligations will be provided for.

As Mr. Watts sees it the immediate undertakings of the reorganization committee are:

1. To determine with the Public Service Commission, the proper valuation of the properties for the purposes of reorganization.

2. To arrange for a new franchise which will insure proper service and protection to the car-riding public, and which will establish reasonable conditions of operations and define all matters necessary to be determined before reorganization can be accomplished.

3. To prepare and promulgate a financial plan acceptable to the city, the Public Service Commission, the court and the present security holders of the company.

Mayor Henry W. Kiel has declared in favor of an initiative election on a new blanket franchise for the company,

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which he contends must provide for payment of some $3,000,000 in back mill taxes now due the city.

Newman, Saunders & Company will shortly open an office in St. Louis and place experts at work on the reorganization details immediately.

Earnings of Westchester High-Speed Line Improve

The New York, Westchester & Boston Railway, operating 57 miles of high-speed electric railway out of New York City into Westchester County, for the year ended Dec. 31, 1923, had gross revenues of $1,452,943, an increase of $98,934 over 1922, and balance after taxes of $247,172, equal to 25 per cent of annual interest charges on its $21,390,000 of 4½s, upon which interest is guaranteed and paid by the New York, New Haven & Hartford Railroad.

There was a deficit after charges for the year of $1,616,714, due to $886,727 interest on unfunded debt, chiefly on $16,300,000 notes and advances by the New Haven, in addition to rentals, miscellaneous charges and regular bond interest.

The Larchmont extension, which was put into operation early in 1921 at a cost of $418,500, has shown average annual net income since of $117,707 and for 1923 of $148,400.

P. R. T. Seeks Approval of $1,000,000 Loan

The Philadelphia Rapid Transit Company, Philadelphia, Pa., has requested the city to approve a proposed $1,000,000 bond issue to retire $389,000 of the company's real estate mortgage bonds and to provide funds for necessary transit improvements. This request was contained in a letter to the Council from W. C. Dunbar, president of the company, on April 10. Its presentation was followed by the introduction of an ordinance by the chairman of the committee on transportation and public utilities providing for the city's assent. The subject was referred to his committee. Mr. Dunbar explained that the proceeds of this loan will be used to:

Retire mortgages now outstanding on various parcels of the company real estate, $389,000.

Construct track extensions to the new Southern carhouse now being built at Twentieth and Johnson Streets, $300,000.

Construct and equip a substation at Fox Chase, $90,000.

Add rotary converter at Ranstead substation, $40,000.

Provide emergency and utility equipment and house same, $81,000.

Purchase additional signals, shop facilities and equipment for Market Street elevated, $100,000.

Another Step Taken in New Jersey Readjustment

Formal application has been filed with the Board of Public Utilities Commissioners of New Jersey for approval of a merger of the Public Service Electric Company, the United Electric Company and the Public Service Gas Company. At the same time approval was asked of a plan to change the 500,000 shares of the Public Service Railway of $100 par value into no par value stock, the shares to be exchanged par for par.

The merger is in line with the plans for financial readjustment to which reference has been made before in the ELECTRIC RAILWAY JOURNAL. The new company will be known as the Public Service Electric & Gas Company and will be controlled by the Public Service Corporation. The electric and gas company is expected to be the company to put out future new capital issues.

Assurance is given that the readjustment will not disturb the relationship which the corporation now bears to its subsidiaries or to the public, nor will it affect the holders of underlying gas, electric and railway properties except to improve their position by facilitating the development of the properties.

Indianapolis-Louisville Line Does Well

The gross operating income of the Interstate Public Service Company, Indianapolis, Ind., for the year 1923 was $2,128,679 greater than for 1922, or 49.8 per cent. The net earnings for the last year were $466,698 greater than for 1922, or 48.5 per cent.

The railway department showed an increase in revenue over 1922. Heavy freight and express traffic made necessary the purchase of additional equipment, including three sleeping cars for service between Indianapolis and Louisville, two express motor cars, three express trail cars, ten live stock cars and two convertible ballast cars for use in track maintenance. The interurban tracks were extended into the Bourbon stockyards at Louisville during the year. This materially increased the live stock business. As many as 337 cars of stock have recently been handled in a month. During the year three parlor buffet cars were placed in service on the interurban line between Indianapolis and Louisville. This new service proved popular from the start and two additional cars of the same type are now under order.

As for financial operations, the company retired its first and refunding mortgage, and in lieu thereof executed a new mortgage designed to finance the requirements of the company under existing conditions on more advantageous terms than the older mortgage executed some years ago. Under the new mortgage the company issued $8,192,000 in face amount of first mortgage and refunding gold bonds, Series A, using the proceeds to retire $4,048,000 in face amount of its first and refunding mortgage bonds and $3,044,000 in face amount of divisional underlying bonds of comparatively early maturities and to finance the cost of additions and extensions.

During 1923, the company also issued and sold $358,000, par value, of its preferred stock, and $335,000, par value, of common stock, and issued and delivered $2,000,000, par value, of common stock in connection with the acquisition of various properties in January, 1923. Also during the year $1,100,000, par amount, of prior lien stock was issued and delivered on account of and in connection with the acquisition of various properties in January, 1923; $211,000 par was issued and exchanged for certain outstanding general mortgage bonds of the company amounting to $211,000, and $1,524,700, par amount, of prior lien stock was issued and sold to investors, many of whom are customers of the company, and the proceeds used to pay or reimburse the cost of additions and extensions to the company's property.

The policy of offering the company's prior lien stock to customers, inviting them to become part owners of the company, has resulted in a wider personal interest in its affairs. The company's stockholders increased in number during the year from 1,980 to 4,485.

STATEMENT OF EARNINGS OF INTERSTATE PUBLIC SERVICE COMPANY FOR YEAR ENDED DEC. 31, 1923

Gross earnings, including merchandise sales		$6,405,343
Operating expenses (including taxes)		4,825,177
		$1,580,166
Miscellaneous income		16,251
		$1,596,417
Rental of leased railway property		165,898
Net earnings		$1,430,519
Interest on funded debt		647,189
		$783,330
General interest and amortization of discount		97,674
Available for dividends		$685,656
Dividends paid and accrued:		
Prior lien stock dividend		250,461
		$435,195
Preferred stock dividend		298,108
Balance carried to surplus		$137,087

Scaling Down Planned in Erie Reorganization

Details have been announced of the plan under which it is proposed to reorganize the Buffalo & Lake Erie Traction Company, Erie, Pa. It is proposed that the committee for the holders of the first and refunding mortgage 5 per cent thirty-year gold bonds, through its nominee, shall acquire all the property of the Buffalo & Lake Erie at foreclosure sales. Two new companies will be organized, designated in the plan as the Erie Company and the Interurban Company. The Erie Company will acquire the lines in the city of Erie and the Interurban Company will acquire the purely interurban line.

The Erie company will have a capitalization of $5,000,000 of 6 per cent first and refunding mortgage sinking fund thirty-year gold bonds, of which $1,000,000 are "presently issued"; $1,500,000 of 7 per cent cumulative preferred stock, of which $1,050,750 will be the initial issue, and 60,000 no par value shares of common stock. From the proceeds of $1,000,000 of the sinking fund gold bonds, and other moneys, the syndicate proposes to retire the receiver's certificates now a lien on the property of the Erie Company and to make available the $700,500 cash to be received by the committee. The property will be subject to mortgages and other secured debt.

The Interurban Company's capitalization is to consist of $1,500,000 of first and refunding mortgage 6½ per cent thirty-year sinking fund bonds, $800,000 of which comprise the initial issue; $1,500,000 of 5 per cent noncumulative preferred stock, of which $700,500 will be "presently issued," and

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30,000 shares of no par value common stock.

On the basis that all bondholders assent to the plan each holder of a $1,000 bond of the Buffalo & Lake Erie will receive $150 par value of 7 per cent cumulative preferred stock of the Erie Company, amounting to 15 per cent of his holdings; 10 per cent in 5 per cent non-cumulative preferred of the Interurban Company, or a par value of $100; three shares of common stock of the Erie Company, no par value, having an estimated book value of $16.47 a share and aggregating $49.41, and $30 cash on the basis of an estimated available balance for this purpose of $218,900. In other words, each holder of a $1,000 bond will receive new stock of a par value of $299.41 and cash of approximately $30.

The company has been in the hands of a receiver since 1915.

Cleveland Southwestern Wants to Issue Bonds

Application was filed with the Ohio Public Utilities Commission recently by the Cleveland Southwestern Railway & Light Company, Cleveland, Ohio, for authority to issue $4,500,000 in bonds and $4,000,000 in common stock for the purpose of consummating the reorganization of the company formerly known as the Cleveland, Southwestern & Columbus Railway.

Following an order of foreclosure sale by the Federal Court the properties were purchased on March 14 by John Fleek for Hayden, Miller & Company, who acted as reorganizing managers on behalf of all depositing bondholders. The sale was approved by the court, stockholders and directors.

The plan of reorganization calls for the issuance of securities substantially as follows: $800,000 prior lien twenty-five-year 6½ per cent bonds; $175,000 equipment trust certificates; $1,500,000 extended bonds comprising $200,000 Cleveland & Elyria thirty-year 6s, $100,000 Elyria & Oberlin thirty-year 6s, $127,000 Cleveland, Berea, Elyria & Oberlin thirty-year 6s and $1,073,000 Cleveland, Elyria & Western thirty-year 6s; $2,200,000 general and consolidated mortgage thirty-year 5s.

Auction Sales in New York.—At the public auction rooms of A. H. Muller & Sons there were no sales of electric railway securities this week.

Loss for 1923 $65,593.—The Fresno Traction Company, Fresno, Cal., reports to the Railroad Commission for the year 1923 that its operating revenue was $430,441 and operating expenses $344,739, giving a net operating revenue of $85,702. The net corporate loss for the year was $65,593. The deficit at the beginning of the year was $621,466. Miscellaneous additions to surplus for 1923 were $75,064 and miscellaneous deductions were $2,425, leaving an accumulated deficit at the end of the year of $614,419.

Approves Track Removal.—The New York Transit Commission announced on April 11 its approval of the proposed condemnation and removal of the tracks of the Sixth Avenue elevated road, at present running from Fifty-third Street to Fifty-ninth Street, and known as the Fifty-eighth Street spur. This will leave the Board of Estimate and Apportionment free to initiate the condemnation proceedings and start the work of removal as soon as it may desire.

Power and Light Properties Included in Sale. — The Warren-Jamestown Street Railway, Jamestown, N. Y., the Warren Street Railway, Warren, Pa., and the interurban line connecting Warren and Sheffield as well as extensive light and power systems of the Warren Traction Company have been sold to the Penn Public Service Corporation, which took over the electric railway properties as of April 10, 1924.

Name to Be Changed.—Steps have been taken by the Northern States Power Company in La Crosse to change the name of its largest division, the Wisconsin-Minnesota Light & Power Company, which supplies city and interurban railway service throughout a large territory in western Wisconsin, to the Northern States Power Company. Formal notice of the proposed action is contained in an amendment to the articles of incorporation of the company recorded recently.

Seeks Partial Abandonment. — The Stark Electric Railroad petitioned the Ohio Public Utilities Commission on April 8 for authority to abandon a part of its tracks in the city of Alliance. The application has been set for hearing May 12. The tracks proposed to be abandoned begin at the west side of Arch Avenue, running west on Main Street to Union Avenue, thence north to the right-of-way of the Cleveland and Pittsburgh tracks, thence on Vine Street.

Suit to Compel Payment of Dividends Dismissed.—The suit filed by holders of participation certificates of the Chicago Railways asking that dividends be ordered paid on certificates has been dismissed by Judge Cliffe of the United State District Court at Chicago. In his opinion Judge Cliffe held that "since the contractual obligations imposed by the plan of reorganization have not been violated, I must grant the motion to dismiss."

Receiver Discharged at Binghamton. —W. G. Phelps has been discharged as receiver of the Binghamton Railway, Binghamton, N. Y., by order of Federal Judge George W. Ray. Earnings of the company for 1923 are as follows: Gross, $1,073,723; net $325,733; interest and taxes, $217,107; balance, surplus, $108,626.

Short Pennsylvania Line Sold.—The Blue Ridge Traction Company, operating an 8-mile line, which connects Danielsville, Edgemont, Berlinsville, Walnutport and Slatington, Pa., was sold recently to H. Sofranscy Company, Allentown, Pa., junk dealers. It is believed that the new owners will scrap the line.

Mortgage Gold Bonds Offered.— Harris, Forbes & Company and A. C. Allyn & Company, Inc., New York, are offering at 100 and interest, yielding 6 per cent, $2,250,000 of refunding mortgage gold bonds of the Columbus Railway, Power & Light Company, Columbus, Ohio. They are known as the 6 per cent series due 1941. The bonds are dated Dec. 1, 1921, and are due Dec. 1, 1941. The Columbus Railway, Power & Light Company does practically the entire commercial electric light and power business in Columbus and vicinity, and does the entire railway business in Columbus.

Seeks Authority to Abandon in Palo Alto. — The Peninsular Railway has applied to the California Railroad Commission for authority to abandon its street railway system in Palo Alto and adjoining territory lying north of the Southern Pacific Company's tracks and to remove the tracks and equipment. The railway had a loss of $8,538 on these lines during 1923 and $12,523 during 1922. The deficit for its entire system for the year 1923 was $377,737.

Representatives of Bankers on Board. —At the annual meeting of the Public Service Corporation of New Jersey, on April 7, Alfred L. Loomis and Landon K. Thorne of Bonbright & Company, New York, were elected to the board of directors. Bonbright & Company have been identified with the recent financing of the company.

Deficit in New Jersey Slightly Larger.—A deficit of $126,922 was reported by the Public Service Railway, Newark, N. J., for February, compared with a deficit of $112,823 in February, 1923. The company is operating under a temporary schedule which provides within the limits of the larger cities served a 5-cent fare with an additional 5-cent charge in the suburbs, no transfers. In all other parts of the territory the rate of 8 cents, four tokens for 30 cents, 1 cent transfer, continues.

Authorizes Bond Issue. — The Key System Transit Company, Oakland, Cal., has been authorized by the Railroad Commission in a supplemental order to execute a deed of trust to secure the payment of its general and refunding mortgage bonds amounting to $20,000,000, and to issue $8,951,000 of such bonds, $1,365,800 bearing interest at the rate of 6 per cent per annum, and $7,585,200 at the rate of 5 per cent per annum, and to use the proceeds to refund outstanding obligations.

Abandonment of Three-Mile Line Approved.—The Public Service Commission, under an order issued April 9, approved the declaration of abandonment by the Huntington Traction Company, Inc., of that part of its line in Huntington, L. I., south of the Long Island Railroad extending along the highway from Huntington to Siding No. 7, a distance of 3 miles, on the understanding that the railroad is to remove all of its structures and place the highway in good condition. The railroad is to continue between the north side of the Long Island Railroad and Halesite. It was asserted at the hearing that if any abandonment is to be permitted, the railroad should not be allowed to retain that part of its line north of the Long Island Railroad in Huntington. The commission holds that so far as this contention is concerned, the evidence is that public interest requires the continued operation of this part of the road, and further, that the commission has no power to compel a street railroad to abandon a portion of its route without its consent.

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Personal Items

Mr. Greenland Goes to St. Louis

Fort Wayne Official Retained to Assist in Extensive Work to Be Done in Connection with Reorganization of the United Railways

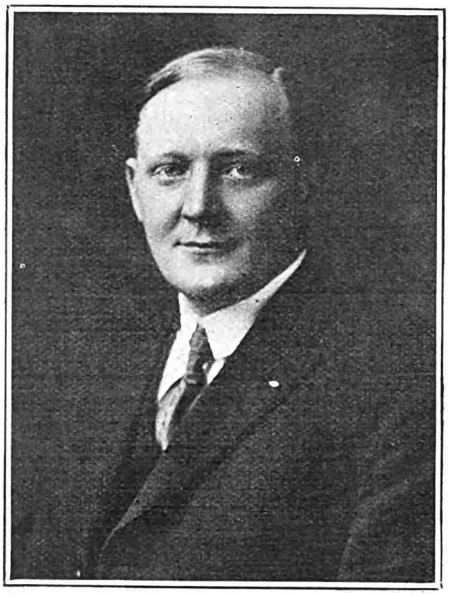
SAMUEL W. GREENLAND has resigned as vice-president and general manager of the Indiana Service Corporation, Ft. Wayne, Ind., effective May 15, to go to St. Louis as the representative of Newman, Saunders & Company, Inc., New York, to assist them in their work as agents of the reorganization committee of the United Railways. That firm has recently opened offices in St. Louis. The company with which Mr. Greenland is now connected owns and operates the electric railways in Ft. Wayne, Wabash, Peru and Logansport and the interurban lines connecting Fort Wayne with these cities and with Lafayette and Bluffton, Ind., and does a general power and lighting business. In addition to his connection with the Indiana Service Corporation Mr. Greenland is general manager of the Ft. Wayne & Decatur Traction Company and holds a similar position under the receiver of the Ft. Wayne, Van Wert & Lima Traction Company.

IMPORTANT WORK AHEAD

Mr. Greenland's duties at St. Louis have not been specifically defined. There is a vast amount of work to be done in connection with the lifting of the receivership of the United Railways there, and it is to this that Mr. Greenland will at first apply himself. The most important matters to come up immediately are the valuation and franchise questions, with which of course are interwoven the preparation and promulgation of the details of the financial reorganization, in working out which the interests of the city, the public service commission, the court and the present security holders will all have to be reconciled so that the future may best be served.

To the part in this work which Mr. Greenland will take he will bring a combination of exceptional natural talent and a knowledge of utility problems extending over a period of twenty-five years. He is one of the outstanding figures among Middle West railway men, because of his progressiveness in modernizing the operation of the Ft. Wayne properties. A very important piece of work here was his part in the complete recasting of the financial structure of the Ft. Wayne & Northern Indiana Traction Company and the organization of its successor, the Indiana Service Corporation. It seemed like a bitter pill for many of the local security holders to have to accept new substitute securities, with greatly reduced face value, for their former paper. But they had faith in the management and, even though reluctantly, came in on the plan and made possible the initial step toward turning the near-bankrupt property into one able to provide first-class service and make a nice profit on the railway as well as the lighting service.

Since the reorganization, the property has been very nearly wholly re-equipped and rebuilt with the best of rolling stock and increased power facilities, including a changeover to 100 per cent 60-cycle service, doing away with all 25-cycle energy.



S. W. Greenland

In the merchandising of transportation Mr. Greenland has also shown his progressiveness. He was quick to see the virtues of the weekly pass as applied to the conditions confronting him and he has been able to turn that to advantage as a revenue producer and as a means of cementing still closer his friendly relations with the public. And aside from the mechanics of the job, Mr. Greenland has been unusually successful in his relations with his employees, and has in addition made himself a real factor in all the progressive work of the community.

So far as his new work at St. Louis is concerned, it would appear that the future there for him is what he makes it. That being so, Mr. Greenland may be expected to make that future something distinctly worth while to the people of St. Louis and to the investors in that railway.

Mr. Greenland was born at Clarion, Pa., on April 27, 1879. He was educated at the Pennsylvania Military College, Chester, Pa., and at Penn State University, where his work in electrical engineering was concluded in 1900. His first job in the utility field was with the Bell Telephone Company at Pittsburgh in connection with construction work. In 1904 he became connected with Robert W. Watson, consulting engineer, Harrisburg, Pa., where for three years he was engaged principally in making engineering reports for financial interests. In 1907 he became general manager of the Columbus Railway, Light & Power Company, which furnishes the gas, electric light and railway services in Columbus, Miss. At the time the Wabash Valley Traction Company was reorganized to become the Fort Wayne & Northern Indiana Traction Company, in 1911, he went to Fort Wayne as assistant general manager and later in the same year was made general manager. Upon the reorganization of this company into the Indiana Service Corporation in 1920 he was elected vice-president as well as general manager.

FORMER SECTIONAL ASSOCIATION HEAD

Mr. Greenland has been active in the Central Electric Railway Association and served as its president during 1922. In 1917 he served as president of the Indiana Electric Light Association. He is a member of the American Institute of Electrical Engineers and the American Society of Mechanical engineers. During the war he was a major in the chemical warfare section of the army and had charge of the erection of a 20,000-kw. steam generating station at the Edgewood (Md.) Arsenal. He also looked after the operation of the utilities at Edgewood.

W. W. Nielson, assistant to A. E. Reynolds, vice-president and general manager of the Springfield Gas & Electric Company and the Sprinfield Traction Company, Springfield, Mo., has been promoted to assistant general manager of the Tucson Gas, Electric Light & Transmission Company, Tucson, Ariz.

Charles A. Blose, assistant line superintendent of the Indiana, Columbus & Eastern Traction Company for several years, has been appointed superintendent of lines, taking the place made vacant by the transfer of C. R. Holland, former superintendent, to a similar position with the Columbus, Newark & Zanesville Electric Railway. Mr. Blose will establish offices at Zanesville.

E. M. Ashworth has been appointed general manager of the Civic Hydro-Electric Commission of Toronto. At the time when the new Toronto Transportation Commission first met in the fall of 1920 Mr. Ashworth, then secretary and assistant general manager of the Hydro commission, was temporarily appointed secretary. At that time P. W. Ellis was unanimously chosen chairman.

Albert C. Spencer, engineer of way of the Toronto Transportation Commission, has become assistant general manager of the commission, which is responsible for the operation of the municipal railway lines in Toronto.

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W. C. Lincoln with Electric Service Supplies

Goes to Chicago from National Railway Appliance Company to Become Western Sales Manager

Willis C. Lincoln has been appointed Western sales manager of the Electric Service Supplies Company with headquarters in that company's Chicago office. Mr. Lincoln has resigned from his former connection as manager of sales and engineering for the National Railway Appliance Company, New York.

Willis Lincoln is well known in the electric railway, the steam railroads and the mining fields. He was one of the first engineer salesmen in the railway field. In fact, he applied his early selling instinct to help finance himself through Union College. With money which he earned by two years sales work with the Brewer-Pryor Piano Company, Mr. Lincoln studied electrical engineering at Union University under

W. C. Lincoln

the late Dr. Steinmetz, then head of that department of the university. Theory was all right, but Mr. Lincoln wanted practical experience. To get that he entered upon the regular test course of the General Electric Company just as soon as he finished at the university. Next he went with the consulting engineering department of that company. Later he entered the railway engineering department.

MR. LINCOLN IN SELLING END

Mr. Lincoln's next work for the company was at selling. This was a logical step, equipped as he was to talk in terms of performance and not in terms of appearance. And so he packed his grip as a sales engineer and covered several states for several years backed by an accurate knowledge of the material his company handled.

When the war broke out in the year 1914 Mr. Lincoln resigned his position with the General Electric Company to take charge of the engineering department of the Railway Improvement Company, New York. Later, as manager of sales and engineering of this company, his knowledge of selling was still further broadened, for with that company he had entire charge of marketing the company's products intended for use by steam and electric railways and in mines and other industrial plants.

J. O. Wilson Resigns from Cleveland-Southwestern

A quarter of a century of service with the Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, is the record of J. O. Wilson, who resigned, effective April 15, to accept a position as executive president of the Harvard Savings & Loan Company and the Harvard Mortgage Company. Mr. Wilson started in as a clerk in 1899 with the Cleveland-Southwestern properties, and worked his way up through almost every department to the executive position of secretary and treasurer, which position he held at the time of his resignation.

Alcide E. Beauvais has been elected president of the Montreal Tramways & Power Company, Montreal, Que., succeeding William C. Finley. E. A. D. Morgan and Evariste Champagne have been elected directors. The vice-presidency has not yet been filled and there remain three vacancies on the directorate.

J. E. Heston, formerly superintendent of shops of the Interstate Public Service Company at Scottsburg, Ind., has resigned, effective May 1, to enter other fields of work. Mr. Heston entered the service of the Union Traction Company of Indiana in September, 1900, and with the exception of two and one-half years, when he was in the service of the Winona Interurban Railway, was with that company continuously until May 15, 1923. It was on that date that he entered the service of the Interstate company.

Albert Swartz, formerly a receiver for the Toledo & Western Railroad, Toledo, Ohio, has been retained by the successor company and will have complete charge of operations. He was vice-president of the Community Traction Company at its beginning and previous to that time was in the employ of the Toledo Railways & Light Company and the Toledo & Western Railroad. He served a short time in the New York offices of Henry L. Doherty & Company, New York, after graduation from Toledo schools. His preliminary engineering work was done on railroads near Toledo. Mr. Swartz will continue to reside in Toledo. He will have his offices at Sylvania, at which place the headquarters of the Toledo & Western are located.

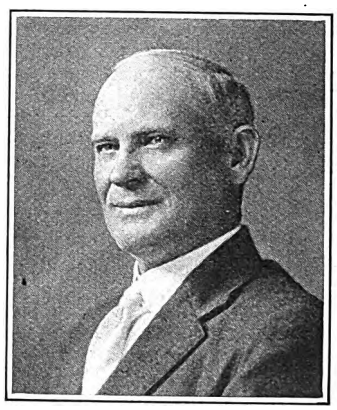
L. Sommers, formerly superintendent of way, subway and elevated division of the Philadelphia Rapid Transit Company, Philadelphia, Pa., has recently been appointed assistant operating manager of the subway and elevated division. C. C. Haney has been made operating manager.

Raymond Page has become manager of the Hornell Traction Company, Hornell, N. Y., following the vote of the bondholders to have the interests of the company turned over to Mr. Page and W. C. Whitaker. Robert W. Bull retires as receiver.

John R. Marshall Promoted in New Brighton

John R. Marshall, chief dispatcher of the Beaver Valley Traction Company and the Pittsburgh & Beaver Street Railway, New Brighton, Pa., has been advanced to the position of superintendent of transportation. The appointment of Mr. Marshall followed the change in general managership made effective when W. H. Boyce accepted the position of commercial manager with the Pittsburgh Railways and was succeeded at New Brighton by Clinton D. Smith as general manager.

Mr. Marshall has been with the company since 1902. In his early years of association with the Beaver Valley company he accepted a job as motorman at the request of John Buchanan, then president of the Beaver Valley Traction Company. For three years he operated a car, at the same time learning the duties of a conductor. Later he was advanced to assistant dispatcher. A year after he was made chief dispatcher,



J. R. Marshall

and it is this position which he now vacates to become superintendent of transportation.

Mr. Marshall was born on a farm on April 6, 1869. He has always made Beaver County his home. He attended the country schools, but as the oldest of eight children, he early obtained a job and board on a farm. His next venture was turning a boring wheel for ten hours a day at a wage of 50 cents a day. He spent seven years in a lumber camp and two years as a tool dresser and teamster in the oil fields of Butler County. Mr. Marshall's father died in 1897 and for five years thereafter he conducted the homestead farm. Later he moved to Beaver with his mother.

Obituary

J. S. Simpson

J. S. Simpson, auditor of the Washington Water Power Company and the Spokane United Railways, Spokane, Wash., died very suddenly on April 5, following an attack of apoplexy. He had been connected with the companies since 1918. Before that Mr. Simpson

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was chief accounting officer of the Washington Public Service Commission. Mr. Simpson was born at Greenland, N. H., in 1871. His first business connection was with the Thomson-Houston Company at Boston. He remained with that company and its successor, the General Electric Company, until 1901. In that year he went to Tacoma to enter the employ of Stone & Webster. D. L. Huntington, president of the enterprises of which Mr. Simpson was an officer, said that "not only had the companies lost a valuable man, in the death of Mr. Simpson, but that the city and the Inland Empire had lost a real friend."

J. E. Barhite

John E. Barhite, for eleven years special County Judge of Monroe County and a member of the Public Service Commission for the Second District of New York from 1917 to 1921, died in Rochester on April 2. He was appointed Public Service Commissioner by Gov. Charles S. Whitman upon the recommendation of the late George W. Aldridge, Rochester, Republican leader. Mr. Barhite was sixty-seven years old.

Lyman K. Brown, for many years treasurer of the Fonda, Johnstown & Gloversville Railway, Gloversville, N. Y., died recently at the age of seventy-five years.

Frank M. Harris, treasurer of the Des Moines City Railway, Des Moines, Iowa, died recently. He had been connected with the Des Moines City Railway since 1897. At the time of his death he was treasurer and general purchasing agent for the company. Mr. Harris was born in the city of Cleveland, Ohio, in 1865.

William C. Hawkes, seventy-nine years old, of Dorchester, died recently at Newton, Mass. Had it not been for a brief period when he was away from Boston, he would have had a record of the longest unbroken service with the Boston Elevated Railway. His first railway connection was with the old Lynn & Boston. Later he became connected with the Highland Street Railway, Boston.

Andrew L. Campbell, formerly chief of the electrical repair department of the United Electric Railways, Providence, R. I., died recently. He was first employed at the power station and later was placed in charge of substations. He had been with the company twenty-seven years.

John Freeman, formerly in the employ of the Northern Ohio Traction & Light Company, Akron, Ohio, died recently at the age of sixty-three years. He entered the service of the company in 1897 as motorman on the Akron city division. One year later he was appointed inspector. Later Mr. Freeman was transferred to New Philadelphia in charge of the lines in that section. Following this assignment he went to Canton as assistant to D. A. Scanlon, then superintendent of the southern division. In 1917 he was retired from service. He was the father of O. L. Freeman, present Akron city superintendent.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Further Reduction in Varieties of Paving Brick

At a meeting of the permanent committee on simplification of varieties and standards of vitrified paving brick of the United States Department of Commerce, held in Washington, D. C., March 28, the recognized types and sizes of vitrified paving brick were reduced from six to five. Since the first conference on paving brick simplification was held Nov. 15, 1921, manufacturers throughout the country have reduced the number of types and sizes of vitrified brick used for highway paving and street track paving from sixty-six to five.

The recognized types and sizes as determined upon by the committee through a process of elimination over three years are: Plain wire cut brick, 3 in. x 4 in. x 8½ in. and 3½ in. x 4 in. x 8½ in.; repressed lug brick, 4 in. x 3½ in. x 8½ in.; wire cut lug brick, 3 in. x 3½ in. x 8½ in. and 4 in. x 3½ in. x 8½ in.

The one type and size eliminated by the committee at its last meeting was the 3½-in. x 3½-in. x 8½-in. wire cut lug (Dunn). This elimination, like all eliminations that have taken place since the work of simplification was taken up by the committee, was determined upon only after a survey of the industry's shipments revealed that certain sizes had steadily declined in favor among engineers of the country to a point where they constituted an exceedingly small percentage of the total shipments of the industry.

For guidance at this and future meetings the committee adopted a resolution to the effect that "any variety of brick which shows less than 2½ per cent of total shipments for three consecutive years be eliminated and that any variety of brick which shows 5 or more per cent of the shipments for three successive years be reinstated in the list of recognized types and sizes unless special technical or other reasons show that such action is undesirable; provided, further, that the recognized types and sizes shall represent not less than 75 per cent of production."

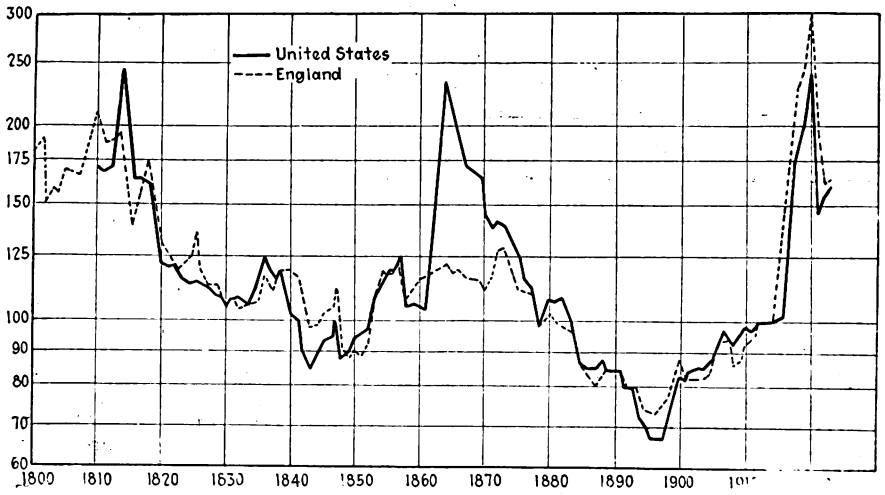
The survey of the paving brick industry made in connection with the simplification conference reveals the fact that the industry has experienced a steady growth since the year of lowest production in 1918. In 1923 shipments reached the high figure of 453,864,183.

G. E. First Quarter Orders Show Decrease

Orders received by the General Electric Company, Schenectady, N. Y., for the three months ended March 31 total $73,487,903, Gerard Swope, president, announced recently. This is a decrease of 8 per cent over the first quarter of 1923, when orders totaled $80,010,045.

Commodity Prices Here and in England Since 1810

In testifying in the International Railway valuation case, referred to in the ELECTRIC RAILWAY JOURNAL, issue of April 12, Dr. Jacob H. Hollander, professor of political economy in Johns Hopkins University, presented the originals of a number of charts in support of his conclusions. Among them were studies showing the trend of prices in the United States from 1913 to 1923, bank credit, gold reserves and federal reserve notes, 1919-1923; prices in the United States, 1913-1923; production in basic industries and volume of business, 1919-1923, and commodity prices in the United States, 1810-1923, and in England, 1800-1923, the last reproduced herewith.



Commodity Prices in the United States, 1810-1923, and England, 1800-1923. Prices in 1924 = 100

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Electric Drills Reduced in Price

An increased rate of production, resulting from the greater demand for electric tools, has enabled the Hisey-Wolf Machine Company, Cincinnati, to reduce its prices. The new price list became effective on March 17. Electric drills of the more popular sizes have been reduced in price from 12½ per cent to 17 per cent. Other reductions range from 5 to 10 per cent.

$22,988 Awarded to 1,752 General Electric Workers for Suggestions

Awards totaling $22,988 were paid to 1,752 employees of the General Electric Company during 1923 for suggestions which increased the efficiency of the company's operations. The suggestions ranged from safety devices for the protection of workers to improved methods of manufacturing electrical apparatus. The highest awards amounted to $500.

During the year 8,078 suggestions were filed, representing about one-tenth the employees of the company. The Philadelphia works leads, with 43 per cent of its workers offering suggestions, and the Edison Lamp Works at Harrision, N. J., tops the list in suggestions accepted, with 48 per cent.

Suggestions are sent to a special committee in each works. This committee investigates the suggestion, passes upon the merit and either makes an award to the man or woman who made the suggestion or explains why the suggestion cannot be effectively adopted. In most cases the award is made within a few weeks after the suggestion is received.

Metal, Coal and Material Prices

Metals—New York	April 15, 1924
Copper, electrolytic, cents per lb.	13.475
Copper wire base, cents per lb.	15.875
Lead, cents per lb.	8.15
Zinc, cents per lb.	6.38
Tin, Straits, cents per lb.	49.25
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.20
Somerset mine run, Boston, net tons	2.35
Pittsburgh mine run, Pittsburgh, net tons.	1.875
Franklin, Ill., screenings, Chicago, net tons	2.175
Central, Ill., screenings, Chicago, net tons.	1.90
Kansas screenings, Kansas City, net tons..	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.65
Weatherproof wire base, N.Y., cents per lb.	17.50
Cement, Chicago net prices, without bags.	$2.20
Linseed oil (5-bbl. lots) N. Y., per gal.	$0.93
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	12.25
Turpentine, (bbl. lots), N. Y., per gal.	$0.99

Rolling Stock

Menominee & Marinette Light & Traction Company, Menominee, Mich., proposes to buy seven new cars at a cost of $50,000.

Grand Rapids Railway, Grand Rapids, Mich., is planning the purchase of twenty new cars.

Department of Street Railways, Detroit, Mich., has just awarded contracts for seventy-five new Peter Witt type cars and will ask for ten new three-car trains similar to the one which has been tried out on the Detroit city lines and is now in operation on Woodward Avenue. Although bids have been asked for 100 new Peter Witt type cars of the large model, contracts were awarded for only seventy-five, street railway officials having decided, after the favorable results obtained from the three-car train, to ask for bids on ten such trains, thus making 105 new cars in all, counting the Peter Witt cars.

Track and Line

Pacific Electric Railway, Los Angeles, Cal., will shortly start extending its track through the heart of Belmont Shore Place and Naples, by way of Second Street. Approximately 7,000 ft. of track will be laid, beginning at Livingston Drive, bridging Alamitos Bay and continuing on through Naples to connect with the Newport-Los Angeles line.

Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich., has doubled its trackage on the docks at Grand Haven.

Toronto Transportation Commission, Toronto, Canada, has already assigned employees to the rearrangement of poles and wires necessary to permit the laying of the curves which will connect the Parliament Street line with the Bloor Street tracks. The rails will be connected with the Bloor Street line and with the loop, which will be built on the plot of land lying east of Parliament and immediately south of the viaduct. It is expected that track laying will start soon and that the loop will be in use within a month.

Seattle Municipal Railway, Seattle, Wash., may build an extension of the Cowen Park line if the petition recently put before the City Council meets with approval. City Engineer J. D. Blackwell estimates the cost of the proposed extension at $125,000, which would pay for the laying of a double track from the present terminus of the line to East Sixty-fifth Street, and for the laying of a single track from East Sixty-fifth Street to Bothell Way, the proposed new terminus. This estimate includes a trestle across the park gulch. For the $125,000 expenditure, 2,100 50-ft. blocks would be included in the assessed district.

Trade Notes

Ohmer Fare Register Company, Dayton, Ohio, in order to complete the acquisition of the American Taximeter Company, New York, and to meet the demands of the company's fast-growing business, has arranged with Spitzer, Rorick & Company, Toledo, for an offering of $600,000 of the 7 per cent serial gold notes. The notes, offered at 101 and interest, are dated April 1, 1924. The American Taximeter Company manufactured a taximeter of the non-recording type which will hereafter be manufactured by the Ohmer Fare Register Company. The plan for the acquisition of this property by the Ohmer Fare Register Company was described in detail in the ELECTRIC RAILWAY JOURNAL, issue of March 15, page 437.

Yale & Towne Manufacturing Company, Stamford, Conn., recently appointed Herbert Charles Rahm advertising manager. In this capacity he succeeds Francis Juraschek, who resigned to enter business for himself. The new advertising manager's first position was as clerk in the advertising department of P. & F. Corbin in New Britain, Conn. In 1915 he received an offer from Sargent & Company to enter its service. Here he took care of all the catalog work. In September, 1922, he went with Yale & Towne as assistant advertising manager. Since August of last year he has been in full charge of the advertising department owing to the continued illness of Mr. Juraschek.

William Lintern, president of the Nichols-Lintern Company, Cleveland, has made a business trip to New England and the Eastern cities. He reports his trip productive of much valuable data relative to the new stop-light which his firm is about to place on the market. He promises a definitive advance, in the shape of a highly simplified system, which will reduce installment and maintenance costs to a minimum.

New Advertising Literature

Century Wood Preserving Company, Pittsburgh, Pa., has issued a bulletin on the "Shipley Treating Unit." The bulletin describes the effectiveness, advantages, construction and capacity as well as uses and availability of the "Shipley Treating Unit."

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has recently published a new booklet, known as Folder 4532-A, dealing with Westinghouse fabrics and papers for insulating purposes. All the forms of treated and untreated fabrics, papers, sleeving, tapes, cord and thread manufactured by the company are fully described in the booklet and their principal applications given. The materials described in this folder are used in the manufacture of Westinghouse electrical apparatus and made available to the general trade.

Crouse-Hinds Company, Syracuse, N. Y., has issued folder No. 12 entitled "Condulets for Concealing in Concrete."

Detroit Electric Furnace Company, Detroit, Mich., has just issued a new publication on brass melting. This booklet tells, first, that the electric furnace is a factor of ever increasing value in brass melting. It next enumerates the economies effected by the electric furnace, and then shows how complete control of analysis, color, texture and homogeneity of the alloy is secured through the electric furnace.

Page & Hill Company, Minneapolis, Minn., has issued a new publication called "Practical Information About Cedar Poles and Butt-Treating." This handbook covers information on the storage of poles, painting of poles, the proper and improper methods of unloading cars, counting and tallying and other practical data for use of engineers, purchasing agents, yard superintendents, foremen and foremen of line crews.

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New York, April 26, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 63
Number 17

Accurate Schedules Demand Accurate Time

WITH steam railroad men accurate timepieces are traditional, and are looked on as a matter of course. Not only are high-grade movements demanded, but the timepieces used in railroad work must be examined periodically by competent inspectors and their accuracy certified.

Some street railway managers are prone to believe that similar accuracy of timepieces is not necessary on their roads. This is on the theory that slight deviations from the schedule are not of prime importance, and that it is the duty of inspectors stationed along the line, along with their other activities, to keep the cars properly spaced and on time.

Headways on a large city system are usually quite close, especially on trunk lines, where a number of routes converge, and it is folly to try to space out the cars on the street if they do not start from their terminals on time. Where the headway is, say, 2 minutes, if a car is 1 minute behind its schedule because the motorman's watch is a minute slow, and the one due next is 1 minute ahead, due to a watch a minute fast, they would run together, and there would be a gap of 3 minutes on either side of them, or 50 per cent above the proper spacing. The car due later might even arrive at the junction first, and so get ahead of its scheduled leader.

A joint headway of 2 minutes is not particularly frequent service, and nearly every American city of any size has at least one such line. The bunching of cars started in this manner is likely to be cumulative. One or two cars off time at the beginning of the rush hour might easily derange the entire service during this period. It is not always unavoidable delays that cause the irregular spacing.

Some roads have a practice, similar to that of the steam railroads, of requiring the men to purchase good watches and have them inspected. While ordinarily street car men do not have a large surplus of funds, a good watch should be considered an essential of the business. Arrangements usually can be made to purchase the watches on the installment plan, and as it is only the quality of movement that matters, the burden is not particularly onerous.

In line with the same policy, standard clocks should be provided at carhouses or other central points, against which the men should be required to check their watches daily, thus synchronizing time on the entire system and preventing any argument as to the correct time. And no alibis should be accepted from trainmen whose watches are inaccurate.

The policy of having the time for a road standardized is just one of the big little things that go to make the difference between good service and indifferent service. As a means of merchandising transportation there is nothing like dependable service, with the cars always on time. Accurate timepieces are the first and a fundamental requisite in such a program.

Railway Conventions for Railway Men

OUR conventions have come to be too much of a character designed to get publicity for the railway man's point of view. While this is desirable to a certain extent, it is somewhat of an imposition on a busy man's time to have to listen to papers and addresses directed not to him, but to the general public, he merely helping to make up the scenery and the occasion for putting this message out to the public.

In this suggestion, there is not the least intention to belittle the importance of good publicity, nor the effort to get all the good out of a meeting, in a publicity way, that can be. But there are ways of doing this without turning conventions for railway men into conventions for the general public; for example, by planning greater publicity for talks of railway men before layman type audiences.

More Outside Point of View Needed

AS ATTENDANTS at numerous railway conventions, the editors of this paper have been impressed with the desirability of bringing in more speakers with an outside point of view. There is a rather natural tendency for railway men to tell each other their problems and consult about them, all from an inside point of view. This is productive of considerable mutual helpfulness, especially with respect to mechanical and operating problems. But on the broader, less tangible problems, such as public relations, they are all attacking them from about the same angle, for their thinking is much along the same lines. They confer, and, agreeing, part without having gained materially.

What would be helpful here, perhaps, would be to have speakers who would present some ideas from the car rider's point of view. Most every layman has ideas on how to run the railway. Some of those ideas, if coming from a man of reputation, might be quite worth the time of a railway man to hear. They might not always make the best publicity—and yet, the railways have nothing to conceal nowadays, and if a condition does exist which would not look well in print, it ought to be corrected anyway, or if it cannot be, then the company doubtless has a reason that will constitute a satisfactory explanation, and the news about the matter would give an opportunity to get that reason before the public.

Would it not be fruitful to invite a prominent news-

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paper man to speak to a railway convention now and then, even though he might represent an anti-traction paper? Perhaps he would disclose something of his reasons for antagonism—some motive that had not occurred to the railway men. This would then suggest a way to correct a misimpression on his part, or a fault on the part of the railway.

House Organs as Mediums for Railway Publicity

ANOTHER good way to get the story of the local electric railway before a part of the public is to prepare short articles for some of the numerous little publications of the "house organ" type. Almost every large organization nowadays has some sort of magazine which is circulated to the employees. These organizations include manufacturing concerns, department stores, the police department; automobile, golf, political and athletic clubs; federated women's clubs, and so on. Such papers are often in need of an article or two on some good, live topic. And they are not troubled with the general publicity that floods every newspaper office. They may not reach a host of readers, but to their limited audiences they have an especial appeal—that associated with company or club interest and backing. Such mediums are numerous, and taken as a whole, they form a very worth-while means of spreading the true story about railway service.

Giving the Pedestrian a Show Should Benefit the Railway

TRAFFIC problems nowadays are considered principally from the standpoint of the street car and the motor vehicle. The discussion usually comes down to whether the motor car should use the streets to the exclusion of other traffic, or whether the street car should be given precedence over vehicles.

There is, however, a silent sufferer who loses no matter what the decision—the pedestrian. Street congestion is getting so bad in most urban business centers that it is exceedingly difficult for him to make his way across the intersections.

Some cities go farther than to consider the pedestrian a pest. They legislate against him to the extent that he must cross the streets at certain designated points, and then only when the traffic signal is set properly for him. Even so, there are vehicles making right-hand and left-hand turns that interfere with his movement and make it dangerous for him.

A speaker recently pointed out that there is a connection between the street railway and the pedestrian, in that except for the pedestrians on the congested streets there could be no surface car system. Railway managers are importuned to tell the motor car owner to leave his automobile home and ride the street cars. It must not be forgotten that this carries with it a certain obligation to make it safe and convenient for the same person when he leaves or boards the street car, wherever that may be. Certainly if he cannot feel that he is safe afoot, he will prefer to drive his own machine with its attendant risks rather than walk on the streets and take a chance against other vehicle drivers.

With this idea in mind, street railway men can justify time spent in campaigns for public safety, for in so doing they are not only performing a public duty, but they are also working in their own interests. The passage of regulations safeguarding boarding and alighting passengers, the construction of safety zones and loading platforms, elimination of vehicle turns that interfere with pedestrian movement, prohibition of parking at places that make it dangerous for persons going from sidewalk to the car stops, are just a few of the things that can well be sponsored in an effort to popularize service and increase patronage.

If it can be shown, as it repeatedly has been, that the street railway can furnish faster, cheaper and above all safer service than the individual can provide for himself, the ranks of the car riders will be augmented and the coffers of the railway will gain accordingly.

A Subway by Assessment Approved in New York

THE legality of the New York State act of 1909 permitting rapid transit lines in New York to be built through assessments on the property benefited bids fair to be determined soon. The line concerned is the proposed Sixth Avenue subway in Manhattan, construction of which is being strongly urged by the Manhattan borough president. Under his direction, the owners of a considerable part of the real estate immediately abutting on the route have agreed to pay an assessment of 10 per cent on their property to construct the new line. Sanction to the plan has now been given by the Transit Commission, though it points out that a 10 per cent assessment on all the property directly affected would yield only about half of the sum required. The commissions suggests, therefore, either an assessment increased to 20 per cent or to lay some part of the cost on property from half a block to a block on each side of the proposed route. It refers the choice between these methods to the municipal authorities.

Much can be said in favor of the plan of special assessments for rapid transit lines judiciously planned. But any act of this kind also contains an element of danger, which property owners in New York now will more generally recognize since Mayor Hylan can now appoint a board to construct rapid transit lines to be municipally owned and operated. Hence, as any property holder may object to his assessment, it is safe to say that active construction work on the new Sixth Avenue subway will wait until the courts act on some test case.

Wisely, the commission's order provides that the present Sixth Avenue elevated railway must remain in place until the new subway is ready to function. In view of the fact that the Sixth and Ninth Avenue lines together now carry over 150,000,000 passengers a year, of which probably at least half use stations exclusively on the Sixth Avenue branch, this was the only decision possible. No new north and south line on Manhattan is under construction, and the present lines certainly could not care for this number of passengers in addition to those now being carried.

The removal of the Sixth Avenue elevated can be seriously considered only after the proposed Sixth Avenue subway has been built, and then only if the north and south traffic on Manhattan does not increase materially during the five years or more required to build and equip the subway. All past experience shows that traffic in New York increases more rapidly than the facilities. In fact, conditions are becoming so bad on trains and in stations during rush hours that the congestion suggests as a possible necessary early measure that those waiting to be carried form queues and be admitted onto the station platforms only as the trains have capacity to carry them.

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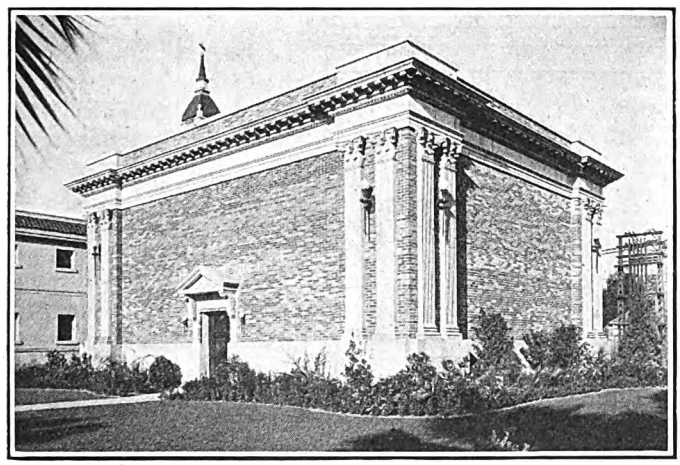
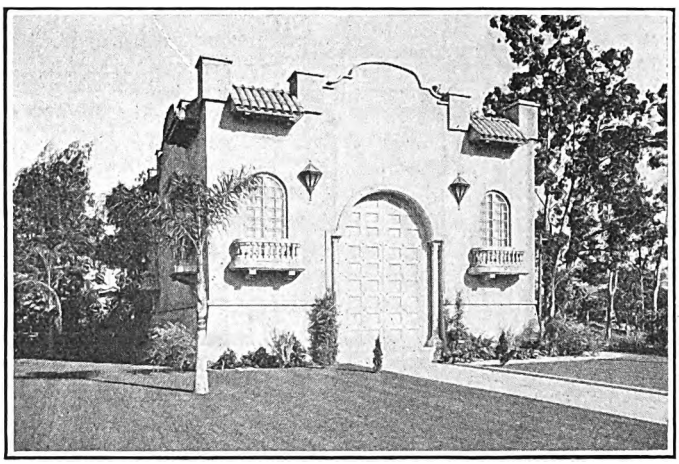
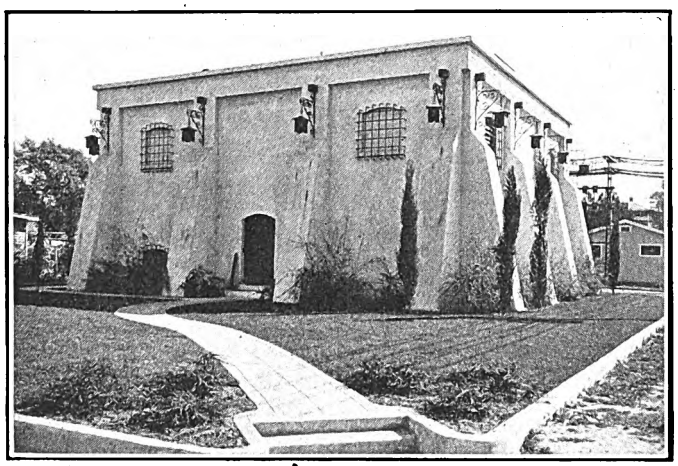
Progress in Noiseless Substation Design

The Los Angeles Railway Has Developed Substation Buildings to Harmonize with Surroundings in Residential Districts—Use of Automatics Has Produced Satisfactory Operating Results and Substantial Economies, Which Are Itemized

By L. J. Turley
Electrical Engineer Los Angeles Railway Corporation







These Designs of Noiseless Substations of the Los Angeles Railway Show the Architectural Treatment. Top, Left—West Adams. Top, Right—Melrose. Bottom—Garvanza

WITHIN the last three years the Los Angeles Railway has placed in service five automatic substations, four of these being 1,000-kw. single units, while the fifth is a double 1,000-kw. installation. A contract has just been closed for the sixth equipment, to consist of a 1,500-kw. automatic set.

This is a good example of the gratifying trend toward the recognition of the economic possibilities claimed by the manufacturers for automatic control features, applied to one or two units in stations scattered over a spreading trolley system. This claim is now substantiated by the increased number of successful installations on other systems, where a desired reduction in cost of attendance has been obtained, together with a general improvement in power conditions.

The automatic type of substation has now passed the early development stage into economic use. A general degree of confidence seems to exist in its reliability for city and interurban service, and it is satisfactorily meeting every kind of normal or emergency load demand. Where high line switching formerly required the presence of an operator, the remotely controlled supervisory schemes of today have met this requirement.

Ordinarily an increase of 6,000 kw. over a three-year period on any large city railway system is unworthy of comment, but due to the timely action of establishing five distinct power delivery points to the overtaxed generating and distributing system of the Los Angeles Railway, and to the favorable and satisfactory operation obtained from the very first installation, the writer considers it of sufficient importance to review briefly the situation that led up to the decision to institute a program involving the construction of noiseless automatic substations.

The redistribution program of 1920 called for several substations in the immediate outlying districts of the city. Without defeating the object of economically serving the entire feeding area, it became necessary to plan the station sites approximately near the established load centers. A problem arose on finding that some of them must be located in restricted residential sections. Realizing that former complaints had been lodged against other stations on account of noise and the unsightly appearance of the buildings, and with due regard for rights of property owners in residential sections, the railway company decided that future substations should be of fireproof structure, unusually attractive, beautifully parked, and with the added feature of eliminating the unnecessary noise which characterizes rotating machines and transformers.

There was a limited amount of available information on sound-proofing applied to substations, and the special conditions imposed novel considerations in combining soundproof construction, forced ventilation, and automatic control operation. Naturally this course would make property and building costs unusually high for 1,000-kw. single-unit installations, but it was considered

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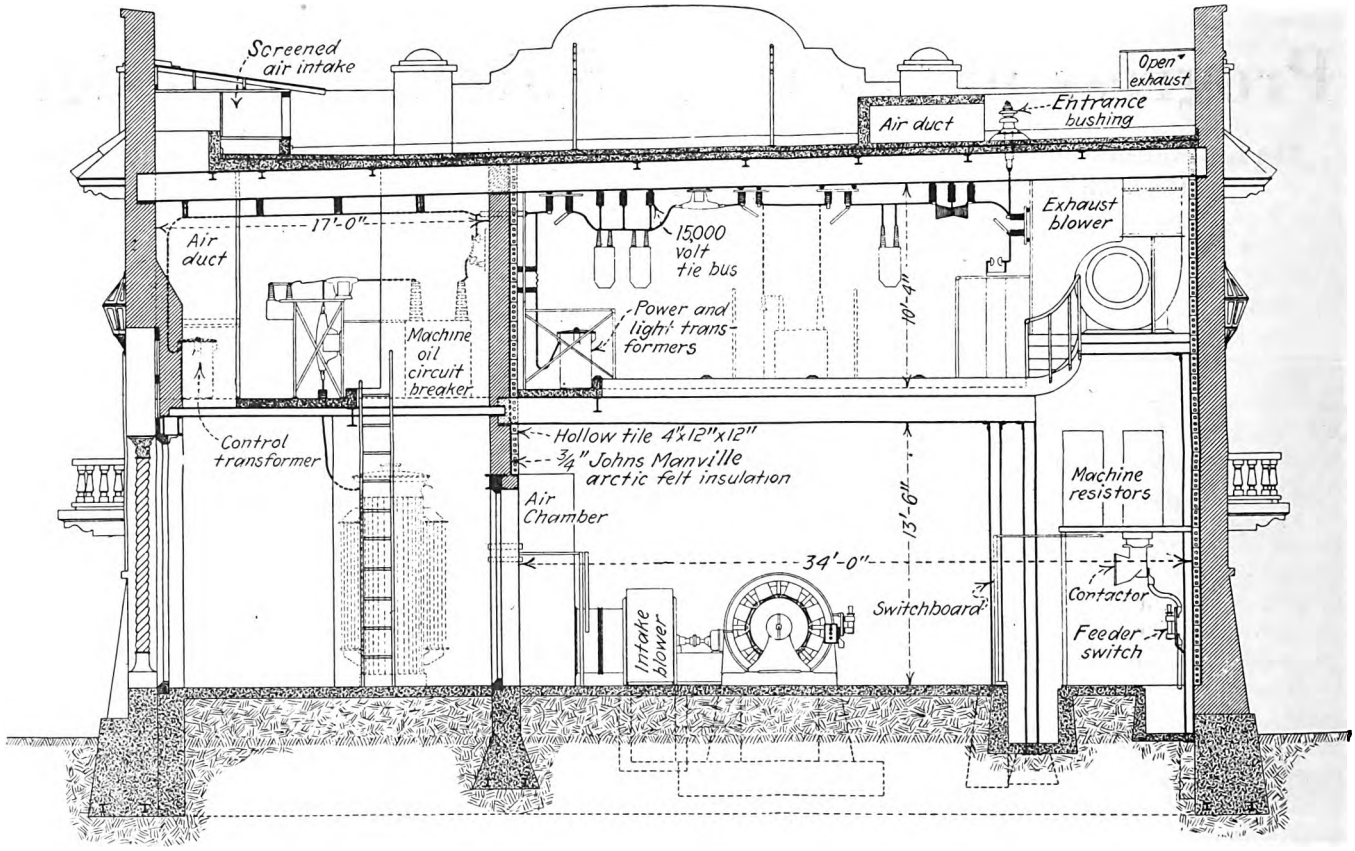
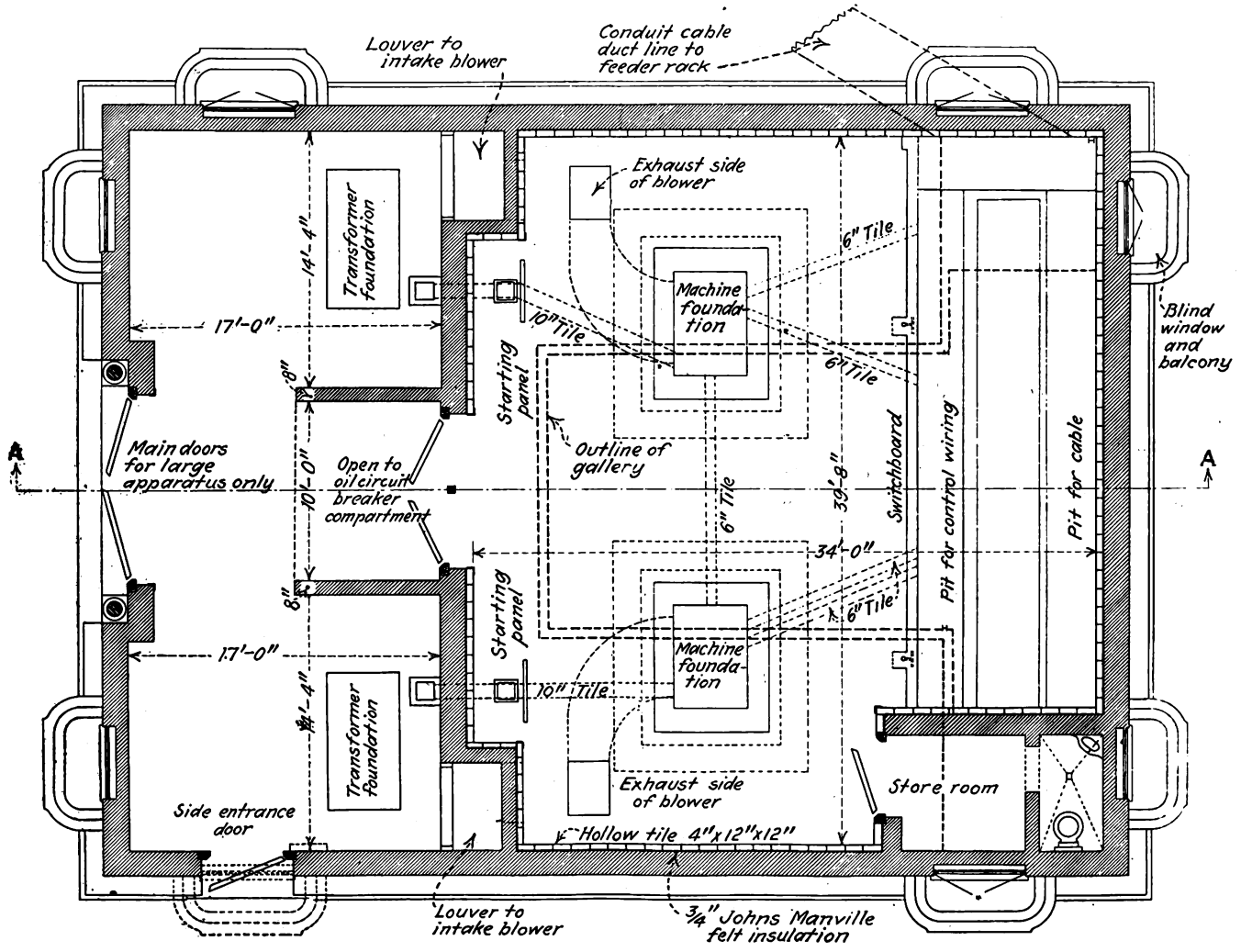


The Sectional Elevation of the Melrose Station Shows How Switches and Auxiliary Equipment Have Been Placed Overhead



Floor Plan of the Melrose Station, Which Has Two Units and Separate Air Supply for Each Machine

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TABLE I—BUILDING DIMENSIONS AND COSTS

	Kw. Capacity	Building Dimension	Square Feet of Building Area	Cubic Feet Machine Room	Air Changes Cubic Feet per Minute	Real Estate	Building and Foundations**	Complete with Equipment
Garvanza.....	1,000	43 x44′	1,892	26,000	9,000	$953	$17,915	$74,806
Melrose.....	2,000	39 x52	2,128	33,000	30,000	7,398	26,280	109,056
West Adams....	1,000	35 x44′	1,540	20,000	15,000	5,019	25,150	74,140
West 54th.....	1,000	35 x41′	1,435	21,000	15,000	*	21,230	68,255
Central Ave.....	3,000	45 x54′	2,430	36,000	40,000	*	Under construction.	

* On division carhouse property.
** Cost include parking, lighting, cable duct lines.

an asset in public good will, together with the improvements sought in giving better service with a shorter feeding area.

Regardless of the company's good intentions, two districts filed petitions of protest to the City Council, with emphatic objections to granting the railway's application, basing their claim on the ground that the architectural harmony of the district would be marred and property values decreased, noise or no noise. The railway realized the importance of rendering increased car service to the entire district, even in view of the protestants declaring the existing service satisfactory. After a year's delay the city granted the application, having been satisfied with the company's first attempt with the Garvanza substation. The ELECTRIC RAILWAY JOURNAL of July 8, 1922, contains a description of this station. Due to the improvements in arrangements and soundproofing in subsequent substations, it is considered of sufficient importance to present an abstract description of the building construction, together with views and plans, showing the accomplishment.

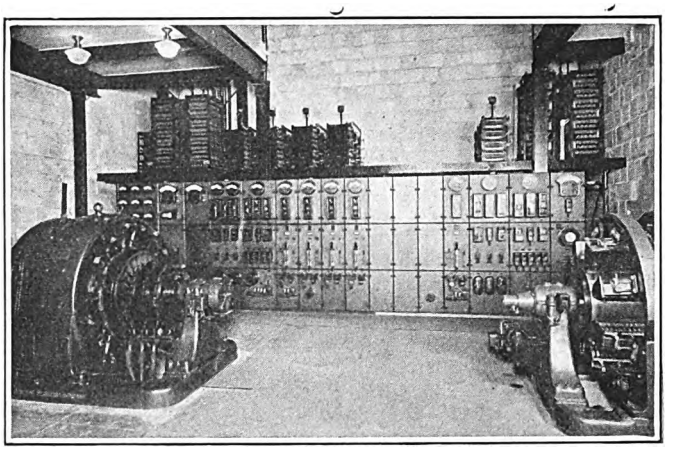
Each automatic substation is located in a district corresponding to its name: Vernon, Garvanza, Melrose, West Adams, West Fifty-fourth Street, and the proposed Central Avenue station. These are all indicated on the accompanying map, along with the manual substations. All are of soundproof design, except the one in Vernon industrial district. The following description is confined to those of noiseless design.

Incidentally, the addition of these substations did not permit any reduction in copper feeder cable, but actually required considerably more. This demonstrates the low voltage existing on the extended lines and the great dependency being placed upon the additional power delivery. Table I gives the general inside dimensions and costs. In addition to the original design of the building, all arrangements of apparatus and installation were made by the engineering department of the Los Angeles Railway.

All substations have fireproof compartments for oil switches and transformers. There are no basements except a 2-ft. x 3-ft. pit located back of the switchboard,

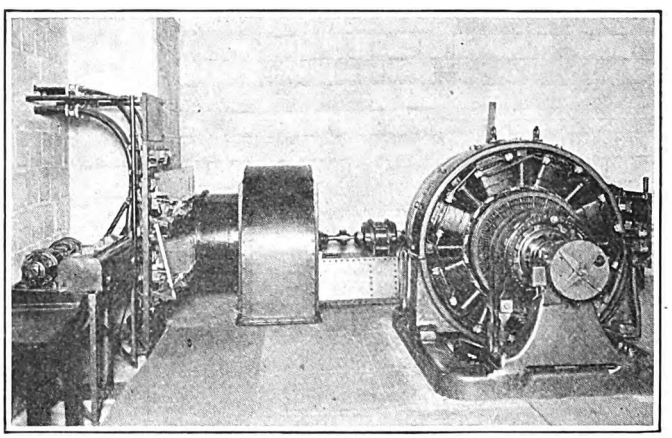
TABLE II—OPERATING CHARGES

	Monthly Average per Substation							
	Repairs to Equipment		Labor of Operators		Supplies		Total	
Year	Automatic	Manual	Automatic	Manual	Automatic	Manual	Automatic	Manual
1922	$9.94	$131.13	$83.16	$564.44	$16.07	$20.75	$109.17	$716.32
1923	1.73	90.01	78.17	563.47	4.91	23.30	84.81	676.78
	Monthly Average per 1,000 Kw. Capacity							
1922	$9.94	$52.77	$83.16	$227.14	$16.07	$8.35	$109.17	$288.26
1923	1.73	36.22	78.17	226.75	4.91	9.37	84.81	272.34



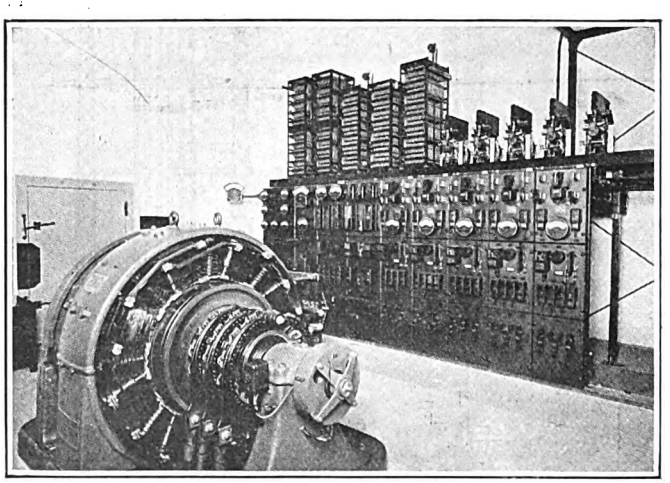
The Machine Room of the Two-Unit Melrose Substation. The Air Outlets Are Above the Grid Resistors

which is used for incoming underground feeder cables to facilitate the control wire connections at the base of the panels. As may be observed from the elevation of Melrose substation, a gallery is mounted over the machines for the indoor lightning arresters and 15,000-volt bus and switches. This plan is used with the two-unit, or high line installations.



Intake Blower of the Melrose Substation

The hydro-electric system of the Southern California Edison Company supplies all the 15,000-volt power used by the Los Angeles Railway. The high-tension lines interconnecting with substations are owned by the railway company, and are three phase 50 cycle, 15 kv. to



The Entrance to the Machine Room of the West Fifty-fourth Street Station Is Through a Refrigerator-Type Double Door

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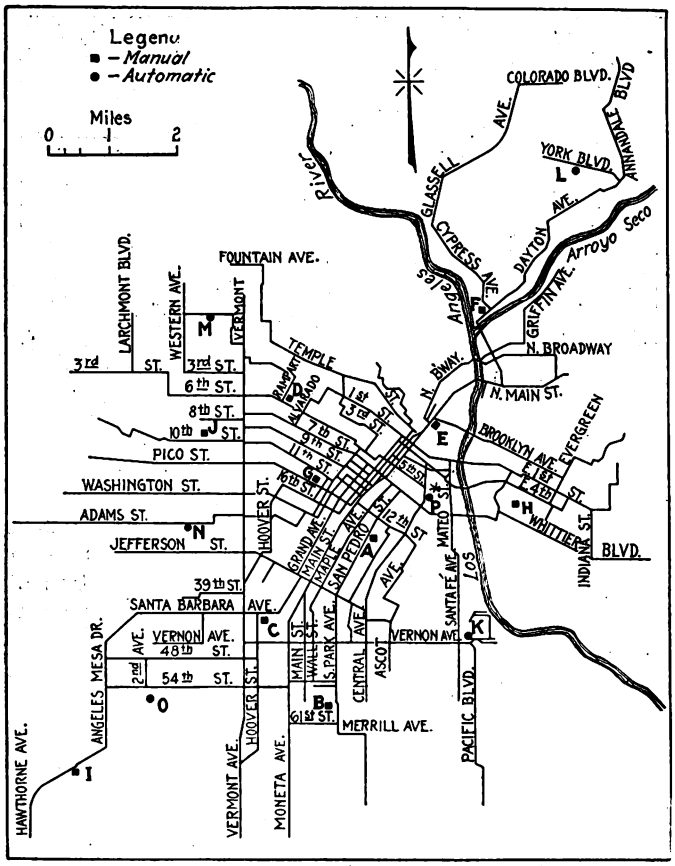
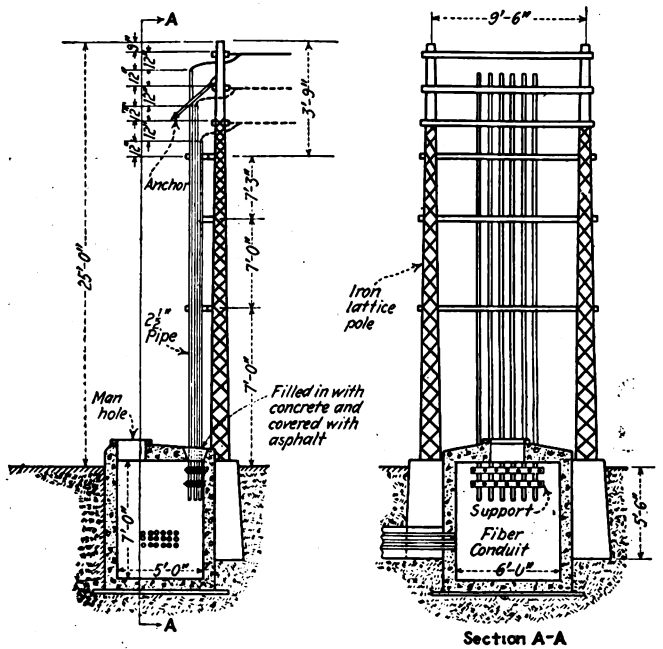


The Locations of Both Manual and Automatic Substations Are Shown in the Route Map of the Los Angeles Railway

Symbol	Name	Number of Machines	Capacity
A	Sixteenth Street	4	3,600
B	Slauson	3	1,600
C	University	4	4,200
D	West Lake	3	1,400
E	Plaza	5	6,000
F	Huron	3	1,600
G	Sentous	3	2,600
H	Soto	3	1,800
I	Centinella	3	650
J	Ardmore	2	1,600
K	Vernon	1	1,000
L	Garvanza	1	1,000
M	Melrose	2	2,000
N	West Adams	1	1,000
O	West Fifty-fourth Street	1	1,000
P*	Central Avenue (proposed)	2	3,000



Standard Feeder Rack and Manhole for Los Angeles Automatic Substations

TABLE III—DATA ON OPERATION AND FAILURES

Year	Number of Substations	Substation Days	Average Daily Kw.-Hours	Daily Hours Operator Present	Actual Time Station in Service	Average Daily Minutes Lost Due to: Regular Inspection	High D. C. Voltage	Men Working	Equipment Failures	Total
1922	3	425	10,200	3.20	93.1%	39	15	22	4	80
1923	3	1,095	13,900	2.20	97.7%	24	10	7	2	43

Year	A. C. Interruption per Substation	Number of Equipment Failures: Garvanza	Melrose	W. Adams	Total	No. of Device Giving Trouble: Garvanza	Melrose	W. Adams
1922	41	8	2	2	12	21.33 64.69	69	133
1923	79	1	6	7	14	7	7.28.66	7

16 kv., aerially constructed with single line to each automatic station for the present. Provision is made at two substations for double high line entry when necessity warrants. Indoor oxide film lightning arresters and choke coils are installed at each station, except at two, which are of the outdoor type. The main-line 35,000-volt oil circuit breakers are automatically and electrically operated and controlled for undervoltage and overload, with sufficient disrupting capacity to care for short circuits.

Methods of Eliminating Noise

The soundproofing feature is used in the machine room only. The ordinary brick walls seem sufficient to prevent transmission of the transformer hum to the outside. Around the machine foundation is placed ½-in. elastite insulation, separating it from the substation 6-in. cement floor to deaden the vibration of the machine. Without any windows or steel frame work penetrating the walls or ceiling, the absorption of the noise developed within the building is obtained by use of the Johns-Manville ¾-in. Arctic insulation placed in layers between the ordinary hollow building tile facing and the 21-in. brick wall. The felt and tile are held securely fastened to the brick with large nails. The ceiling is made up of a 4-in. slab of reinforced concrete mixed with Truscon waterproof paste, on top of which is laid one layer of ¾-in. Arctic insulation, which is covered with an additional 3-in. slab of waterproof concrete.

With all doors 6 in. thick properly constructed with heavy beveled jambs, felt lined and held securely closed to a tight fit by Glockler refrigerator door clamps, the soundproof feature has been such a success that two of the substations were placed in operation and running for some days before any one in the neighborhood was aware of the fact, and then only from seeing the exterior lighting of the building at night and inquiring "when the noise was to start." Although one might detect a slight rumble when in close proximity to the outside wall, yet at 3 ft. distance no noise of machine, transformer or rushing air is noticeable against extraneous disturbances. As with the West Fifty-fourth Street station, a double door is used where entrance is planned from the outside direct into the machine room. Property values are advancing, and many new residences have been constructed since these stations were started.

The exterior view of Melrose shows blind windows with balconies. With a row of 10-watt lamps placed

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in a recess back of the amber colored glass, the lighting effect at night is similar to that with a drawn shade, as may be observed in the surrounding dwellings. This class of exterior design, with parking arrangements of shrubbery and automatic sprinkling system for lawn, as shown by the views, may not be necessary in every case. This is true of the West Fifty-fourth Street station, but still the principle of sound absorption used in this type of construction will be found satisfactory where such an installation is considered.

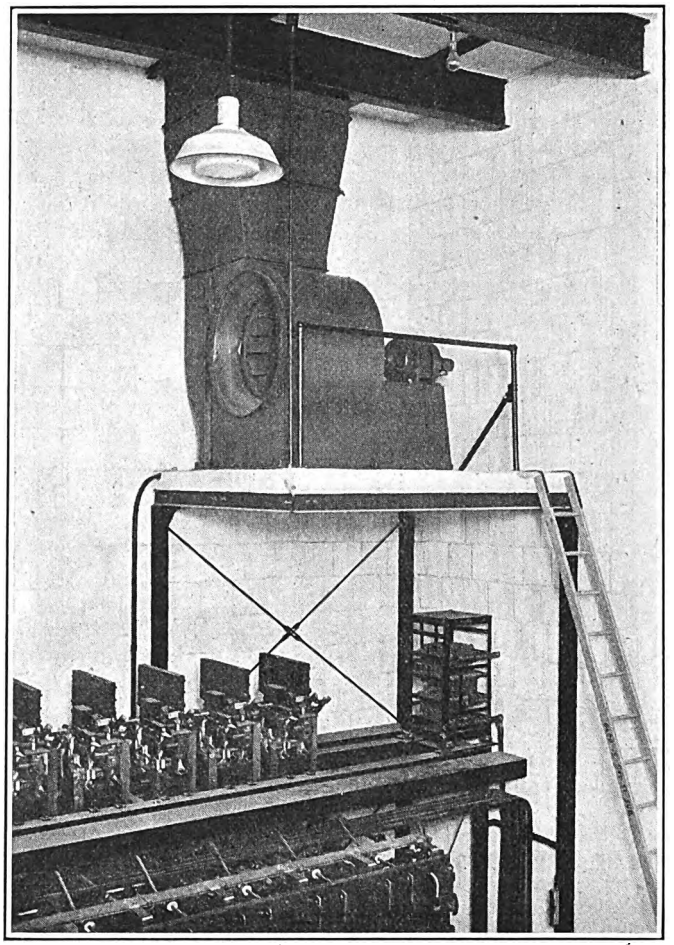
The Central Avenue station will have the added feature of an air washer scheme. This was felt to be necessary, since several failures due to poor contacts of relays have been attributed to dust accumulation, where automatic substations are located in a dusty district. The floors of all the transformer and oil switch compartments are provided with drainage to an outlet for oil in case of explosion or fire. A suitable number of fire extinguishers are conveniently located throughout the building.

Forced Ventilation Is Used

The ventilating scheme for Melrose, as for the other forced-draft stations, is as follows: The air is drawn into the transformer room from the roof by way of a large duct, with 20 to 30 sq.ft. area. This duct is covered on the roof by a housing screened on the sides to prevent rain and large particles from entering. An attempt is made to filter the air in its passage by use of a removable tray covered with large mesh screen on which is laid one layer of cheese cloth. The air is drawn into the transformer room past all sides of the three-phase transformer, thence through a large fireproof louver, and forced into the machine pit by a Sturtevant No. 90 silent vane fan, directly connected to a 3-hp., 40-deg., 600-r.p.m. motor. The air in the machine and switchboard room is drawn up by a similar blower located near the ceiling, thence to the roof through an air duct, which extends out on the same plane with the roof, doubling back on itself. This exhaust duct is constructed along acoustic principles by baffling the noise of the machine and rushing air, yet not unnecessarily increasing the static pressure.

The grid resistors used in the station for machine and feeder control are located directly under the exhaust fan, so that hot air rises quickly in case the grids are connected into the circuit. Melrose has about 33,000 cu.ft. in the machine room, and being a double unit the air is changed in this station, with both units in service, approximately every minute. The 2-min. rate of change is about correct for the southern California climate to maintain proper transformer and machine room temperature for the 1,000-kw. installation on a 65 per cent load factor. Unless precautions are taken in locating the feeder resistors, it becomes necessary, as with the West Adams station, to provide an auxiliary exhaust blower of about 8,000 cu.ft. to care for the hot air, and to permit cooling of the feeder grids in the shortest possible time consistent with load conditions.

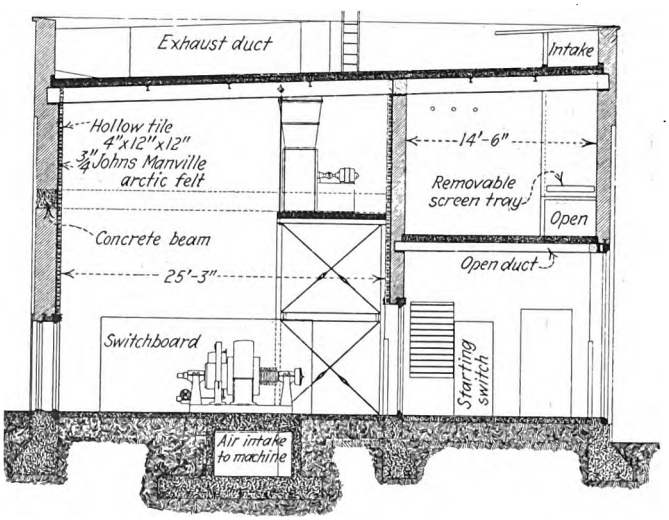
The blower motors are started up and operated with the machine. Provision is made for them to cut out 10 to 15 min. after the machine is shut down. They are equipped with an underspeed relay, which will shut down the machine in case either of the motors fails to come up to speed, or blows the main line fuses. These motors are fed from a three-phase bank of separately connected transformers. A throw-over switch in the



In the Fifty-fourth Street Substation the Exhaust Blower Is Mounted Above the Switchboard

motor circuit permits operation of the converter, independent of the blower motors.

Up to date each of the soundproof substations is equipped with General Electric apparatus. This gives greater interchangeability of parts. The 1,000-kw. synchronous converter has a 200 per cent overload rating for 2 hr. It is flat-compounded, with high reluctance interpoles and without flash barriers on either end. The transformer is three-phase, oil-cooled, with four 2½ per cent taps on the high-tension winding below 16,500 volts. The 1,500-kw. unit on order for Central



Vertical Section A-A of Fifty-fourth Street Station, Showing Air Intake and Exhaust

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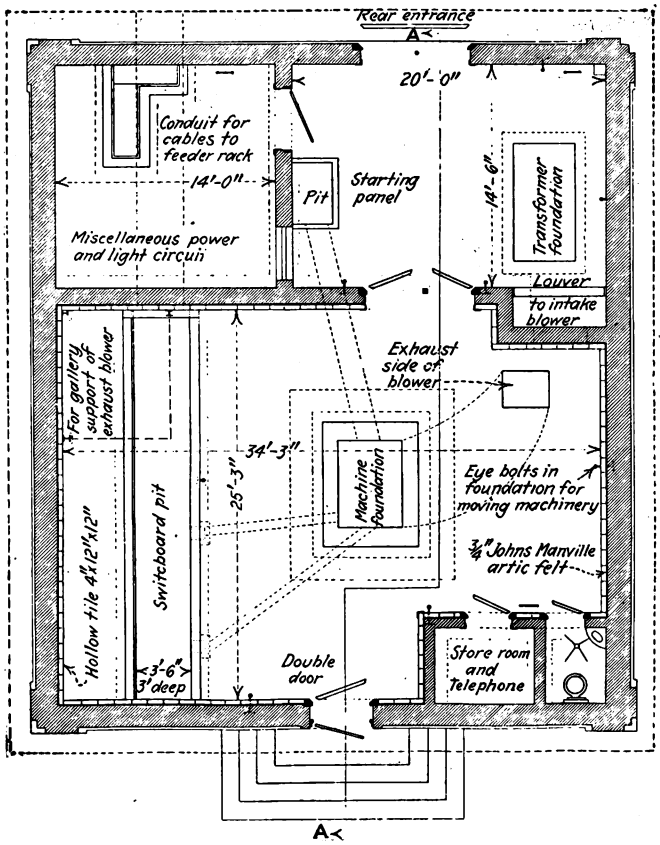
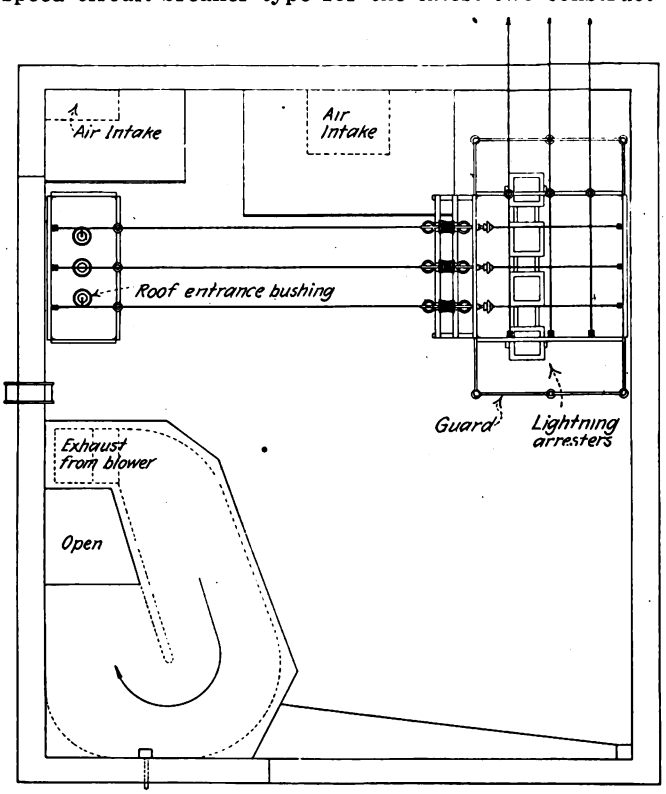


The Floor Plan of the West Fifty-fourth Street Substation Shows Arrangement for a Single Unit

Avenue station will have flash barriers on the d.c. end only.

All substations have current-limiting resistors for the machine current, while for the positive feeders resistor control is used in three stations, with the high-speed circuit-breaker type for the latest two construct-



Roof Plan of Fifty-fourth Street Station. Note the Circuitous Route for the Exhaust Air

ed. There are usually four positive 600-volt feeders in each substation, with provision for an ultimate capacity of eight. This number is due to the extensive trolley sectionalizing policy of this company.

All feeder cables leave the switchboard through a pit to underground fiber conduits, which extend from the inside of the substation about 50 ft. to a feeder rack; thence aerially to the overhead trolleys. This is shown in one of the illustrations. The feeder rack was considered a better means to take care of the cables on leaving the building, since it permits the building to be unattached and adds to the outside appearance. There are but two stub-end feeders out of a total of 24, all the rest being tied in with manually operated substations. Each feeder has a d.c. electrolytic lightning arrester without choke coils. The insulated negative feeder scheme is used extensively with these stations for reducing rail potential gradients and minimizing the effects of electrolysis.

The control and protection for all machine and resistor-type feeders follow the standard General Electric methods. The feeder control bus is energized at all times, whether the machine is running or not. However, there are two special means of meeting conditions. One multiple-end feeder is provided with a reverse-current relay, so that it will be disconnected from the station bus in case of reverse feeding. It is automatically reclosed when the outside trolley voltage is lower than the station bus, so that this feeder is usually disconnected from the station during the period when the machine is off the line.

The West Fifty-fourth Street d.c. reclosing feeders are equipped with high-speed circuit breakers. These are provided with the standard General Electric auxiliary feeling out control with the added feature used with the manually-operated stations in handling grounded trolley wires. At the instant of a grounded trolley wire, the high-speed breaker opens the circuit. The auxiliary feeling out detects whether the existence of the grounded wire warrants keeping the feeder open. At the end of a 10-sec. period, if the feeder is cleared of ground, normal service is resumed, but if at the end of 10 sec. the ground still exists, then the feeling out is delayed a predetermined time, usually 10 min., before an attempt is made to detect outside conditions. This process is repeated in the same sequence until normal conditions are established. A considerable amount of trolley wire has been saved from being annealed. There also is the important consideration of the safety of traffic, and trainmen are enabled to clear the wire from ground without fear of hazard.

TIME SWITCHES CONTROL HOURS OF SERVICE

The machine is controlled by a time switch set for about 18½ hr. per day, including Sunday. This switch gives a definite starting and stopping period, and in addition prevents starting up of the machine due to low voltage during the early morning period. Another time switch controls the exterior lights from sundown to midnight. No scheme is included for remote indication telling when the machine is on or off, or any method of remote supervisory control. Some improvement in this matter is contemplated shortly. To provide means of determining the nature of any abnormal conditions, there is being considered for each automatic substation a graphic strip chart meter, showing the total machine ampere load and bus voltage, together with two special

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pan attachments to indicate by short movements on each edge of the chart whenever certain contactors in the machine circuit operate. This seems to be about all that is necesary in the way of recording instruments.

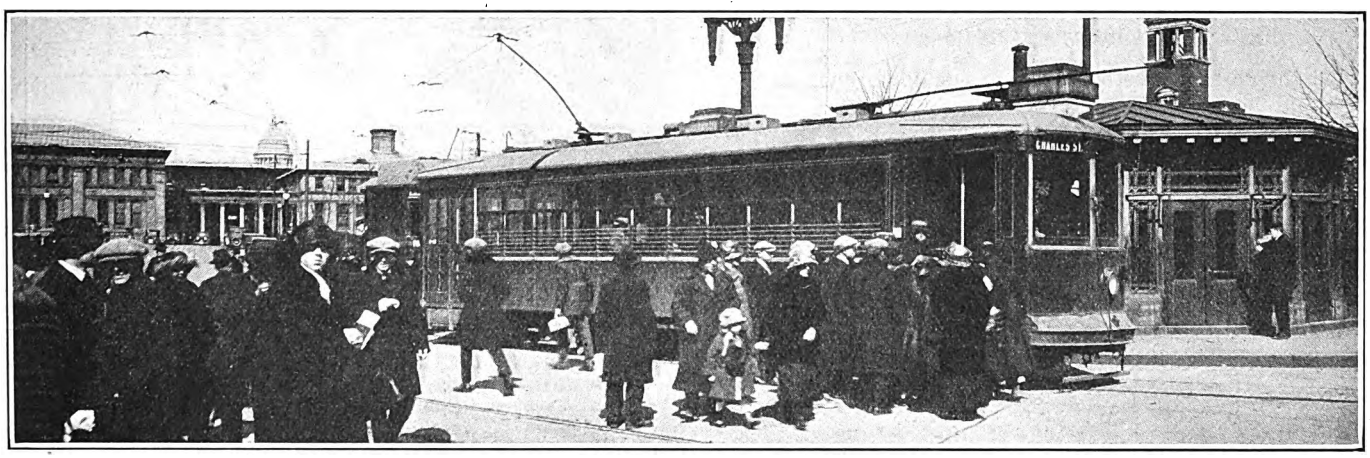
Table II shows average operating charges, comparing the automatic and manual stations; while Table III gives operating data. Due to greater familiarity with the control and equipment by the attendants, the duration of failures has been reduced for 1923. The attendant in charge is subject to call at all hours. He is furnished a roadster for inspection or emergency duty and is required to live in the city.

The scheme of inspection is as follows: The machine is blown out and cleaned twice a week. The a.c. and d.c. brushes are inspected and the commutator slots cleaned once a week. A general substation cleaning of all 15,000-volt insulators, bus and transformers, together with necessary inspection and adjustment of relays, is made once a month. It will take the time of two attendants to care for inspections of six automatic substations, with one helper during the general cleaning up.

With 15 to 24 months operation of these substations, there has been no case of a flash-over on the d.c. or a.c. end of the synchronous converters, although there have been more than 120 a.c. interruptions and many trolley breaks.

Looping Back Reduces Delays by 28 per Cent

The Downtown Rerouting Recently Inaugurated by the United Electric Railways of Providence, R. I., Has Speeded Up the Car Service and Reduced Congestion—At the Same Time a Change Was Made in the Method of Fare Collection



A Loading Point on Loop No. 1, Exchange Place, Which Is Used by Cars Entering Providence from the North

BEGINNING on Sept. 9, 1923, all lines operated through the business district by the United Electric Railways of Providence were discontinued and all cars entering the business district were routed around eight loops. This change reduced from 16 to 3 the number of points where straight railway crossing movements take place in the congested area. Points where left-hand turning movements occur were reduced from 12 to 6, while the number of right-hand turning points remained constant. As a result of these changes there has been a reduction of 28.4 per cent in the number of cars late as compared with the corresponding period the previous year.

There were formerly 35 car routes in Providence, of which 12 were through routes and 23 terminated in the business district. The first step leading to the change in routing was a comprehensive traffic survey by Ford, Bacon & Davis, Inc., covering a period of three months. This investigation showed that the number of passengers actually riding through the business section was less than 5 per cent of the total railway traffic in Providence.

Many of the streets in the business district are narrow and winding. Although in the newer sections of the city there are broad straight streets, on approaching the old part of the town these all feed into a few narrow thoroughfares. During the rush hour there was extreme congestion of vehicles and street cars. Formerly the car routes crossed each other at many places, and cars were forced to make turning movements against a heavy flow of traffic in the opposite direction. The result was that the speed of operation was slow and interruptions to service were frequent.

During the severe snowstorms encountered in the winter of 1920, it was necessary for the railway temporarily to split operation on some of the through routes. The resulting improvement in service was so marked that many of its patrons wrote to the company at that time suggesting that the change be made permanent. After careful consideration of all sides of the question and several conferences with municipal authorities, the company decided that loop operation should be substituted for through operation.

Three principal objects were sought. In the first place it was thought that by eliminating the long, slow

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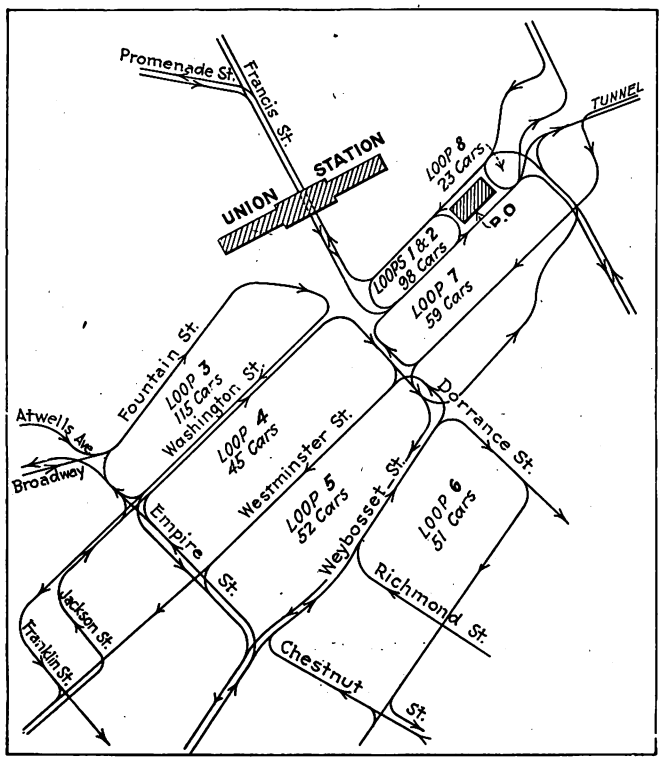
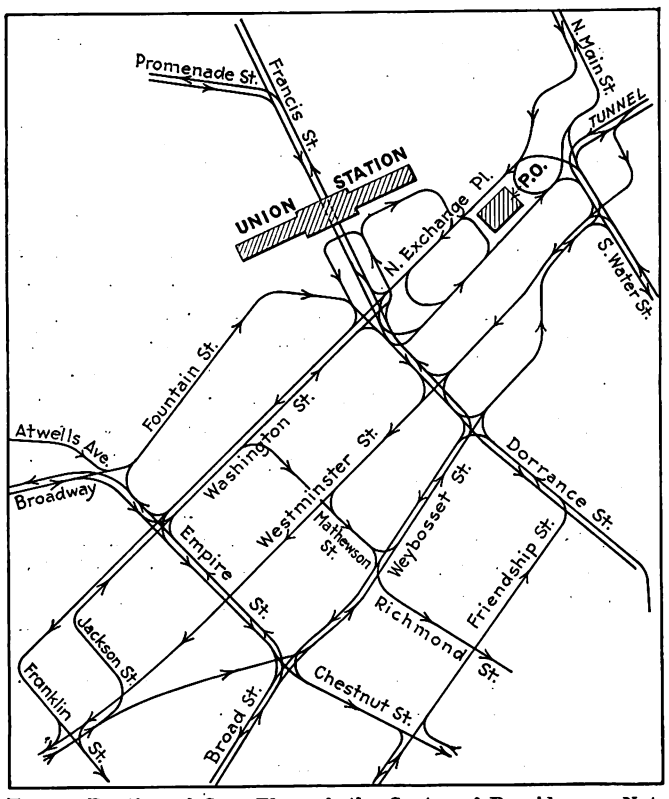


New Routing of Cars Through the Center of Providence Under the Loop System. All Lines Reach Dorrance Street Within a Short Distance of One Another

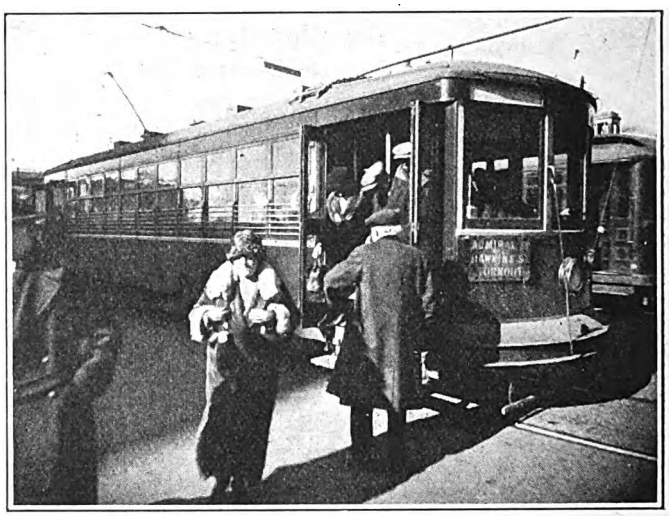
crawl through congested traffic in the downtown district it would be possible to give more satisfactory service to the majority of the passengers on each of the individual lines. In the second place, it was hoped to eliminate much waste mileage that was being run because carhouses were located near the outer ends of certain routes. To take care of the afternoon rush hour it was necessary to send a large number of cars out at an early hour. These operated to the center



Former Routing of Cars Through the Center of Providence. Note the Variety of Turning Movements Along Dorrance Street

of the city practically empty, and on the return trip, after having done their work, operated empty from the center out to the carhouse. Such wasteful operation was a feature of nearly all of the crosstown lines. In the third place the railway wished to install a system of pay-enter-inbound and pay-leave-outbound fare collection. This was impossible with the through routing, but could be arranged easily under the loop plan.

The city officials approved the proposed change in car routes, and as an additional step to reduce congestion they agreed to regulate automobile parking more strictly. For a week prior to making the change the company published half-page advertisements in all the daily newspapers explaining the reasons why the change was being made and the benefits which it was hoped would result therefrom. Pamphlets were distributed by conductors on the cars explaining in detail the modifications in routes, the new schedules, etc. Special telephone service was given so that it was necessary only to call the company's number and ask for "Traffic Change." This established communication with an offi-



Passengers Board and Alight in the Congested District at Both Ends of the Car Under the Pay-Enter-Inbound and Pay-Leave-Outbound System of Fare Collection

cial of the railway who could give any needed information. Beginning on the day that the change became effective several starters in uniform were stationed at central locations to help perplexed patrons.

The general nature of the change is shown by the accompanying drawings of car movements in the center of the city. An outstanding feature of the old routing was the excessive number of turns into and out of Dorrance Street. At the intersection of Dorrance and Weybosset Streets in the rush hour 26 cars made a left-hand turn against 72 cars which continued straight across. At Westminster Street 104 cars southbound had to cross 116 eastbound and westbound cars. In front of the City Hall 41 cars made a left-hand turn across 40 westbound cars. On Washington Street 86 cars had to cross 139. Another bad feature of the old plan was the congestion on the north end of Weybosset Street, where many lines operated along a narrow, crooked thoroughfare.

All this has been changed under the new routing. Cars coming into Providence from the north turn back on Loops 1 and 7. Cars coming from the west pass under the Union Station and operate over loops via the north side of Exchange Place, returning via the south side of that street, thence into Francis Street. At first

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these cars took a crossover on Francis Street, but because no sheltered waiting station was available there for passengers, and because a somewhat dangerous condition was created by their walking across Exchange Place, this plan was changed in favor of the present method of operation. Approaching the city from the south and southwest cars use Loops 3, 4 and 5. Loop 6 is used by cars coming from the east. There are now forty-one routes in all as compared with the thirty-five formerly operated. The density of traffic on the different loops in the rush hour is shown in the table:

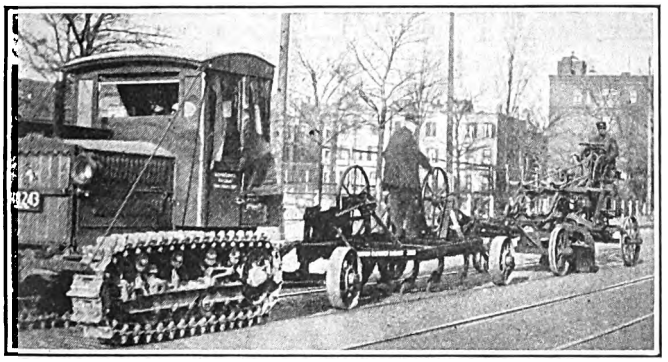
Loop 1	62 cars	Loop 5	52 cars
Loop 2	36 cars	Loop 6	51 cars
Loop 3	115 cars	Loop 7	59 cars
Loop 4	45 cars	Loop 8	23 cars

Considering the wide scope of the changes made very few complaints have been received. The majority of railway patrons have undoubtedly benefited by the new arrangement and are pleased. Some time after the loop system went into effect a central belt line was established, in order to connect up the different lines. This operated on a 7½-min. headway from the Union Station via Dorrance, Westminster, Mathewson, Weybosset, Market, Canal Streets and the north side of Exchange Place. Free transfers were issued and accepted between this belt line and other lines in the central district. The average number of passengers carried per trip was one. Many trips carried no passengers at all and after a two months' trial this belt line was abandoned. The light riding on the belt line proved that very few people have been inconvenienced by the discontinuance of the crosstown lines.

Practically all lines now enter Dorrance Street and come to within a short distance of each other. Passengers bound to or from the central business district can make the trip without change, and the comparatively small number desiring to go from an outlying district on one side of the city to an outlying district on the other side can do so by changing cars in the center and walking a short distance to reach the other line.

Tractor-Drawn Plow Cuts High Ice

ANOTHER addition to its snow-fighting equipment made during the past winter by the Boston Elevated Railway was that to remove the crown of high ice which sometimes forms between the rails. This is a Killifer ice breaker drawn by a tractor.



The Projecting Teeth Break Up High Ice Between the Rails

Following the ice breaker is an ordinary road scraper to clear the broken ice away from between the rails. The accompanying illustration shows clearly how the equipment is set for service.

Signs Tell Strangers How to Reach Their Destinations by Railway

BY W. H. BOYCE
Commercial Manager Pittsburgh Railways*

IN THESE days of competition, modern business methods must be applied. Try to induce people to ride. Don't be ashamed of the product you have to sell, unless it's that kind of a product. Even then, a bold front would help get you more than the "just can't help it" riders.

Did you ever step into another man's town where the taxicabs are always plentiful, the chauffeurs of which are more than willing to separate you from 50 cents or a dollar to take you to a location that could be just as easily and almost as quickly reached by a

Such Signs Are a Real Help to Strangers

street car that two or three minutes later passes the place where you are standing?

Did you, preferring to patronize the street railway company, and wishing to save the difference in fare and not wanting to appear as a stranger in a strange land, stand on the station sidewalk, trying to appear to be looking directly ahead and all unconcerned in an attempt to make "the folks" think that you felt right at home, and did you at the same time roll eyes right, left, up, down, and all around in an attempt to bring within your range of vision some indicator which would show you when, where, how and to what points the street cars operated?

Well, others have been in the same fix. A few of them may slip around the corner of the station, out of sight of the taxicab drivers, and make inquiry of some hanger-on regarding street car operation. The majority of them, wishing to be thought of as world and town wise, hard-boiled travelers, take to the taxi, and of course the railway company loses a passenger.

An item of their merchandising of transportation campaign to help swell their receipts, as well as to guide the stranger in their midst, is the installation of a number of blue and white enameled signs by the Beaver Valley Traction Company and the Pittsburgh & Beaver Street Railway. These signs, 23½ in. x 27½ in., and 23½ in. x 11½ in., are located at various railway stations and at the nearest points on car lines adjacent thereto, as well as at points of heavy traffic within the business section of the larger towns.

Some of the signs in use are shown in the accompanying illustration. Those headed "Car Stop" are located at car stops, and the others serve as guides to persons leaving the train at the station, which is a short distance from the car track.

In addition to the signs already mentioned, smaller blue and white enameled signs, 16 in. x 8 in., reading "To Street Cars," with arrow indicating the direction, are located at various points, such as the high school football fields, and in front of hotels or other points where strangers are apt to be in need of directing.

*At the time this article was written Mr. Boyce was general manager Beaver Valley Traction Company.

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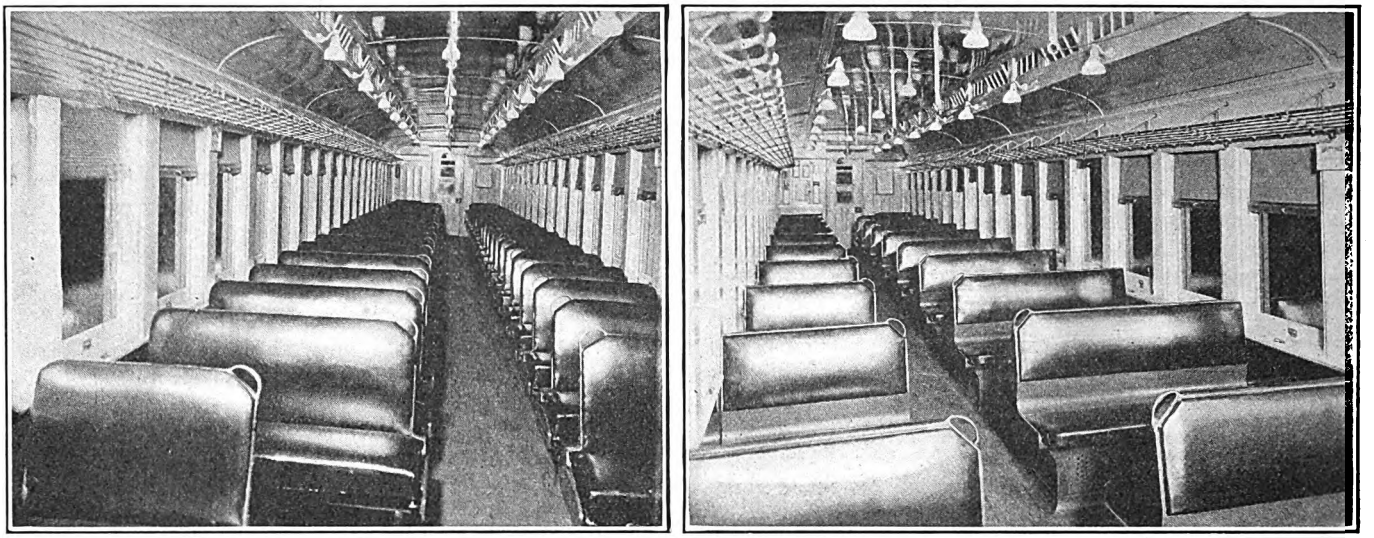


Two Experimental Arrangements of Seats to Increase the Capacity. Left—Back-to-Back Stationary Seats. Right—Reversible Seats

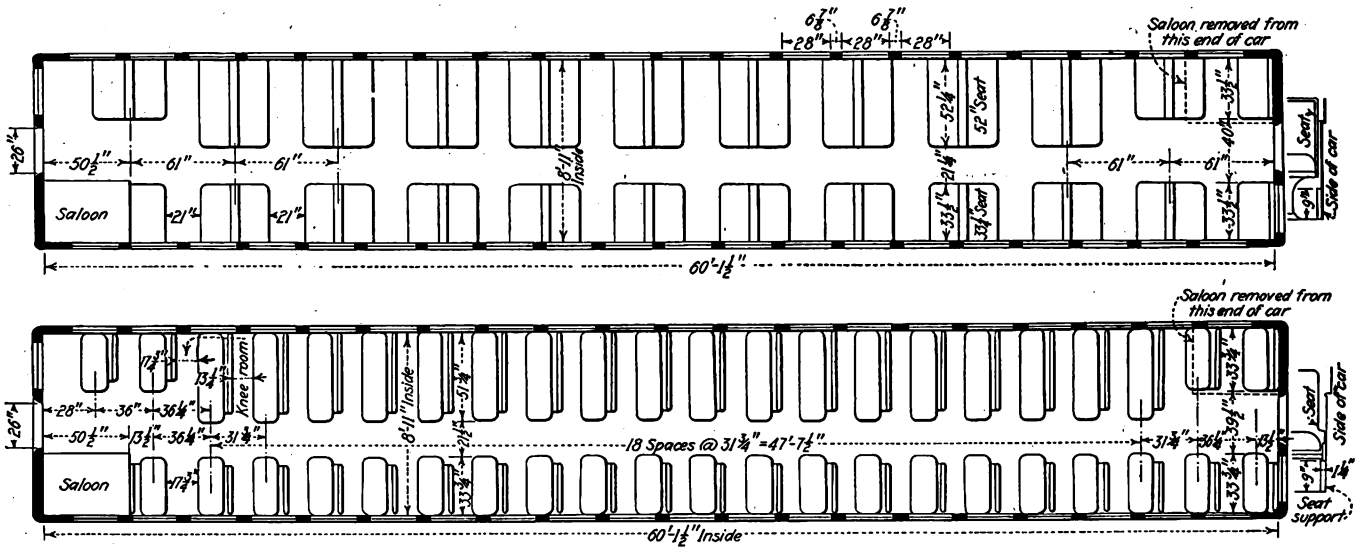
New Seating Arrangement to Increase Capacity

Seats for Three on One Side and Two on the Other Side Increase Capacity of Multiple-Unit Coaches of New Haven Railroad 38 per Cent

DURING the last three years the number of trains into and out of the Grand Central Terminal, New York, during commuter hours has approached the station capacity. Yet each day an increase of 3,000 passengers over that of the corresponding day of the preceding year has had to be handled, which has resulted in the New York, New Haven & Hartford seeking a way to increase the seating capacity of its cars, as the number of trains and the number of cars per train has about reached the limit.

Two experimental seating arrangements have been installed in two multiple-unit cars which have been re-equipped for this experiment. Additional seating accommodations have been provided by a closer spacing of seats than formerly and the use of a three-passenger seat on one side of the aisle and a two-passenger seat on the other. A different seating arrangement has been installed in each car, but each has the three-passenger seat, one in the form of a reversible seat and the other a stationary back to back seat. These two cars are a part of the equipment used in suburban service and have been rearranged at a cost of $2,000 each. The recent installation in service was accompanied by installation of signs in suburban cars setting forth the reason for the change and inviting the patrons to express their preference between the two types of seats and seating arrangement.

The converted car is 60 ft. long inside and 8 ft. 11 in. wide between the inside linings. In the case of the reversible seat car the seat spacing has been reduced from the previous standard of 34⅞ in. to 31¾ in., and a Pantasote covered low back seat has replaced the high back plush seat. This gives a seating capacity of 104, or an increase of 38 per cent over the old arrangement that accommodated 75. The new seats are without arms, the wide seat measuring 51¾ in. and the narrow



Rearrangement of Multiple-Unit Coaches Used in Suburban Service of the New Haven Railroad to Increase Seating Capacity
Above—Stationary seats back to back were tried in this car. Below—Another car was equipped with this arrangement of reversible seats

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seat 33¾ in., leaving an aisle of 21½ in. This width of aisle allows free passage of passengers in both directions because of the low backs which do not extend the full width of the seats. The seat construction is the same as is usually found in rapid transit cars, with full spring cushion and back and a handle located at the aisle end of each back.

In the other car the backs of the stationary seats, covered also with Pantasote, have been spaced 61 in. apart, allowing 21 in. of knee room between facing seats. This arrangement of seats gives a capacity of 108, or an increase of 44 per cent over the former seating arrangement.

The three-passenger seats have not been placed at the extreme ends of the cars. The last two seats are of the two-passenger type, allowing a wider aisle at the body entrance. No change has been made in the platform or vestibule doors. One toilet has been removed from each car, allowing space for seats for four more passengers.

St. Paul Valuation Before Minnesota Commission

Cost to Reproduce the Property Is Submitted by Consulting Engineer for the Company on Six Different Bases of Unit Costs—Going Concern Value Placed at $4,000,000

THE Railroad and Warehouse Commission of Minnesota opened hearings on March 31, 1924, to determine the value of the property of the St. Paul City Railway. Upon the valuation fixed by the commission at this hearing will depend the rate of fare to be in effect in St. Paul. The company now has a 6-cent fare, which is lower than that established in many cities of the size of St. Paul, but the city is endeavoring to reduce this rate. The present case was started in 1921 and after a conference of the valuation engineers for the company and the cities of Minneapolis and St. Paul with the commission it was decided to make valuations of the property on six bases.

At the March 31 hearing, Mr. Drum of A. L. Drum & Company, Chicago, on behalf of the company, submitted to the commission valuations of the property on these six bases, which are itemized by classes of property in the accompanying table.

The St. Paul City Railway operates the entire street railway system located within the corporate limits of the city of St. Paul, Minn., and a line to South St. Paul, consisting of about 8.29 miles of single track outside of the city limits. The inventory and appraisal includes the entire property in the present St. Paul 6-cent fare zone, consisting of the property of the St. Paul City Railway and the property comprising the line on East Seventh Street from Duluth Avenue to city limits of St. Paul and the South St. Paul line extending outside of the city limits of St. Paul. The property consists principally of 176.71 miles of single track; lands; the power distribution system, consisting of overhead trolley, feeder lines, underground conduit and underground wires; car equipment; carhouses; office, shops and miscellaneous buildings; four rotary converter substations, having an aggregate capacity of 20,400 kw., all primary power being furnished by the Minneapolis Street Railway and the St. Anthony Falls Water Power Company; shop machinery; tools; miscellaneous equipment, consisting of office furniture and fixtures.

The valuation of the physical property was made from a complete and detailed field inventory of the property taken as of Jan. 1, 1920, to which have been added the net capital expenditures from then to Jan. 1, 1922, to bring the valuation to the latter date.

The cost to reproduce the physical property now represents the minimum amount of capital that would have been required actually to reproduce the physical property of the company as of Jan. 1, 1922, on the following six different bases of unit costs: (1) Pre-war cost as of Jan. 1, 1920, using average prices for the five-year pre-war period, 1911 to 1915, inclusive; (2) ten-year average cost as of Jan. 1, 1920, using average prices for the ten-year period, 1912 to 1921, inclusive; (3) July 1, 1921, cost as of Jan. 1, 1920, using current prices as of July 1, 1921; (4) present-day cost as of Jan. 1, 1920, using current prices as of April, 1922; (5) Sept. 15, 1923, cost as of Jan. 1, 1920, using current prices as of Sept. 15, 1923; (6) estimated original cost as of Jan. 1, 1920, derived from the books of the company, or estimated, using prices in effect when property was installed or purchased.

The total power supply used by the St. Paul City Railway Company is generated at the steam power station of the Minneapolis Street Railway and at two water power stations operated under a lease from the St. Anthony Falls Water Power Company to the Minneapolis Street Railway, expiring June 1, 1937.

The value of the water power leases to the St. Paul City Railway is based on the saving effected due to the two water power leases, this saving being computed on the basis of the total cost of the electric power pur-

THE COST TO REPRODUCE NEW AND THE ESTIMATED ORIGINAL COST OF THE PHYSICAL PROPERTY OF THE ST. PAUL CITY RAILWAY AND LEASED LINES AS OF JAN. 1, 1922

Division	Pre-War Cost, Average Prices 1911-1915	Ten-Year Average Cost, Average Prices 1912-1921	1921 Cost, Prices Current July 1, 1921	Present-Day Cost, Prices Current April, 1922	Estimated Original Cost	September, 1923, Cost
Land	$994,613	$994,613	$994,613	$994,613	$994,613	$994,613
Track and paving	5,482,794	7,184,175	9,856,108	8,960,410	4,475,782	9,033,012
Bridges, trestles and culverts	114,445	129,284	141,976	138,104	109,633	141,841
Tunnels	400,062	522,167	657,574	651,138	329,679	640,733
Electrical distribution system	1,179,120	1,654,123	1,742,350	1,585,408	1,256,550	1,888,921
Rolling stock	2,818,151	4,390,329	5,838,799	5,257,859	2,599,280	5,932,093
Substation equipment	395,453	527,164	720,114	639,908	456,916	720,322
Shop machinery and shop tools	561,742	782,811	954,754	807,375	564,872	989,141
Buildings and structures	988,416	1,401,241	1,731,750	1,612,750	974,082	1,717,196
Furniture and fixtures	68,530	104,588	140,645	122,622	68,530	148,638
Stores, tools and miscellaneous equipment	578,027	578,027	578,027	578,027	577,795	578,027
Expenditures not apparent in inventory	149,696	149,696	149,695	149,695	89,996	149,696
Engineering and superintendence	686,552	920,910	1,175,320	1,074,896	624,887	1,146,712
Administration, organization and legal expense	671,354	747,138	831,457	817,534	661,628	822,100
Taxes during construction	220,485	312,002	442,835	442,835	220,485	422,143
Interest during construction	1,837,133	2,447,793	3,114,720	2,859,980	1,680,567	3,041,422
Working capital	305,444	305,444	305,444	305,444	305,444	305,444
Cost of financing	872,600	1,157,575	1,468,809	1,349,929	799,536	1,434,602
Grand total	$18,324,617	$24,309,080	$30,844,990	$28,348,527	$16,790,275	$30,126,656

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chased under the water power leases and the total cost of manufacture of this if generated at a modern steam power station. The total saving to June 1, 1937, is prorated between the Minneapolis Street Railway, the St. Paul City Railway and the Minneapolis & St. Paul Suburban Railroad on the basis of the total kilowatt-hours used by each. This element of value was included at $782,229.

The presentation of the claim for "going concern value" was made generally on the basis that the St. Paul City Railway had passed through the following stages of development: (1) Construction period; (2) developmental period of construction; (3) period of development into a successful going concern.

Mr. Drum submitted that the fair going concern value of the property was determined to be not less than $4,000,000, based on an estimate of the cost of placing the physical property in successful operation.

The basis recited that, in addition to the cost of the component parts of the bare physical property, the cost of placing the physical property in successful operation, that is, the cost of converting the inert railway plant into a successful operating system, is an element of cost that is encountered in creating a street railway system. In determining the amount of this item of cost the fact was considered that the St. Paul City Railway is in active and successful operation and has passed through the period between the beginning of operation and the time when the business earns not only operating expenses and taxes, but also a return on the investment, so that the cost of bringing the bare physical property into an efficient operating going concern has been encountered and met.

The business of the company has been built up, the service and equipment have been planned and perfected successfully to serve the business, an experienced and successful operating staff has been organized, trained and perfected in its duties, and extensions have been made into unpopulated territory requiring many years of operation before the increase in population (due to the construction of such extensions) can create traffic sufficient to pay the operating expenses and interest on the capital invested in such extensions.

Another element of going concern value submitted was that due to the consolidated operation with the Minneapolis street railway system, which was measured by capitalizing the estimated saving per year to the St. Paul company.

The Readers' Forum

Scheduling Car Leaving Times

PIQUA, OHIO, March 31, 1924.

To the Editors:

Your editorial entitled "Make Your Headways Sell Your Service" in the issue of March 15 has in it so much with which I find myself in thorough agreement that I hesitate to take exception to some other features of it. Let me rather suggest that we expand the ideas of scheduled leaving times and of so-called "freak headways" a little further.

While I agree that freak headways should not be deliberately set up when they reasonably can be avoided, there are some circumstances and conditions that have a very marked bearing on this question. Likewise in the matter of scheduled leaving times of cars on lines operating on a "regular" headway.

Take, for example, three lines each operating on a 10-minute headway from a central terminal using common track for 1½ or 2 miles out to the point of divergence. I believe that as a general rule, if cars on routes A, B and C are spaced 3, 3 and 4 minutes apart over each 10-minute period on the common track much better service is provided than if three cars, bunched, went out over this 1½ or 2 miles every 10 minutes. The advantage of frequent service in the short-haul territory outweighs the possible disadvantage to the patrons of lines B and C whose cars leave the central terminal at 3, 13, 23, etc., and 6, 16, 26, etc., minutes after the hour rather than at 10, 20, 30, etc., minutes after the hour.

On a relatively small system with several lines radiating from a central point and with very little joint track used by cars on different routes, it generally would be desirable for all cars to leave at the same 10, 20 or 30 minutes past the hour, both for ease in remembering the schedule and to facilitate transfers. But peculiar local conditions might modify any general rule.

Take again the case of suburban and interurban service operated from a terminal station like that of the Pacific Electric Railway in Los Angeles on headways of 20, 30 or 60 minutes, with three, four or five-car trains. Concentration of scheduled leaving times serves to limit the station capacity not only as to tracks but also as to waiting room area, gate, passageway and platform space. Much better service is possible by spreading the leaving times of different lines more evenly over the hour. It also would have a tendency to smooth off the power peaks.

The staggered hour plan is applicable not only to the hours for industrial and other labor for the purpose of smoothing off the traffic peaks, but may be applied to scheduling of cars and trains from concentrated terminals.

Referring now to the freak headways there seem to by two features you have raised for consideration: First, headways in excess of 5 minutes or in excess of 10 minutes, which are not exact multiples of 5 minutes, such as 17 minutes or 28 minutes; second, headways that are unbalanced such as 4 and 6, or 3 and 7, even though the average may be exactly 5 minutes.

I would say that the occasion would be very rare that would justify a 28-minute headway rather than a 30-minute headway, particularly if we were dealing with an individual line not complicated with local service. Very often suburban service is supplied by having certain cars (i.e., every second, third, fourth, fifth or sixth car) in city service run through to the suburban terminal. The traffic demand on the city line determines the basic headway for the city service. The suburban service, particularly in off-peak hours, is not determined by traffic which may be very light, but, let us say, has been determined upon as a matter of policy to be on a headway of approximately 15 minutes.

If the city service is on an 8-minute or 7-minute headway, we could probably stretch a point and use a basic 7½-minute city headway and send alternate cars

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to the suburban terminal on an even 15-minute headway. But if the city line traffic requires a 6-minute headway shall we take alternate cars and give a 12-minute suburban headway, or take every third car and give an 18-minute headway? I know of conditions that would justify the 12 and others that would justify the 18.

If a 6-minute headway is proper for the city line it would be too much like making the tail wag the dog to say that the city line should be cut to 5 minutes in order to make a nice even 15-minute headway to the suburban terminal. And likewise, if a 6-minute headway is required, a 7½-minute headway would be very inadequate and quite unjustifiable merely to make an even 15-minute suburban headway.

Every third car on a 5-minute headway, or every fifth car on a 3-minute, make up an even 15-minute suburban headway, but if city traffic requires a 3½ or 4-minute headway, the resultant suburban headway would be 14 minutes in the first case and either 12 or 16 minutes in the second case. Conditions may justify arranging the headways in cycles of 4, 4, 4 and 3 minutes, every fourth car being a suburban car on an even 15-minute headway. And let me say that I would put the suburban car, which serves the longest stretch of the line, following the 3-minute headway in the 4, 4, 4 and 3 cycle.

The foregoing discussion assumes double-track operation, at least no obstacles due to different headways on single track. But very often the problem is complicated by single track and again general rules must be altered to suit the local conditions.

Much of what has been said relative to suburban cars operated as integral parts of the city service is applicable to city lines with split or multiple terminals, turn-back service, etc. Typical examples may be found on the Milwaukee system and on the Winnipeg lines. Service demands on the main line should generally fix the main line headways rather than the desirability of making the branch line headways multiples of 5 minutes. I have before me a concrete example of the effect of changing a main-line headway from 6 to 5 minutes with resultant branch line headways changed from 12 to 10 minutes.

The change was made for the off-peak hours in the middle of the day and was not based upon traffic checks, which, by the way, showed a 6-minute headway to be adequate, but for some other reason, perhaps to make the branch line headways 10 instead of 12 minutes. The car mileage was increased about 750 car-miles per day with no appreciable increase in revenue. It simply showed that a 6-minute headway served the frequency factor of adequate service on that particular line as well as a 5-minute headway. I believe 750 car-miles per day is too great a price to pay for the difference between a 12- and a 10-minute branch-line headway.

Moreover, the electric railways in this country are operating on rather narrow margins and, speaking generally, are not in a position to waste service for the sake of headways of exactly 10, 15 or 20 minutes. One or two cars on one line for a few hours does not seem to cost much for one day, but the cost of one or two more cars on each line totals a neat little sum in the course of a year. In many cases the additional expense produces no commensurate return.

With reference to combination headways of 7 and 3 minutes I do not believe many schedule departments are laboring under any illusions on this point. While the 3 and 7 combination is rather extreme, a 5 and 7, a 4 and 6, a 3 and 5, a 2 and 3 or some other similar combination may be used, not by mistake or through carelessness, but for a very definite purpose.

The use of combination headways is particularly suited to city lines having turn-back or short-line service where all cars do not go to the end of the line, and where there is from 20 to 30 per cent of the total traffic beyond the turn-back point. If the traffic check taken within the zone of maximum loading shows the need for an average 5-minute headway the through cars would be overloaded and the turn-back cars would fail to carry their share of the load if all cars were spaced exactly 5 minutes apart.

A much better balance of the loads is obtained by the combination headway of 4 and 6 minutes with the short line car following the 6-minute interval and the long line car following the 4-minute interval. It is not advisable to put in too much differential, and in this connection it may be noted that a short-line passenger just missing a short-line car can take the next car which will be a through car. But a through passenger unable to get aboard an overloaded through car or just missing it cannot reach his destination on the next car (which is "turning short") but must wait for the next through car. Therefore the through cars should be favored in the time differential even more than the traffic ratio would indicate.

Another occasion for justifying combination headways is where single cars and two-car trains are used on the line at the same time. If traffic comes to the line at such a rate as to justify a 4-minute service with single cars, or an 8-minute service with two-car trains, the schedule for alternate single and double units should not be an even 6-minute headway. The double units would be underloaded and the single units would be overloaded.

Experience indicates that a space interval in front of a two-car train equal to twice the interval in front of a single unit produces an unbalance in the other direction, at least in city service subject to variations encountered in actual surface operation. In the case cited the combination headway would probably work out on a 5 and 7-minute basis rather than on a 4 and 8-minute basis or on a 6 and 6-minute basis.

Thus, in the tendency toward lack of balance in passenger loads due to difference in length of route or territory served or in the size of the successive passenger carrying units, we find ample justification for combination headways made up of unequal intervals.

I realize that in endeavoring to make some points clear I may have made some general statements open to the same criticism that might apply to the editorial. If so it only proves the point that each property has its own peculiar problems which require separate analysis and individual treatment. This leads me to quote the third paragraph of your editorial in pointing the way:

"Undoubtedly great economies in electric railway operation have been accomplished by the scientific scheduling of cars. Careful study by competent men is required to prepare time-tables so that cars will not pull out too early, stay out too long, waste time in excessive layovers, or bunch in the central district. The time and money employed to make accurate traffic checks are well spent."

JOE R. ONG,
Consulting Transportation Engineer.

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Association News & Discussions

Badgers View Utility Business Broadly

Responsibilities of Utility Management, Speakers' Bureau Activity and Training of Women Employees for Publicity Work Are Considered—Railway Section Holds Lively Discussion on Many Operating Subjects

AT THE meeting of the Wisconsin Public Utilities Association, held at the Hotel Pfister, Milwaukee, on April 17 and 18, a broad conception of the utility business was voiced by the speakers at the general sessions. In the railway sectional meeting, held during the afternoons of the two-day session, papers dealing with detailed technical operating and maintenance problems were given a spirited and enthusiastic discussion. Although the railway men in attendance did not quite accept the invitation of Chairman B. W. Arnold to remove their coats if necessary, the frank and free discussion accorded most of the papers added greatly to the value of these sessions.

The broadminded thinking of the general sessions reached its climax in an address delivered on Friday morning by John F. Gilchrist, vice-president Commonwealth Edison Company, Chicago, who took the responsibilities of utility management as his subject. He said that the management of the present-day public utility property is vested with responsibility to many interests, and unless each is fully considered in the administration of the company's affairs, the utility does not develop its service in the fullest sense of the term. The modern utility management carries a direct responsibilty to the people of the district served, to the customers of the utility, to the employees of the company, to commercial and industrial organizations in the community and to the stockholders of the company.

If the utility discharges its obligations to the first four interests in accordance with the fullest conception of real public service, Mr. Gilchrist contended, the interests of the stockholders will be automatically safeguarded. This, he said, is true because failure to earn a fair return to the stockholders immediately reacts to curtail the service which the company can render because such failure limits the ability to meet the needs of a growing community.

Mr. Gilchrist went further in his analysis and said that each management owes an obligation to its brothers in the industry and should take part fully in any activity to further the interests of the industry as a whole.

Since the utility industry can only function properly and efficiently as a monopoly, Mr. Gilchrist said that this in itself imposed several extremely important obligations and responsibilities. The first of these is the responsibility to maintain both continuity and adequacy of service. Then there is the responsibility of providing new capital to take care of needed extensions as the community develops. Customer ownership of the company's securities has proved to be one means of meeting this later requirement.

A further responsibility is that of assuming a proper place as a leader in the community. Another is the development of young men as future utility leaders and managers. The rapid development of industry in general and the increasing complexity of the problems involved raise a serious question, Mr. Gilchrist said, of the possibility of developing men rapidly enough to keep pace with the continually increasing requirements.

Satisfactory Progress Made

In his opening address at the general session, President Harold L. Geisse attributed the success of the association to the co-operation of its individual members and also paid a tribute to the assistance rendered by the associate manufacturer members. The activities of the association and its committee on public utility information has produced a noteworthy improvement in public understanding of the utility problems in Wisconsin and surrounding territory. He reported the organization of a speakers' bureau to supplement with the spoken word the work carried on by the committee on public utility information through the newspapers.

Women Employees to Help

Another step in the publicity work of the association was marked, Mr. Geisse said, by the organization of a women's public information committee in conformity with the work started by the National Electric Light Association. In their various capacities, he said, women are important contact points with the public and their education and training may be expected to aid materially in presenting authoritative facts to the general public regarding the utility business.

Miss E. M. Westenhaven, chairman of the women's public information committee, outlined the progress already made in organizing this women's work. Of the 575 women employed in utility work, exclusive of telephone companies, in Wisconsin, 528 have been included in the educational work under way. Speaking of the qualifications of women employees, she cited the success with which they have engaged in the sale of utility securities to the public as an illustration of their qualifications for assisting.

W. S. Vivian, Middle West Utilities Company, delivered an address on the subject of "Service." He drew a distinction between service and facilities, pointing out that the latter includes the mechanical facilities of the company only, whereas the former also includes the personnel and the personal contact.

General principles which have governed the organization of safety campaigns in various cities were outlined by J. W. Harte, Elliott Service Company of New York.

High Interest in Railway Section Meetings

At the opening of the railway section meeting Thursday afternoon, Chairman B. W. Arnold, Chicago, North Shore & Milwaukee Railroad, voiced approval of the combined meetings with other branches of the utility business. He thanked the membership for its co-operation during the two-year period of his chairmanship and stated that the individual members profited from meetings of this kind in direct proportion to the enthusiasm and energy with which they entered the activities and participated in the discussions.

A paper on substitute ties was read by J. C. Jameson, vice-president Dayton Mechanical Tie Company. He said that their use, although now stimulated by the difficulty of securing good grade wood ties and by the constant upward trend of wood tie prices, would likely in a few years be forced upon railways by the government in its effort to conserve the forests. He advocated some means of preventing the transmission of the shock and vibration of rolling stock directly to the concrete in which the ties are imbedded. Concrete, as a track foundation in paved streets, was held by him to be the best construction. Crushed rock or gravel ballast is practical only in open track which permits of periodical tamping. When sealed over by street paving, some shifting of ballast must occur.

In the discussion of Mr. Jameson's paper, A. A. Oldfield, Oshkosh, stated that the high price of substitute ties prevented their wider use. He also said that it sometimes became necessary to use stone ballast when making repairs under track carrying traffic. In regard to noise he reported no more noise with substitute tie construction than is obtained on wood ties, when the traffic consists of light-weight cars.

Dudley Montgomery, Madison, said that his property had tried the use of steel ties and had found considerable difficulty in bringing the track to line and surface in hot weather. He also said that steel ties had been found more noisy than wood ties and believed that the type of pavement was a con-

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siderable factor in the selection of the type of tie to be used. He questioned the value of a substitute tie in monolithic construction where the track is imbedded in concrete. He felt that in this form of construction the rail is carried and imbedded in the concrete, and described the use of old wood ties in some recently constructed track in Madison, utilizing wire reinforcing between rails. He stated that this track was expected to give good results for the operation of light-weight cars.

C. E. Warwick stated that no particular difficulty had been encountered in Green Bay in properly lining up the track when using substitute ties. He said that in hot weather the practice of leaving some of the joints open and completing the welding operation at night or in the evening under lower temperatures enabled proper alignment to be made. Mr. Oldfield said that by using 60-ft. rail lengths in Oshkosh, it was possible to weld up approximately five lengths of rail in advance. By keeping the aligning gang at work directly ahead of the concrete machine, no particular difficulty had been experienced.

N. C. Rasmussen, Wausau, reported some difficulty in holding track to line and surface in hot weather but said that his property was able to obtain satisfactory results by avoiding welding too far in advance of the concreting gang.

Chilled Iron Wheels Discussed

The manufacture, test and maintenance of chilled iron wheels to meet service conditions was the subject of a paper read by Francis J. Fox, Griffin Wheel Company. Mr. Fox listed the essential requirements of a car wheel as follows: (1) Sufficient hardness of the wearing surface to carry concentrated loads without excessive deformation over irregular tracks at high speeds; (2) maximum service on the wearing surface per unit of metal worn away; (3) maximum coefficient of friction between tread and brakeshoe; (4) tread surface should allow maximum durability of shoe; (5) wheel should produce minimum wear on rail.

By means of enlarged charts he described the method of chilling the tread and a portion of the flange of chilled iron wheels, and described the character of the resulting metal. This he said consisted of combinations of carbon and manganese with the iron. At the tread, the carbon is retained in combined form by the sudden chilling and the resulting metal at this point is very hard, containing 3.5 per cent of combined carbon. Mr. Fox then described the condition of the metal at various points in the wheel from the tread to the hub, stating that the combined carbon gradually decreases and the amount of graphite increases, giving the desired physical characteristics for the various parts of the wheel. At a point near the hub, he said, a sample taken from a wheel would show 96.5 per cent iron and 3.5 per cent graphite and would have the characteristics of soft steel.

Mr. Fox further described the methods used in the manufacture, testing and inspection of chilled iron wheels. He also pointed out that the service results obtained depend to a considerable extent upon the service conditions on each property, and stated that machining, mounting and maintenance practice have an important bearing on the total life of the wheel.

Cast and Rolled Wheels Compared

Many of the members present engaged in a general discussion of Mr. Fox's paper, which, in general, resolved itself into a comparison of results obtained with rolled-steel and chilled-iron wheels. A considerable part of the discussion related to the subject of flat spots on chilled-iron wheels, resulting from skidding, in comparison with those on rolled-steel wheels. Mr. Montgomery attributed a considerable part of the difficulty with flat spots on chilled-iron wheels to the action of sand when used on slippery rails. He stated that the chilled-iron wheels tend to slide on striking the sand, whereas the steel wheel continues to roll. He reported the results of the practice followed in Madison for a time of washing greasy rail with a sprinkler instead of using sand. Under this condition the difficulty with flat spots on chilled wheels was largely eliminated. But his road was required to go back to the use of sand as a result of a ruling by the Railroad Commission.

In reply to a question, Mr. Fox discussed the variations in the thickness of the chill on the tread of chilled-iron wheels and stated that in the manufacturing process it was possible to control this thickness within comparatively close limits.

Air Brake Developments

A. B. Wood, Westinghouse Air Brake Company, presented an illustrated paper describing the development of air brakes for light-weight cars. The importance of a proper understanding of the function of the air brake on the part of those who operate, supervise and maintain the cars was emphasized. In the proper selection of brake equipment, in supervising and insisting on proper instruction of operators and maintenance men, and in adopting standardized equipment on the various cars of a property, those in executive charge, Mr. Wood said, can do much to further safe and economical practices.

Mr. Wood pointed out the remedy for several recently detected causes of difficulty with safety control equipments. Among other things, the use of a choke fitting in a union close to the air whistle on interurban cars was recommended as a means of overcoming the difficulty from emergency action of the brake when the whistle is blown.

In answer to questions, Mr. Wood also discussed the problem of freeze-ups in air-brake lines and said, as a matter of design, it is almost impossible entirely to avoid this trouble. He also described the construction and operation of an anti-freezing device known as the Air Rectifier, which injects small quantities of alcohol into the system and which was reported by several of those present to have eliminated difficulty from freeze-ups.

The latest developments in automotive brakes were also described and illustrated by lantern slides. This included a description of the rotary inlet valve type of compressor which has been developed for this brake equipment.

Claims Work Discussed

On Friday afternoon W. T. Bie of Green Bay read a paper showing how the Wisconsin Public Service Corporation has collected more money during the past year than had been paid out in the settlement of claims. The paper will be abstracted in a forthcoming issue. It was discussed by Mr. McQuade of the Chicago, North Shore & Milwaukee Railroad, C. L. Hedges of LaCrosse and N. C. Rasmussen of Wausau. Mr. McQuade said that in a large city it was much more difficult to make the kind of a record cited by Mr. Bie. The North Shore Line, he said, felt that it was accomplishing good results when it held disbursements for claims within 2 per cent of the gross income. The latest figures obtained showed this figure to be approximately 1.6 per cent. He attributed the difference in the conditions of the large city and the small community to the greater difficulty of making and maintaining contact with the residents along the line and with the people of the town who make up juries. In addition he said that the ambulance chaser is always present in the larger city. He advocated the careful and continuous upbuilding of favorable public sentiment, founded on efficient service, as the best method of obtaining permanently improved conditions.

Mr. Rasmussen said that the practice in Wausau was to settle claims whenever possible and avoid lawsuits. Careful training of employees, and cooperation by all operating departments for the prevention of accidents, were held to be the most successful methods of holding the costs of claims to a minimum.

Commissioner A. L. McDonald, in a paper abstracted elsewhere in this issue, held that proper treatment of employees is necessary if they in turn are to be expected to make the proper kind of contact with the public. C. R. Mahan, Chicago, North Shore & Milwaukee Railroad, described several accounting practices of that road in a paper which is also abstracted elsewhere, and Dudley Montgomery of Madison presented a paper giving the result of a study of the growth of automobile and street car traffic with increases in population. From the results of his studies, which are given on another page, Mr. Montgomery expressed an optimistic viewpoint of the future of the industry. In his opinion, there has been no time during the past twenty years when the outlook for the electric railways was as bright as at present. He said that although automotive vehicles offered a type of de luxe service which appealed to certain classes of people, the possibilities of running special service with street cars for certain classes of patrons at increased fares had by no means received the consideration which it merited, and although a railway might be criticised for catering to a preferred class of passengers, such service was comparable with the operation of certain classes of bus service,

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and warranted careful consideration by railway operators.

ELECTION OF OFFICERS

Acting on the report of a nominating committee, G. C. Neff, Wisconsin Power & Light Company, was elected president of the association; L. L. Tesslier, DePere Light & Power Company, was made vice-president, and H. A. Smith, Southern Counties Power Company, was elected treasurer. In the railways section, Dudley Montgomery, vice-president Madison Railways, was elected chairman, and N. C. Rasmussen, superintendent railway department, Wisconsin Valley Electric Company, Wausau, was made vice-chairman.

The Commission's View of Platform Men*

Trainmen Cannot Make Up for Defects in Service for Which the Management Is Responsible—They Can Win Public Approval by Their Services Beyond Those Forming an Essential Part of the Job—They Should Never Be Censured in Public

BY ANDREW L. MCDONALD
Member Wisconsin Railroad Commission

THE Railroad Commission receives many forms of criticism from the car-riding public. Sometimes such criticism or complaint is the result of long-standing alleged inefficiency in service. Frequently it comes from people who spontaneously give vent to their attitude and feeling toward real or imagined disregard of the rights of the car-riding public. The motormen and conductors have quite as much to do with the relations between the public and the company as the board of directors or the manager. They are frequently made the target of complaint and possibly abuse for acts and conditions for which they are not at all personally responsible, but which acts reflect inefficiency or inattention of their superiors. Because of their intimate contact with the public, they have to be men of quick action and thought and should be imbued with absolute loyalty to the employing company. They must be, in the very nature of their employment, much more courteous and considerate than are the people who patronize the cars.

From personal observation as a mere patron of street railway and interurban service, as well as from my experience as a commissioner, motormen and conductors do not generally entertain a narrow and provincial view of the scope and character of their duties. They are not only required to load and unload passengers and run the cars so as to avoid danger to pedestrians and vehicles, but in general must be a kind of geographical encyclopedia and a source of wide information to the public. They are constantly bombarded with all kinds of questions, many of them wholly unrelated to the immediate service in which they are engaged. The employees who are building up a mutually helpful relationship between the riders and the company are those who meet these demands, as well as the technical duties they perform, with unfailing courtesy and sympathy.

The commission, of course, can only insist on such operation as will effectively care for the comfort, the safety and efficient transportation of passengers. It is self-evident that the motorman and conductor cannot make up for defects in equipment or service, for which superintendents and managers are primarily responsible.

The prerequisite importance of amicable and friendly relations between the company and the traveling public is constantly being more fully recognized by the transportation companies. It is not only what is done by employees close to the public that counts, but it is also the manner of doing things that is of vital importance. From my observation the present tendencies of street railway and interurban operation are toward the exercise of a very general spirit of helpfulness and care toward the patrons of the service. In fact, one frequently wonders at the extreme patience which these men exercise. There are, of course, exceptions to this general practice. There is an occasional grouch who does not appreciate or realize the value of courtesy and sympathetic helpfulness. Operators with such a narrow view will not answer the numerous questions that seem nonsensical and often without point. To the patron making such queries, however, the answer may be of vital importance. Even when unable to answer a question, the employees' manner may either give offense or may be such as to retain the friendliness and respect of a passenger.

COMMISSION OBSERVERS GIVE EXAMPLES, GOOD AND BAD

In this connection general criticisms and deductions perhaps are of much less value than concrete illustrations. Pursuant to this thought I called together those of our staff whose duty it is to check up men in the operating branch of the service in question and asked them to tell me some of the things that had come to their attention within the last year in the different cities in the state, and a recital of some of these may be helpful to those charged with the immediate duties of operating the railway properties.

One of them said that recently during rainy weather a car in a certain city was very much crowded and those standing in the rear might easily have moved forward so as to permit several to board the car who were standing out in the rain. The conductor requested the passengers to move forward but was met by a noisy protest from a prominent man who shouted defiance to the effect that he did not propose to "crowd" forward for any one. This patron was thinking of himself and selfishly had forgotten all about the people standing out in the rain. The conductor bore the loud criticism with patience rather than to retort as most people would be inclined to do. Unquestionably he gained the approval and respect of all fair-minded and right-thinking persons in the car.

It was pointed out by the observer who reported this incident, and I feel deserves repetition here, that in this case the conductor used the term "crowd up forward, please." The word "crowd" is what annoyed the irate gentleman spoken of, and it would perhaps have been better to have used the word "move" forward, please, or "step" forward, please. The word "crowd" did not appeal to that observer as the proper term to use under such circumstances.

Of course, it is impossible for street car companies to expect their employees working for moderate salaries to be perfect Chesterfields in courtesy and manner. I am reminded of a story told of a newly appointed railway manager who was riding one of his own cars to observe the performance of the conductor and motorman. The specific conductor called out the names of the streets in such manner that it was impossible to detect the names by which such streets were christened. After some period of observation on the part of the manager he approached the conductor and chided him for his bungling and inefficient manner in attempting to call the names of the streets. The conductor asked him what business of his it was how he called the streets. With great dignity the manager declared his official capacity and advised the conductor to be more musical and accurate in his future street calling. To this the conductor replied with some heat: "What do you expect of a poor dub getting $75 a month in calling street names—grand opera?"

Many illustrations could be given to show that an unusual degree of judgment is required by street car operators. Quick thinking is sometimes necessary to avoid serious accidents. Another observer stated that recently an automobile was parked at the curb of a narrow street in a certain city. As a street car was approaching at the average speed another automobile was being driven in the same direction just in front of the car, but not on the track. The driver, in order to pass the standing automobile, suddenly and without warning turned upon the tracks immediately in front of the rapidly moving car. The motorman reversed the power and thus avoided what would otherwise have been a very serious accident, with possible loss of life. In this case no blame could have been attached had the collision occurred, but the motorman, through his training in alertness and quick wit, did what was expected of him. He saved the driver of the automobile from the results of his own folly.

Another observer reported recently seeing a conductor get off his car, lift on board a small child, then get off the car again and assist a crippled man to the car and help him to a seat. He

*Abstract of paper presented before Wisconsin Utilities Association in Milwaukee, April 17 and 18, 1924.

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later managed to find a seat in a very crowded car for a lady carrying a small child. Perhaps these acts might be interpreted as beyond the conductor's duties but they represent what the public receives in the way of service, purely from the humanitarian impulse which no doubt prompted the conductor in these instances. The public was better served because these acts saved time and allowed the car to proceed more quickly and to reach its destination sooner.

Many other incidents of like nature might be cited. Those given are a fair sample of the courtesy extended to both deserving and undeserving patrons of street and interurban cars every day.

Supervisors and other operating men have their part in the scheme of public service, and they too will often be called upon to exercise judgment and discretion, which can hardly be said strictly to be included in their duties. In dealing with the men who are operating or maintaining the cars they should not fail to realize that these men are in a position often most trying and nerve-racking.

To illustrate, a short time ago a motorman was seen driving a car along one of the principal streets of a certain city when a little child suddenly darted squarely down the track in front of the car. Quick action brought the car to a stop within 2 ft. of the child. Do you think the motorman's nerves were such that he could at that time have endured any kind of criticism from a superior?

The same observer recently noticed a superintendent standing at a timing point in a certain city when a car approached with its signs improperly set, the two destination signs being in conflict. A bystander who was talking to the superintendent called attention to this. The superintendent stepped into the car and severely reprimanded the conductor in front of a carload of passengers. In the interest of service to the public and in common justice to the employee, this is one mistake on the part of supervising officers that the commission cannot condemn too strongly, and I might add too that it is not so very unusual. While it is true this conductor had made a mistake, and also true that his attention should have been called to it, it could have and should have been done simply by calling his atttntion to it at that time and later, if it was deemed necessary, talking to him about it at the barn.

To you supervising officers I would say: Don't forget that your employees are just as human as you are, and sometimes perhaps just a little more so, and don't publicly criticise and censure them and then expect them to deal politely and civilly with the public. Don't forget you are their superior officers and that such criticism from you, especially if unmerited and unjust, irritates and angers them even though they are not in position to express their feelings to you. It is just natural that for some time after such public rebuke has been made it will be pretty hard for that particular conductor or motorman to deal civilly and courteously with the public. Don't forget that this conductor or motorman is your representative with the public and that his attitude and treatment of your patrons either adds to or takes away from the patronage of your company.

Rules at Time of Accident Must Be Followed with Judgment

Another little thing has come to our attention. There is a rule in force by practically all companies forbidding employees to give any information to the public in case of an accident. The rule may be well meant, but unless carried out with judgment, its workings may lead to absurdities.

To illustrate, some time ago a slight accident occurred in a certain city shortly after noon when many were going home to lunch. The car was disabled and could not be moved for a long time, a fact known by the car crew. Questions asked by passengers brought no replies from the trainmen, and after waiting for a long time many were compelled to go back to their work without being able to get home for lunch.

Within two or three blocks was another car line that would have delivered these people very near their desired destination. What harm could have resulted if the operators had been permitted to advise the passengers of the facts, which could not possibly have had any bearing on any damage claim that might later be made against the company? The men in charge of that car, or any other car, if properly instructed, can be trusted to exercise reasonable judgment in such cases, and a friendly feeling toward the company is sure to be engendered when people know that their interests are receiving as much consideration as the company's interest in a damage claim.

In conclusion, from my acquaintance with the average railroad man, I would say this: Make all possible effort to have your men properly instructed in their duties, pay them a wage that will keep poverty and want out of their thoughts, treat them as you would be treated yourself if your positions were reversed, and you will find they will respond and that such treatment will bring a splendid return in the way of public interest in your railroad and patronage of it.

Accounting Practice on the North Shore Line*

By C. R. Mahan
Auditor Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.

WE HAVE in practice three methods of accounting that differ somewhat from those in general use on other properties: First, cost department accounting for the engineers; second, centralized merchandise dispatch accounting; third, accounting for tickets issued by cash register machines.

There never was a time in the history of our industry that called for closer co-operation between the engineers and accountants than the present. Today it is very necessary that the accountants exercise the utmost care in correctly stating the cost of maintenance and also the outlay applicable to investment. The very nature of the work performed by the maintenance of way department is so diversified and so widely spread over the entire system of the carrier that constant and careful attention is required to differentiate between the expenditures properly chargeable to income and those which are chargeable to capital.

Carriers working under a budgetary control system endeavor to regulate their expenditures for upkeep and additions and betterments within the amount specified by the budget. In order that the engineers may successfully carry out their part of the program, it is essential that the accountants furnish them with accurate detail unit costs during the progress of the work. Should the engineers be compelled to wait until the work is completed before they are furnished with unit costs, they would have little chance to correct faulty organization; to detect inefficient labor, or to correct imperfect construction or maintenance methods. With these points in view and with the assistance and co-operation of our chief engineer, we organized a cost department under the supervision of the accounting department.

In Charge of Engineer Auditor

This cost department is in charge of an engineer auditor, who has had considerable experience in handling cost work and is thoroughly familiar with the requirements of the engineering department as well as those of the accounting department. The personnel of this department was recruited from the engineering and accounting departments, and by this co-ordination of employees developed a combination of forces that had a concrete understanding of the requirements of each department and resulted in the installation of a system of accounting that by one continuous operation provides the engineers with a sectional unit cost report which shows the description of each account, account number, manhours, money, unit and unit cost, and also summarizes the final result for the accounting department labor distribution entry.

It is our intention, in the near future, to extend the scope of this department so that it will also furnish all other departments with such unit costs as they may find desirable.

Centralized Merchandise Dispatch Accounting. The centralized system of merchandise dispatch accounting is in charge of the merchandise dispatch station accountant under the supervision of the auditor of merchandise dispatch accounts, who in turn reports to the auditor. The purpose of creating

*Abstract of a paper before the Electric Railway Section, Wisconsin Utilities Association, Milwaukee, Wis., April 17-18, 1924.

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this department, in so far as practical, was to separate the accounting from the physical operation of the station.

The receipt of the original waybills for inbound traffic, the revision thereof, the issuing of merchandise dispatch (expense) bills with their component parts, mailing statements to credit patrons and collections and remittance of all charges, remain part of the agent's duties. The methods used were described in ELECTRIC RAILWAY JOURNAL for Sept. 1, 1923, page 329.

The merchandise dispatch accountant's office abstracts by tabulating machines all outbound and inbound waybills and miscellaneous items, furnishing the station agents with their copy and the traffic department with a copy of forwarded abstracts. Station accounts are kept in balance and reports furnished the station daily. The station agent sends in the daily cash sheet which is posted to the abstracts. Uncollected reports are drawn off by stations each month and the station furnished with a copy. All correction notices are sent out and all adjustments are made by this department as well as all refunds. The draft covering, however, is forwarded to the agent who makes the delivery, the agent taking up the paid expense bill.

This method of accounting results in uniformity and accuracy in abstracting and in keeping the station accounts in balance. The accountant's office is in possession at all times of the amount of uncollected charges, which results in an enforcement control over the agents to collect the charges within the time limit prescribed by the Interstate Commerce Commission, and also results in considerable saving of the traveling auditor's time in the actual checking of the stations, as the verification of the uncollected accounts prior to the current month is handled by mail in the accountant's office.

Tickets Issued by Cash Register Machines. We have now in operation 22 cash register machines issuing tickets sold by agents, and it is our intention to install additional machines in the stations not now equipped just as rapidly as the volume of business justifies the expenditure. These were described in ELECTRIC RAILWAY JOURNAL for Nov. 11, 1922, page 773.

The accounting for machine ticket sales is very simple, as it is not necessary to check a ticket case containing a stock of one-way tickets for each agent. The machines automatically list and total all tickets sold. The agent sends in the machine tape with his ticket report to the auditor of passenger accounts. The tapes indicate the destination point by symbols opposite the amount received for each ticket. These tapes are then tabulated on an analyzing machine that gives the total sales by stations for tickets sold from one station to every other station. This ticket analysis, previous to the machine installation, required the time equivalent to two and one-half employees. One operator now does the work, and in addition is distributing the various classes of accounts for the storehouse and summarizing our daily mileage reports for the month in accordance with our prescribed classification.

We have found by actual test that tickets can be issued more rapidly by machines than card tickets can be issued, and in addition the passenger gets a receipt. There is less opportunity for ticket manipulation as the ticket is automatically canceled when the hat check is lifted by the conductor and placed in the hat check holder. The machines have cut down our investment in printed one-way stock considerably. Ticket paper costs approximately 30 cents per thousand, while card tickets run all the way from 80 cents to $1.25 per thousand.

Effect of the Automobile on Passenger Traffic*

BY DUDLEY MONTGOMERY
Vice-President Madison Railways,
Madison, Wis.

THE past fifteen years have been the most trying in the history of the street railway business. Together with the trials of war and much adverse legislation and criticism, the industry has had to meet the competition of the automobile.

In 1910 we were all worried about the possible diminution of street railway traffic due to automobile traffic, and yet at that time no one conceived of the ultimate growth of the automobile industry. The accompanying charts give the facts from 1910 to 1923, both inclusive, and represent what is considered to be conservative judgment from 1923 to 1930.

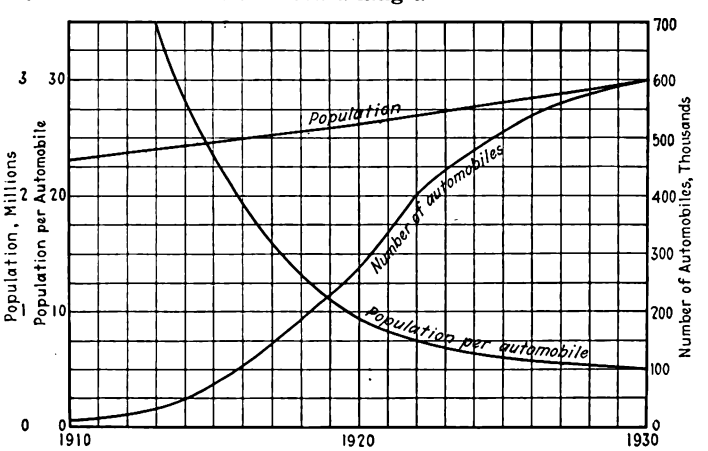
The chart for the State of Wisconsin shows the present trend of population and automobile ownership. Assuming that the population between 1920 and 1930 will increase by the same proportion that it did during the previous ten years, and that by 1930 there will be five inhabitants per automobile, we can expect a total of 600,000 automobiles in the state at that time. The chart for the city of Madison shows the probable increase in population, the number of passengers being carried and those that probably will be carried by the electric railway in 1930.

The many predictions of how many automobiles the country could support and the time when the enormous annual increase of production would slacken to a point commensurate with the normal growth of population have usually fallen short of the facts. I would call attention to only one comparison, which seems to provide some measure of future development; that is, that there are now more automobiles in the United States than there are telephones. I believe that an expansion much beyond this point will not prove to be the permanent saturation point.

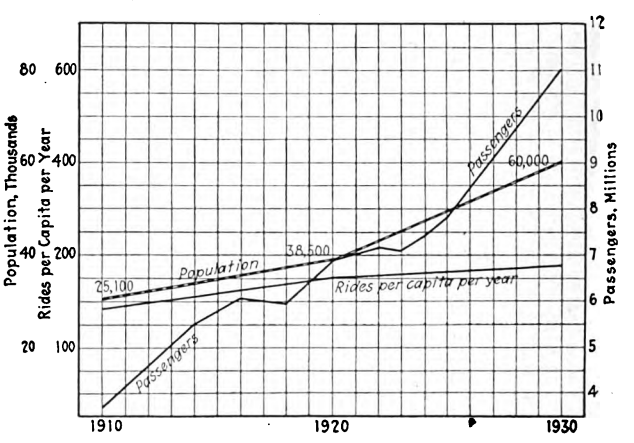
The number of persons who at present own automobiles but are using them less and less for daily service is increasing steadily. They find that the expense is greater than they care to assume, that the difficulty of finding space to park their cars is an annoyance, that the wear and tear on the automobile standing in the weather is another expense and that the time saved, if any, is of no great moment to them. The result is that they are using their automobiles mostly for pleasure riding.

The country is going through much the same kind of experience with the

*Abstract of a paper before the Electric Railway Section, Wisconsin Utilities Association, Milwaukee, April 17-18, 1924.



Relation Between Population Growth and Automobiles, State of Wisconsin



Relation Between Population and Street Car Riding Habit, City of Madison

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automobile that it did with the bicycle, and a part of the novelty of automobile driving is wearing off. This is especially true where traffic congestion is serious enough to hamper and irritate the driver.

For some time we have been collecting data and making observations to determine the amount of traffic which the automobile takes from the street car, and two of the best illustrations which we have are comparisons between the month of March, 1923, and that of April, 1923, and between December, 1923, and January, 1924.

	March, 1923	April, 1923	December, 1923	January, 1924
Passengers	718,400*	630,400	615,100	754,700
Aver. per day	23,950	20,600	19,800	24,300
Difference	3,350	.....	.....	4,500

*One day no service.

Each of these two combinations of months were comparable in Madison except that the weather in April and December was mild and beautiful, whereas March and January were cold and stormy. If we assume that the automobile travel during March and January was of a nature which used to be carried by horse or was new business peculiar to the automobile, we find that 14 per cent in the first instance, and 18½ per cent in the second, of the total possible traffic was accommodated by the automobile, and from 81½ per cent to 86 per cent by street cars.

From this and other information we find that the street cars are carrying, on the average, 80 per cent, or four-fifths, of the city traffic, and we believe that they will continue to hold this proportion. It must be remembered that the largest part of the automobile riding is new business developed by the automobile and cannot be considered as a loss to the street railways.

In coming to these conclusions, we are not forgetting the possibilities of urban bus operation. Such transportation is more likely to appeal to those now riding in their privately owned automobiles than to street car patrons, and we believe that we can compete with the bus in attractiveness of service. There is no doubt that the street car is still the service of lowest cost, and there is every reason to believe that, as the people settle down to a steadier existence, the street railways can look forward to a normal increase in their business based on increase in population and riding habit.

The Electric Railway Situation Today*

Securities Strengthened by Public Appreciation that Railway Is a Necessity and by Earnest Endeavor of Operators to Give Best Possible Service Under More Efficient Methods

By W. H. Sawyer
President East St. Louis & Suburban Railway, East St. Louis, Ill.

THE greatest advancement which has been made in the position of the electric railways has been the appreciation on the part of the public that electric railways, being a national and civic necessity, are entitled without question to make a fair return on a fair value. This has strengthened electric railway securities so that the buying public today has more faith in them as investments. This is especially true of the city electric railways, which today, speaking nationally, are in a fairly healthy condition and merit recognition from the investors. In fact, it is probably true that in the past year's market, which in general has possibly been somewhat inflated, electric railway securities have not come fully into their own.

One reason why electric railway securities are better investments today than before is the appreciation on the part of the investing public of the underlying necessity of electric railways. Another is the increased efficiency in mechanical production shown by the operators. A really fundamental reason is that the 1924 electric railway executive and operator has a more keen appreciation of the fact that it is his duty to give the very best service practicable for the rate of fare charged, and further, that it is his duty to give service in such a way that it will satisfy, in so far as it is humanly possible, the customers and the potential customers of his electric railway.

I care not where you go, there is a different attitude today on the part of the electric railway executive and operator. He wants to satisfy his public. We executives and operators who went through the horrible nightmare during war times learned our lesson and were brought to an appreciation of the fact that part of our troubles were of our own making.

Times and conditions have changed. The old flat franchise fare is gone, never nationally to return. Our customers today in different localities call it by different names, but in the last analysis street car fares today are in most cases based on the cost of the service. In no place does the customer pay more than the cost of the service.

There has for some time been a question in my mind whether regulation practically eliminating profits and practically restricting return on investment to the cost of money would not work out detrimentally in the end, but at the present time the theory of regulation on the basis of a fair return on a fair value and no more is, I am frank to say, giving very general satisfaction. There has also been a question in my mind whether the electric railway operator would be as efficient if all the efficiency went to the benefit of the car rider, but today this generation of electric railway executives and operators is more efficient than ever before. We have too big a job before us today to grow pessimistic over the possibilities of what may happen in the next generation. If, however, we continue to have regulation, and the customer is protected from paying more than the cost of the car ride, including, of course, a fair return on a fair value, it is essential that careful thought be given by all to see to it that the investor is given a fair return on a fair value. Otherwise there will be no investors, and then there will be no electric railways—but that to me is unthinkable. Electric railways must continue and investors must, therefore, continue to be willing to invest in electric railway securities, and the people must, therefore, continue to be willing to allow the investor a fair return.

Another new phase which has come about due to the general adoption of this service-at-cost idea is the desire on the part not only of the electric railway companies, but of their customers also, to have eliminated those items of expense which are not part of the cost of the car ride. Years ago when conditions were different, when there was no regulation, when there was a flat rate of fare, every concession forced out of the company was considered a benefit to the civic community. Under today's condition expense saddled by the community on the car company is paid by the car rider. The company and the customers both want to see the lowest practicable fare for good service. The company and the customers both want to see all unfair expense eliminated from the cost of the car ride.

One of the best illustrations of an unfair expense charged against the cost of a car ride today is the paving tax. In communities working under old-time franchises the car rider still pays for the paving between the car tracks, although this paving is not needed by the car rider, is not worn out by the car rider, and does not even deteriorate due to the electric cars. It is in keeping with the spirit of changed conditions that new franchises are eliminating this paving tax, and rightfully so. The car rider should not pay for paving worn out by vehicle owners.

Upon examining some figures a while ago I noticed that the Kansas City Railway had invested in pavements and viaducts more than $5,000,000. It seems unthinkable that a company with gross earnings of only about $10,000,000 should have to invest more than $5,000,000 in pavements and viaducts, and maintain and keep in repair such pavements and viaducts. Interest, depreciation and taxes should certainly be taken as high as 10 per cent on this $5,000,000. This means $500,000 a year to be paid by the car rider for fixed charges on pavement and viaducts. To maintain this paving alone would cost on the average approximately $200,000 a year.

I am not well enough acquainted with the local situation to hazard an approximation as to the cost of maintenance of viaducts, but there is no

*Abstract of paper presented before Missouri Public Utilities Association at Kansas City, Mo., April 9, 1924.

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question but that the street car riders in Kansas City pay, exclusive of regular state, county and city taxes, upward of $800,000 a year for indirect taxes which no other business is called upon to pay. There is no question but that the Kansas City car rider has to pay considerably more than ½ cent of his car fare for these inequitable indirect taxes. It is therefore not to be wondered at that where new franchises are being granted the car riders are asking for the elimination of these indirect taxes and imposts.

In some instances the street car company is asking for the elimination and it is being opposed by the elected representatives of the community. This is, I believe, due to the fact that there is not yet a full appreciation of the fact that the car rider must eventually pay for the cost of the car ride—and no more. Once this fact is appreciated and understood, mayors, city councils or city commissioners will not ask that the burden of these indirect taxes be put upon the car riders, who are mostly the working class of people, for the benefit of the community at large.

Railway Men Studying the Bus

No electric railway man gets to his feet today to talk without touching upon what we call the bus situation. It was only a few years ago that electric railway men shuddered at the mere mention of the word "buses." They had in mind the jitneys, which for a long period almost sapped the lifeblood of many companies, including the local company here in Kansas City. The average electric railway man is not disturbed today when you mention buses. It is one of the problems which he is studying—studying from an analytical, unprejudiced standpoint. Buses are going to be used more and more as time goes along by electric railway men in fulfilling their transportation duties to their communities. In many cities the electric railway man is today rightfully using a considerable number of buses to supplement and round out his transportation service.

There are objections to buses, especially in some localities, and especially on some streets in some localities. The bus as a vehicle does not carry as many people as the street car does as a vehicle, and from the status of the art today it is impracticable for it to do so, and to transport the same number of people therefore requires more buses than street cars. Bus transportation costs more per passenger carried than does street car transportation. Buses add materially to the downtown congestion, which is one of the biggest problems electric railway men and civic communities have to solve. I do not believe that bus operation should be independent of the street and interurban car facilities, but I do believe that every electric car man should give serious thought as to whether buses operated by the railway company are not necessary to round out and complete the transportation needs of his community. But buses should not be allowed to compete in such a way as to take away the cream of the traffic from the electric cars in which the people now have their money invested, and upon which the people finally must depend for service.

A short time ago while in Chicago at a convention similar to this I listened to a well-meaning man talk about educating the public by the use of publicity. I took the ground that the man meant right but that he was wrong in his phraseology. The public does not need to be educated, but we need to be educated, we electric railway executives and operators. I think the facts are that none of us are yet fully educated either as to the proper quantity or quality of publicity or advertising, but we are on our way, we are on the right path, in that we are today conducting our business as other successful men conduct their businesses, giving full service for value received, giving efficient service, and acquainting our customers through the newspapers with all the facts surrounding our business, which in the final analysis is really their business.

I. C. C. Considers Mail Rates

Association Committee Presents Extended Report on Proper Basis for Determining Charges to Be Paid for Electric Railway Mail Service

THE question of the proper charges to be paid by the Post Office Department to the electric railways for the haulage of mail is now before the Interstate Commerce Commission. For years the electric railways have believed that they were underpaid for the services which they render in the haulage of mail matter, and under the direction of a committee of the American Electric Railway Association they have been endeavoring to secure an increase. The last rate schedule established by the Interstate Commerce Commission went into effect Dec. 1, 1920, but has been found inadequate in a number of particulars. Since that time both the association and the department have been compiling data on the subject and these data have been presented as exhibits to the commission. The final step in the effort to secure fairer rate for mail service took place April 10, when W. H. Maltbie, as counsel for the association, filed with the commission a brief discussing the evidence so far submitted. This brief occupies a pamphlet of about 116 pages. The following is a summary of the principal points made in it:

The Present Rates

Briefly, the present rates are:

Class I. R.P.O. service.—In this service the railway furnishes and transports either a full car or a compartment for the exclusive use of mail, but all the work in connection with the handling of the mail is done by the regular employees of the department. The rate is based per car mile on the linear length of the car, or compartment, as follows: For each linear foot of car length up to 20 ft., 1¼ cents per mile; for each foot of length over 20 ft., ¾ cent per mile.

Class II. Independent cars.—This class covers those cases where the car or compartment, at least during the time when it carries the mail, is used exclusively for the post office department, but the mail is handled by the employees of the transportation company. The present rates allow for the additional service of handling and responsibility for the mail an additional charge of ¼ cent per mile for each foot of car or compartment length up to but not exceeding 20 ft.

Class III. Closed pouch service in baggage or express cars or compartments.—In this form of service the mail is carried, with other express or baggage, in a baggage or express car or compartment. It is handled entirely by the employees of the transportation company and is given preferential treatment in that space must be provided for any quantity tendered, and as the space occupied must be carried after the mail is discharged to the end of the run, an additional allowance is warranted. The rate which has been paid for this service is 1 cent per mile per foot of car length used for mail, plus a surcharge of 2 cents per car mile to cover handling, preferential treatment, excess haul and responsibility, but applicable only to the first unit of each shipment. In other words, this surcharge is 2 cents per shipment-mile.

Class IV. Closed pouch service in passenger cars or compartment.—This comprises cases where the mail is carried in passenger cars or passenger compartments, all handling being done by the company. As there is even greater responsibility in protecting the mail against loss and damage than in Class III, the rate is slightly higher, i.e., the base rate is the same as Class III, but the surcharge per shipment-mile is 3 cents instead of 2 cents as in Class III.

Basis of the Present Case

After an experience of about two years, the railway companies requested the reopening of the case on the ground that the rates were inadequate. To determine what were fair rates, a questionnaire was prepared by co-operation between the representatives of the post office department and those of the American Electric Railway Association, designed to secure the information desired by both parties. Many valuable data were secured. These data have been accepted by both parties. Some testimony was also presented during the hearings through witnesses, particularly by A. S. Richey and Thomas Conway, Jr. Some of the points in which it was found that the department and the companies differed will be mentioned.

The method of determining the revenue length of car, particularly the

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extent to which the platform should be considered as part of the length of car, was one point of difference. In an effort made to determine the actual cost to the company of the service, there were differences in opinion as to the proper method of apportioning some of the expenses, whether the Federal income tax should be treated in the accounts as an operating expense and the proper "fair return" to allow, the department proposing 5½ per cent and the carriers asking for 8 per cent of the fair value. There was also a disagreement as to the space to be considered as "occupied," particularly in Class IV service.

CARRIERS PROPOSE RATES

The position of the carriers before the Interstate Commerce Commission was that the rates should be based on the cost of service, plus a fair return, but that as the cost varies with each city, it is more practicable to take the average cost of all electric railway transportation as a base rate. In the absence of operating figures for the entire country, the average figure of the 151 railway companies from which data were obtained in this study of mail rates is taken. Then the cost per car foot mile may be obtained by dividing the total operating expenses and other costs of the railway systems by the total revenue car foot mileage. The "fair value" of the properties, for the purpose of this determination, may then be taken as 4.35 times the total annual operating expenses, and on the value thus obtained, the fair return should be figured at 8 per cent.

In developing the reasonable rate on the basis of this cost, the carriers' brief said that in general mail service is divided into three classes: (A) Full car service, (B) full compartment service, and (C) fractional service. Classes A and B are subdivided according to whether mail is handled by the post office employees or by the railway employees, and Class C is subdivided according as the fractional service makes use of freight, express or passenger equipment.

The brief then says that the proper basis for rate making is the cost per car mile or the cost per car foot mile, plus a fair return, with proper discount from the car mile rate for short length cars and proper surcharges for: (a) Special service not demanded in passenger traffic, (b) fractional or l.c.l. service, (c) necessary excess run, due to demand for service between points other than termini of existing car runs and (d) the fact that the mail service is an ordered service.

The brief then points out that the revenue length of the car should be taken to include one-half of all platforms. The rates per car foot mile would then be shown in the tabulation at the top of the next column.

THE BRIEF SUGGESTS TWO METHODS

In applying the rate thus obtained to the full car R.P.O. rate, the brief suggests two methods. One is that the full car mile cost of 51.49 cents be subject to a discount of 25 per cent for cars less than 28 ft. The other is that there should be a base rate of 65 per cent of the total car mile cost of 51.49 cents, or 33.46 cents, to which there should be added for each foot of car, 35 per cent of the car foot rate of 1.42 cents, or 0.50 cent per mile.

Where the railway company pays the labor costs for handling, an additional charge of 1.5 cents per linear foot per mile is recommended, pending a more accurate determination of the cost, with a reduction to 0.75 cent per linear foot per mile for full car or full compartment service. For R.P.O. apartment service, the rate recommended is the base rate of 1.42 cents per linear foot of apartment, plus the present short length surcharge of 25 per cent for the first 20 ft. and 25 per cent discount for any portion of the apartment over 20 ft. in length.

The suggested rates for closed pouch or express car or compartment service are based on a unit of 30 cu.ft. This figure is obtained on the assumption that 30 cu.ft. are equivalent to 1 linear ft. of an 8-ft. car, in which mail is piled to a height of 5 ft., with a 2-ft. aisle. The rates recommended are:

COMPUTATION OF CAR FOOT RATES

1.	Total number of cars covered by study	26,502
2.	Total number of car miles	574,892,000
3.	Car-foot miles (Post Office Department's estimate)	20,742,000,000
4.	Increase in item 3, due to addition of one-half of platform length in freight, express, mail and express-mail cars, and one-fourth of platform length in passenger—express and passenger—mail cars	0.251 per cent
5.	Corrected total car foot miles (item 3 multiplied by 1.00251)	20,793,000,000
6.	Operating expenses	$204,084,942
7.	Taxes, other than federal income tax	$15,852,192
8.	Federal income tax	$1,080,191
9.	Miscellaneous debits	50,557
10.	Lease of road (net balance)	5,376,206
11.	Total cost, exclusive of fair return	$226,444,088
12.	Total cost per car mile in 1921, exclusive of fair return (item 11 divided by item 2)	39.38 cents
13.	Total cost per car mile, October, 1923, exclusive of fair return (97 per cent of item 12)	38.20 cents
14.	Total cost per car foot mile in 1921, exclusive of fair return (item 11 divided by item 5)	1.089 cents
15.	Total cost per car foot mile, October, 1923, exclusive of fair return (97 per cent of item 14)	1.056 cents
16.	Fair return expressed as a percentage of fair value	8 per cent
17.	Ratio of fair value to total operating expenses	4.35
18.	Fair return expressed as a percentage of operating expenses (item 16 multiplied by item 17)	34.8 per cent
19.	Car mile cost plus fair return, October, 1923 (1.348 times item 13)	51.49 cents
20.	Car foot mile cost, plus fair return, October, 1923 (1.348 times item 15)	1.42 cents

CLOSED POUCH BAGGAGE OR EXPRESS CAR OR COMPARTMENT RATE

(For Units of 30 Cu.Ft.)

	Cents per Mile
First unit	4.5
Second unit	4
Third unit	3.5
Fourth unit	3
Additional units	2.75

CLOSED POUCH PASSENGER CAR OR COMPARTMENT RATE

	Cents per Mile
First unit (10 bags)	7
Second unit (sufficient volume to make total for first and second units 60 cu.ft.)	6
Third unit	5
Fourth unit	4
Additional units	3.5

The brief explains at length the basis for these figures, and includes, in the data given, interesting figures on the average load factors on cars on different railway systems. The load factor, in this connection, is defined as the revenue passengers per car mile, multiplied by the average length of ride in miles, and divided by the average seats per car. Recent figures for various properties were declared to be:

	Per Cent
Easton (Pa.) Transit Company	37.43
Nashville Street Railway	39
Public Service Railway of New Jersey	39.72
Springfield (Mass.) Street Railway	46.8

Recent figures on average length of rides in different cities were also quoted. They are given in the following table:

	Miles
Cleveland, Ohio	3.11
Chicago, Ill. (surface lines)	4.16
Detroit, Mich.	4.06
Milwaukee, Wis.	2.93
Nashville, Tenn.	2.5
Philadelphia (surface lines)	2.71
San Francisco, Cal.	2.4
Springfield, Mass.	2.88
Worcester, Mass.	2.5

In connection with the proposed rates, the carriers declare that there should also be a minimum charge for a mail route, but as it is difficult to determine with any degree of accuracy what it should be, they suggest a minimum charge not less than 1.42 times the one at present in force. This will make the new minimum charge approximately $250.

New Reports Available

SPECIAL reports and compilations on the following subjects prepared by the association staff during the past month are now available to member companies upon request.

Working Conditions of Trainmen: A new edition of the association's regular bulletin based on up-to-date information covering hours of labor, length and types of runs, layover time, overtime rates, extra compensation allowed for special types of work, number of trainmen, labor turnover, etc.

The Problem of Traffic Congestion: Extracts from reports of traffic surveys and leading articles on the traffic problem in city streets giving a general survey of traffic conditions and brief specific surveys of some of the leading cities, including descriptions of methods adopted to relieve congestion in certain cities, the results obtained and also some theoretical solutions of traffic problems which have not actually been tried out. Discussion of the comparative efficiency in the use of the streets by passenger automobiles, buses and street cars is also included.

Trend of Trainmen's Wages in 1914 *to* 1923: Shows for a large group of companies the maximum wage rate and the number of years of service necessary to reach it for the years 1914 to 1923, inclusive.

In addition to the above, supplements to the Wage Bulletin, Fare Bulletin and Cost of Living Studies have been prepared, bringing them down to date.

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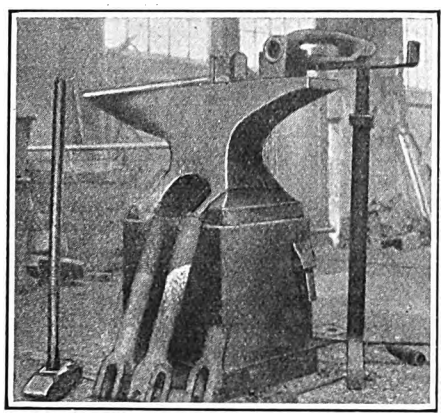
Maintenance of Equipment

Closing Ends of Turnbuckles for Rethreading

WHEN the threaded ends of turnbuckles become worn, it is desirable to rethread them. This requires that the hole be closed in sufficiently to permit the tap to cut a thread of standard size. This work is carried on very efficiently in the shops of the Philadelphia & Western Railway, Norristown, Pa., by use of swages of the particular shape necessary for the hexagonal ends of the turnbuckles. In closing in the ends, the turnbuckle is heated in a forge, and the end is placed in the bottom swage which is placed in the hardy hole of an anvil. The top swage has a handle. When this is held in position on top of the turnbuckle a couple of blows from a sledge will close in the end and retain the proper exterior shape. After the turnbuckles have been cooled they are again threaded in a bolt threading machine.

Threads on the brake rods also become worn. If there is sufficient stock remaining the rods are upset and rethreaded. Otherwise they are cut off at an angle, and a new end is welded on. This is then rethreaded to proper dimensions.

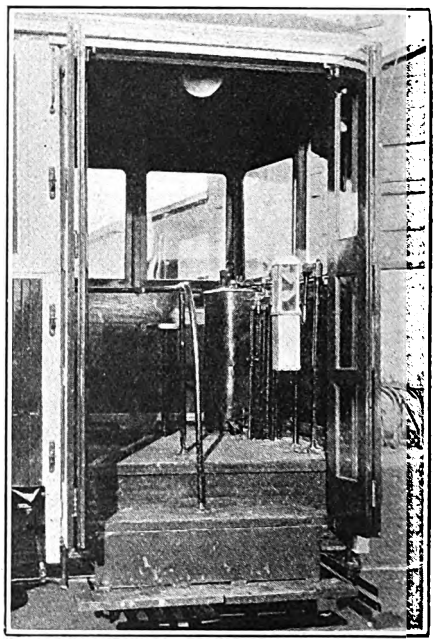


Turnbuckle in Position for Closing in Ends

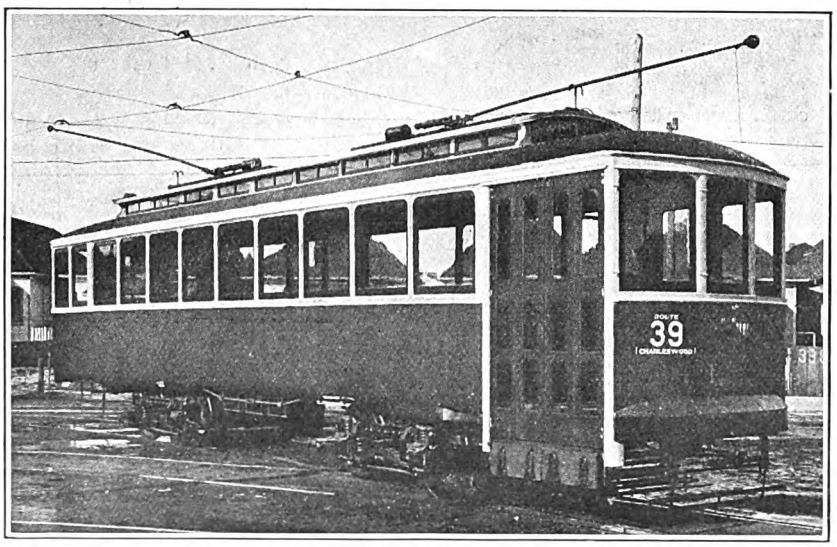
Protect Passengers Against Drafts

SEVERE climatic conditions prevailing in Manitoba have influenced the design followed in the reconstruction of four double-truck double-end cars by the Winnipeg Electric Railway. These have been converted into one-man safety cars for service on suburban lines. Swinging doors separate the interior of the car from the vestibule in order to protect the passengers against drafts.

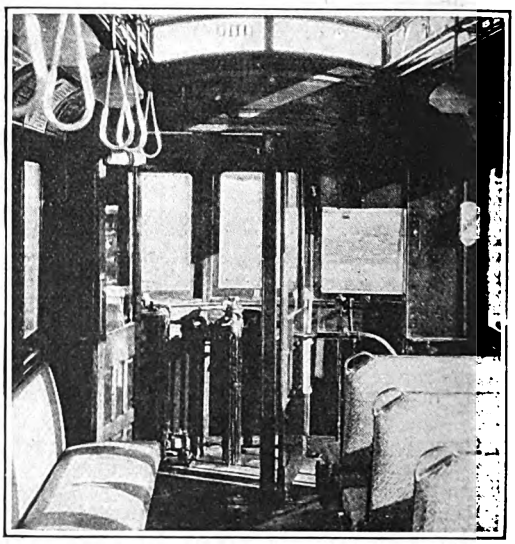
The platforms are flush with the car floor, but there are two steps between the platform and the ground. The lower step is of the folding type and is connected with the door operating mechanism. A second step is in the form of a well inside the doors. This arrangement prevents drafts entering the car through a crack under the doors. Entrance and exit doors are operated individually by means of a selective mechanism manufactured by the Safety Car Devices Company. The cold air coming in the car interior is thus reduced to a minimum. A Peter Smith heater is located in the center of the car in order to distribute the heat evenly.



Double Doors, Separately Controlled, and Step Arrangement on Rebuilt Winnipeg Cars



Four Cars of This Type Have Been Converted by the Winnipeg Electric Railway for One-Man Operation on Suburban Lines



Swinging Doors Separate the Vestibule from the Car Interior in Order to Prevent Drafts

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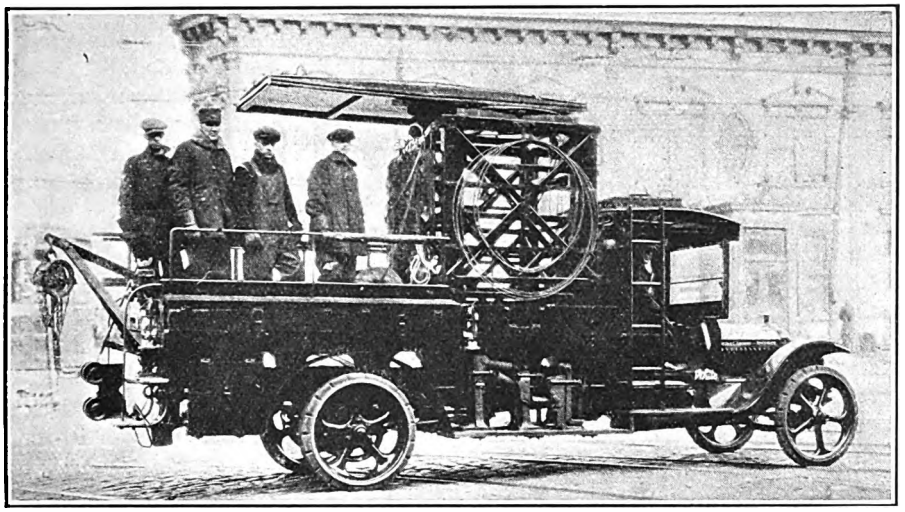


Combination Truck for Line Maintenance and Emergency Car Work

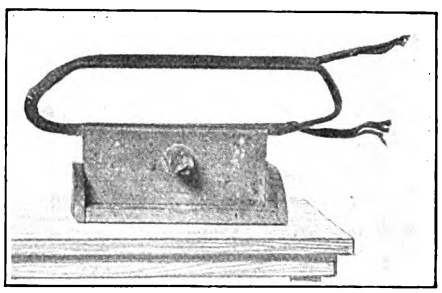
Combination Line-Emergency Truck

A NEW truck which can be used for overhead maintenance as a line truck and as an emergency truck for rolling stock has recently been placed in service by the New York & Queens County Railway, New York, N. Y. The chassis is a White 2½-ton model with a McCardell three-section tower mounted on it. Special running boards are provided on the sides and three jacks are carried on either side and a stone jack on the rear step, making a total of seven jacks carried by the truck. A four-wheeled buggy for moving vehicles with broken axles is also carried on the rear. Provision is made for a portable hoisting arm, which may be attached to the rear end and used for hoisting an automobile that has been disabled on the track. This hoisting arm functions the same as the hoist on an ordinary garage wrecker and when not in use it is slid into a compartment located under the truck flooring. A full set of materials and tools for maintaining overhead lines is carried on the truck as well as the wrecking tools.

In addition to this tower truck, the company has also placed in service a Ford 1-ton truck, and through the addition of these two is able to retire a stable of five horses, two horse-drawn tower trucks and two horse-drawn freight trucks and to eliminate one line crew. By the use of the new trucks for car emergency calls a wrecking car previously used by the company has almost been eliminated.

Vise Holds Armature Coils

A HAND VISE constructed of wood of the type shown in the accompanying illustration has been found a great convenience in the armature room of the Eighth Avenue Railroad, New York. The hand vise is made entirely of wood with two upright jaws mounted on a wooden base. The front jaw is moved back and forth through the use of a hand screw in the center. The armature coil to be taped can be placed in the vise and quickly fastened. In taping coils it is most convenient to provide so that they can be swung around at various angles during the taping process. The particular advantage in using a hand vise of the type shown is that this can be fastened to the bench by a "C" clamp and can then be shifted to a position most convenient for the winder.

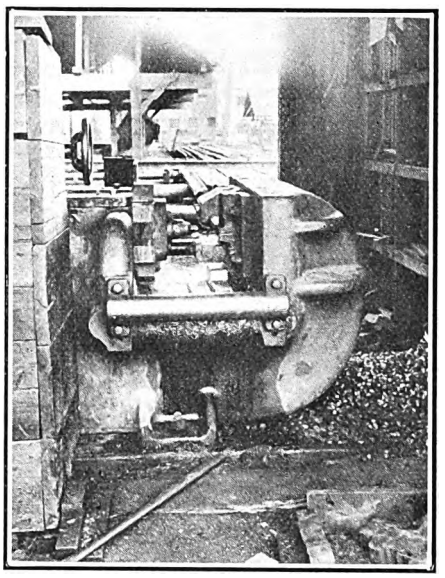


Convenient Form of Hand Vise for Taping Armature Coils

Rail Saw, Punch and Bender

RAILWAY systems which are a long distance from the producer have to install more shop and yard equipment than if they were closer to the source of supply. Among the appliances owned by the Spokane United Railways, Spokane, Wash., is the extensive installation for cutting, punching and bending rails shown in the accompanying line illustrations.

The plan shows the track on which flat cars, loaded with rails to be cut and punched, are brought into these yards. From these cars the rails

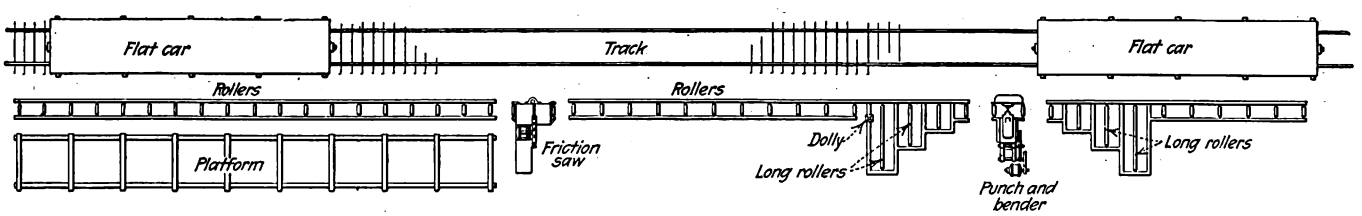


This Machine Punches and Bends Rails

are skidded to an adjoining platform and are then placed on rollers which carry them to the friction saw. Here the worn ends are cut off. They are then run down another set of rollers to the punch and bender, where the ends are punched or the rails are bent.

It will be noticed that the rollers on each side of this bender are of various lengths. These are to permit the 60-ft. rails, while being bent to a short radius curve, to lie workwise on the rollers.

An accompanying illustration shows the bender and punch used as a punch. In the background will be seen the rail saw and roll-way. It will be noticed that both rail punch and rail saw are housed to protect them from the weather.



Plan of Installation for Cutting, Punching and Bending Rails in Spokane

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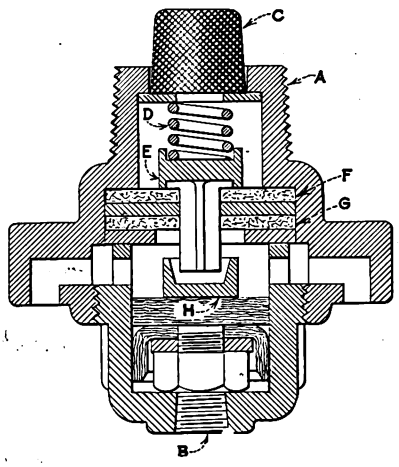
New Equipment Available

Automatic Drain Valve for Car Reservoirs

A NEW type of automatic drain valve for car air reservoirs is being placed on the market by the Columbia Machine Works, Brooklyn, N. Y. The action is somewhat similar to the air-operated slack adjuster for brakes, in that each application of the air causes the discharge of the water accumulated in the reservoir since the last brake application.



Automatic Non-Cumulative Drain Valve

In this way the water is removed practically as fast as it is condensed, and does not have a chance to freeze and prevent proper action of the brakes.

The manner in which the device operates may be seen from the following description:

Referring to the accompanying diagram showing the construction details, the threaded part, marked *A*, is arranged to screw into the main reservoir. There is a pipe connection at the bottom from the opening *B* to connect with the brake cylinder of the car. With each application of the brakes air is admitted from the brake cylinders through the opening *B* to the drain valve.

With the valve in position in the main reservoir, any water which may accumulate passes through the strainer *C* and into the valve chamber *D*. A small valve, *E*, is held on its seat at *F* by the main reservoir air pressure and also by a spring which seats on the top of the valve.

With each application of the brakes, brake cylinder pressure is admitted at *B*, which raises the valve *H* and also valve *E*. This produces an opening from the chamber *D* to atmosphere, so that any moisture which accumulates in this chamber is blown out as the valve is lifted from its seat. When the valve *H* reaches its upper position it seats against the rubber gasket *G*, and thus closes the opening to atmosphere. With the release of the brakes the valves again take their normal position and in so doing there is again a short blow of air from the chamber *D* to atmosphere, which carries any moisture out of the chamber *D*.

This type of valve has been installed upon a number of electric cars, and is giving satisfactory results. It is made entirely of brass, and is arranged to screw into the main reservoir in place of the usual drain cock.

Removable Top for Double-Deck Bus

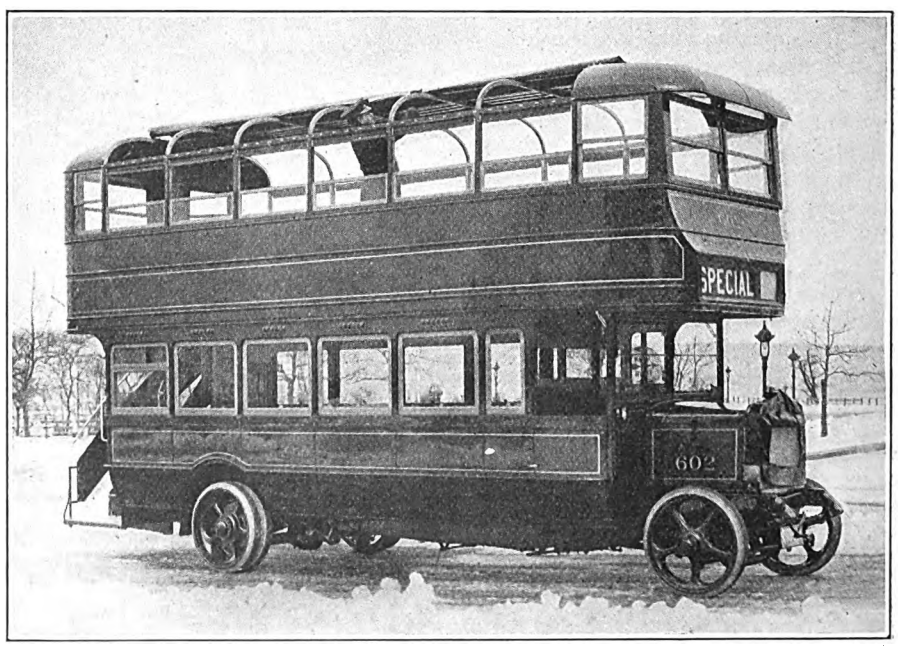
A DOUBLE-DECK bus seating 64, with a top designed to make the upper deck comfortable every day in the year, has been placed in service by the Fifth Avenue Coach Company, New York. To make the 38 seats on the upper deck available in cold and inclement weather and at the same time have the upper deck attractive for open-air riding on pleasant days a removable semi-glass inclosed top equipped with drop curtains and a roll cover roof of light waterproof material has been provided.

The top is bolted to the rail of the upper deck and is inclosed both front and rear with glass and a permanent section of roof. There is also a permanent roof over the aisle. On each side of the aisle roof is a roll cover, which, when lowered, forms the roof from the aisle to the top of the windows. These two roll sections can be lowered in a few minutes by the conductor.

The lower half of each upper deck window is covered with a fixed 10-in. glass panel, while the upper portion may be closed with a roll shade. This, when lowered, overlaps the upper edge of the glass panel, so that rain, snow or sleet cannot get in. With the overhead covers and side curtains down there still is plenty of light entering the inclosure through the front, rear and side sash. Electric lights mounted just above the windows illuminate the interior at night.

In general appearance the bus shown in the accompanying illustration resembles No. 601, a 60-passenger double-decker, which was exhibited at Atlantic City last October. The additional seats in No. 602 have been provided by extending the upper deck beyond the driver's vestibule. This also affords additional safety when driving, as the overhang forms a visor to the windshield, protecting it from rain or snow.

The new bus was manufactured by the New York Transportation Company.



Sixty-four-Passenger Bus with Removable Top Equipped with Roll Roof and Side Curtains. This Arrangement Is Designed to Make the "Open Deck" Usable All Year

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The News of the Industry

Subway to Replace "L"

A Four-Track Trunk Line to Be Built on Sixth Avenue, New York City, Within Five Years, Maybe

A subway under Sixth Avenue, New York City, extending from Trinity Place to Fifty-ninth Street was recently approved by the Transit Commission. Later the commission suggested the subway be extended under Central Park and then east to Queens. It will be a four-track trunk line and as approved is an adaptation of the proposal first advocated by Julius Miller, Borough President of Manhattan, for tearing down the Sixth Avenue elevated and constructing a subway in its place, provided the property owners along Sixth Avenue pay the cost of the change through assessments. A large number of them have consented to a 10 per cent assessment, believing this would cover the cost as outlined below. But the commission points out that the cost will require a 20 per cent assessment. The elevated structure is not to be removed until after the completion of the underground system.

Cost Estimated at $60,000,000

The commission points out that the estimated costs are affected by the existence of the Hudson & Manhattan structure in Sixth Avenue from Ninth Street to Thirty-third Street. Of the four new tracks, two used for express purposes will have to be built beneath the existing Hudson and Manhattan tracks, and of the two used for local purposes one must be built on either side of the existing tracks and at a depth sufficient to avoid interference with the Hudson & Manhattan stations. Other engineering difficulties will be met in dipping the new line under the Pennsylvania Railroad tubes at this point. These engineering difficulties will add about $7,000,000 to the cost of the subway.

The engineers estimate that the mere destruction and removal of the Sixth Avenue Elevated line would cost $500,000, less whatever sum might be realized through the sale of the scrapped material. Further, that the amount of the award the courts in a condemnation proceeding would allow the railroad for its property is entirely conjectural. But in allowing $49,000,000 as the cost of the subway, the commission assumes that the total cost of acquiring and destroying the old line and of building the new would be not far from $60,000,000. It also says that during the year ended Dec. 31, 1923, 153,409,605 passengers were carried in both directions by the two lines, the Sixth and Ninth Avenue branches, from Rector Street station to the terminus of the joint line at Anderson and Jerome Avenues in the Bronx. Traffic checks indicate that 60 per cent of this total, or 94,000,000, were carried either to or from stations on the Sixth Avenue branch, and approximately 59,000,000 to or from stations on the Ninth Avenue branch below Fifty-third Street.

Details of Detroit Trackless Trolley Plan

The Detroit Department of Street Railways plans to use trackless trolleys as feeders to the East Warren extension. Announcement to this effect has been made to the City Council by Ross Schram, assistant general manager of the municipal system. Extensions of the tracks for about 1½ miles are planned and if the trackless trolleys are found available they will probably be run from ½ mile to 1 mile beyond the terminus of the proposed track extensions.

The costs of laying tracks and providing overhead lines is estimated at $100,000 per mile, while for trackless trolleys the cost of the overhead equipment is placed at $10,000 a mile, with cars costing about $9,000 each.

The municipal officials plan on putting a number of trackless trolleys in service in the outlying districts where the population does not warrant the laying of expensive tracks, provided the cars sent for examination and experiment prove satisfactory, as the city was authorized by a charter amendment passed two years ago, to purchase and operate trackless trolleys.

Announcement has been made that the D.S.R. officials expect to pay up within five years the $5,000,000 bond issue voted last spring by the aid of monthly sums set aside from the earnings. The monthly sums will take care of the interest on these bonds and part of the principal. The new cars purchased are to be paid for without depleting the bond issue or financing by so-called car trust certificates. As the cars are delivered, it is planned to have the controller obtain the necessary money on notes, charging the payments to the fund for additions and betterments.

The notes are to be taken up with a fund established by the setting aside of a definite monthly sum. It is anticipated that all of the notes will be written off in a maximum of five years, $4,000,000 having been spent for rolling stock.

The $1,000,000 available this year from bonds, it is estimated, will take care of all reasonable demands for extensions and will be sufficient to build 10 miles of track. While petitions have been received asking for the construction of from 30 to 50 miles of track, only 20 to 25 miles of track are necessary now, according to Mr. Schram.

City Would Buy Lines

Purchase Negotiations Under Way in Chicago—Proposal First Step in Plan to Co-ordinate Service

Negotiations between representatives of the city of Chicago and officials and representatives of security holders of the Chicago Surface Lines and Chicago Rapid Transit Company on the subject of municipalization of Chicago transportation systems are being carried on in a series of meetings held in Mayor Dever's office. These meetings, which are being held at the invitation of the Mayor, have for their purpose the formulation of a plan whereby the city may purchase the transportation properties by the issuance of so-called "Schwartz certificates."

Preliminary negotiations on the subject of the proposed purchase have been under way for some time between legal representatives of the city and of the security holders. In addition to the question of the legality of the proposed Schwartz certificates, which must be definitely determined in order to assure their marketability, the price to be paid for the railway properties and the organization and control of the proposed board of control which would operate the combined properties must be settled before further progress can be made.

Companies in Receptive Mood

The Mayor's proposal to purchase the existing transportation properties is the first step in his general plan for the co-ordination of the service of the elevated and surface lines, to be followed by expansion of the existing systems, and the construction of subways.

At a meeting held in the Mayor's office on April 22 there were present Samuel Insull and Attorney Patrick J. Lucey for the Chicago Rapid Transit Company, Henry A. Blair and Leonard A. Busby for the Chicago Surface Lines, together with Frank O. Wetmore, president of the First National Bank; A. W. Harris of the Harris Trust & Savings Bank, and M. A. Traylor of the Illinois Merchants Bank. As representatives of the city there were present Mayor Dever, Corporation Counsel Francis X. Busch and Alderman U. S. Schwartz, chairman of the local transportation committee. Another meeting of the conferees was set for April 24.

Mr. Busby had previously indicated that the management intends to do everything possible to reach an agreement with the city on a basis which will recognize and adequately protect the rights of the owners of the property and accomplish the city's desired purpose of bringing about a unified transportation system, with adequate provisions for extensions and improvements to meet present and future transportation needs.

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More One-Man Cars

Buffalo Company Changing Over to One-Man Equipment Except on Main Lines

One-man cars are being placed in service on a majority of the local lines in Buffalo by the International Railway as part of an economy campaign. Herbert G. Tulley, president of the company, explained the International sustained a deficit of $1,000,000 last year and it is essential that every operating economy known to electric railway practice be used in Buffalo.

Trainmen operating one-man cars on the local lines of the International receive 5 cents an hour more than the regular scale. It is said that none of the present trainmen will lose his position because of the operation of cars with only one man, but that the company will stop hiring new men for a short time.

The one-man system of car operation is being adopted on all the lesser traveled lines in the city. One-man cars now are being operated on the William, Abbott Road, Elk, Hoyt, Connecticut, Clinton and Chicago Street lines. They will soon be placed in service on the Jefferson line and on May 18 the new system will go into effect on the Sycamore Street line. Other lines will be added to the list as rapidly as the cars can be changed over in the company's shops.

Headways Reduced

On the Sycamore Street line, where the new system will go into effect on May 18, the headway will be reduced from ten and a half minutes to seven and a half minutes at midday and during the rush hours from three minutes to two and a half minutes. A similar plan will be followed on other lines where one-man cars are being placed in operation.

Mr. Tulley says that an investigation covering a period of a year on lines where one-man cars have been in operation shows that accidents during loading and unloading have been reduced to a minimum. He said that on lines operating cars with two trainmen there has been an increased number of accidents during loading and unloading.

The one-man cars will not be placed in service on the more heavily patronized through lines in the city where speed in starting and stopping in congested areas is essential in order to keep to schedules.

The City Attorney has advised the City Council that there is nothing in the franchise or in the city ordinances which would force the company to operate cars with crews of two men. This opinion by the city law department has kept the Council from seeking the aid of the courts to require the company to man cars with two men.

Buses and Trucks Supplementing Service in Utica and Rome

Motor buses and express trucks are supplementing the electric service of the New York State Railways on the Utica, Rome and interurban lines. Beginning April 28, a large passenger bus will operate between the American Corner and railroad station in Rome, in addition to the 20-minute trolley car service. The bus body was constructed in the railway shops at Utica and has a seating capacity of 25 persons. It is mounted on a Brockway chassis.

Utica has a passenger bus of the same type which is used mostly for sightseeing purposes. The route is over the city's beautiful boulevard. This bus is equipped with a body built by the Kuhlman Car Company and has a Brockway chassis. Early in June the company will inaugurate a commercial trucking service between Rome, Utica and Little Falls and intermediate points. Four White automobile chassis have been purchased and bodies are now under construction at the company shops. The express line will be operated under the name of the Utica Railway Coordinated Bus Lines Inc. The trucks will be of 2½ and 3½ ton capacities.

Seven and Three-Quarter Cents Needed in Baltimore

Hearing on a petition filed by the United Railways Company, Baltimore, to be permitted to put into effect a new schedule of rates and charges was started by the Maryland Public Service Commission on April 22 and is attracting great public attention. The hearing is expected to continue for several days. The original petition as filed by the railway company did not fix a specific figure to which it desired to increase the fare from the present 7-cent rate. On the first day of the hearing it was said by the counsel of the United that in order to accomplish what it desires he believes the company should have a rate of about 7¾ cents.

The original petition asked that the company be permitted to maintain rates which would yield an annual net income of $1,500,000. This figure was cited because in 1920 the Public Service Commission set $1,000,000 as the minimum annual net income and the company pointed out that at the same time the commission had decided that $1,500,000 was "reasonable, necessary and in the public interest" and placed upon the company the burden of increasing the net income to that figure by exercising economy and efficiency.

The figures placed before the commission at the opening of the hearing were submitted by William H. Maltbie, counsel for the United. Joseph C. France, also representing the company, addressed the commission on the need of additional revenue on the part of the railway. In its petition as filed recently the company said that in 1923 only $976,266 was earned and in the four years from Jan. 1, 1920, to Dec. 31, 1923, the total net surplus was $3,454,365, which is $2,545,635 below what should have been made under the annual rate of $1,500,000. In the opening arguments for the company it was declared that the $500,000 had been saved by economy and efficiency in operation, but this saving had been eaten up by other circumstances. The saving was made, it was declared, but the company cannot control the riding habits of the public and the demands for extra service.

Non-Parking Rule Helpful

Traffic Is Speeded Up in Downtown St. Louis by Enforcement of Recent Ordinance

Marked improvement in traffic conditions in downtown St. Louis has resulted from the strict enforcement by the police of a city ordinance abolishing the parking of automobiles and other vehicles on Olive Street between Third and Twelfth Boulevard.

So successfully has the new plan worked out that the Traffic Council, which has been placed in control of vehicular traffic in the city through the recently enacted traffic code, has decided to extend the no-parking rule to Washington Avenue. Parking will be abolished on Washington Avenue from Fourth Street to Eighteenth Street during the morning and evening rush periods. This will provide a free line of traffic by which the morning and evening peak can flow freely into and out of the congested district.

The maximum time now required for a street car to make the trip from Twelfth Boulevard and Olive Street east to Fourth, north to Locust, west to Broadway, south to Olive and thence west to Twelfth Boulevard is ten minutes less than before the new law went into effect. The clocking was done on April 7 and April 9, during the peak of the rush hours. A survey made by the research department of the United Railways on Oct. 23, 1923, showed that this trip required a maximum of thirty-three minutes. The recent survey showed a maximum of twenty-three minutes.

Extension of Plan Proposed

The elimination of parking on Washington Avenue is expected to be even more beneficial. That street is the gateway for East St. Louis and other East Side cities into St. Louis and is used by the four bus lines now operating in St. Louis, the Page, Park and Compton divisions of the United Railways and hundreds of service cars. With cars parked along the curb this throws most of the heavy traffic onto the railway tracks and street cars and buses lose most of their time in the territory east of Eighteenth Street.

Experts for the United Railways have found that motorists now use Olive Street for a speedy exit from the congested districts. Instead of trailing the street cars and running continuously on the tracks, these machines are able to pass between the tracks and the curb. On other streets where parking is permitted from ten to twelve machines line up in back of every street car and very frequently a street car or bus loaded and ready to go is held up by a minor mishap to an auto.

Elimination of parking on crosstown streets will greatly speed up traffic on both Washington and Olive Streets, experts of the railway say. The survey conducted by the railway in October, 1923, and circulated under the title "Rush-Hour Car Movement in the Congested District" is regarded as having played an important part in the action of the Traffic Council in forbidding parking on Olive Street and the decision to curb parking on Washington Avenue.

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East Boston Tunnel Changed Over to Train Operation

By joining forces with the Boston Transit Commission, so as to muster a working crew of about 800 men, the Boston Elevated Railway changed over the service in the East Boston Tunnel between 8 o'clock on the evening of April 18 and 5 o'clock on the morning of April 21 from surface cars to the operation of four-car trains. It was a stupendous job. The tunnel was closed to the public during the fifty-seven hours. Then the crossovers were broken, the guard rails taken down, the third rail installed for a distance of 2 miles and platforms erected at the several stations. This was work which could not be done until the surface cars ceased running. Its completion was accomplished in record time, however, as everything was ready for the work the minute the cars were out of the tunnel. All the platforms had been built in small sections which fitted together like a picture puzzle. The third rail had been welded together in lengths of 400 ft., all ready to set in place.

Forty new steel cars have been purchased by the Elevated for this service, the trains to run between Maverick Square in East Boston and Bowdoin Square in Boston, meeting surface cars at both ends. The new work cost about $2,500,000. It makes the total cost of the East Boston Tunnel approximately $9,000,000. The Elevated pays the rental on this sum to the city of Boston.

Question of Confiscation Involved in Florida Suit

The United States Supreme Court granted a writ of certoriari on April 21 by which it will review the decision of the Florida State Supreme Court in a suit brought by the city of Palatka against the Southern Utilities Company. The company had a franchise secured from the city in 1914. Owing to the increase in costs due to the war, the company later gave notice of an increase in rates of gas. The city sought an injunction on the ground that the rate named in the franchise was a contract obligation. The city was sustained by the trial court and by the State Supreme Court. The company alleges that the rate is confiscatory and that there is no rate-making power delegated by the Legislature of Florida to the municipality.

Puget Sound Property and City of Seattle Must Pay Taxes

Under a ruling of the United States Supreme Court, the city of Seattle and the Puget Sound Power & Light Company will be compelled to pay taxes totaling $401,000, on railway property for the period from September, 1918, to March, 1919. The case was the outcome of the railway purchase by the city, which was contracted in the fall of 1918, but was not consummated until March, 1919. Under the contract, the city was to pay three-fourths and the company one-fourth of the taxes due for this period. When the company started suit to prevent collection of its one-fourth the city joined. The city contended that if the company were to be exempted from the county taxes, the city should also be exempted. The Supreme Court of the United States, in refusing to grant a rehearing of the case, upheld the Supreme Court of the State of Washington.

Will Investigate Cincinnati Property's Books

Carl H. Nau, head of the firm of Nau, Rusk & Swearingen, certified public accountants of Cleveland, Ohio, was sworn in as Master Commissioner to examine the books, papers and records of the Cincinnati Traction Company by Judge Robert S. Marx, in the Hamilton County Superior Court on April 7. Appointment of the master commissioner is the result of a suit filed by Attorney Robert Alcorn, as a taxpayer, against the traction company to compel the payment of franchise tax deficiencies amounting to $1,050,000. Hearing of the suit started on April 1. Judge Marx decided to have an expert accountant go over the traction company's books and obtain data desired, so as to get at the bottom of the case. Attorney Alcorn objected to the procedure. W. Kesley Schoepf, president of the traction company, then offered to provide $5,000 out of his own pocket to finance the accounting of Mr. Nau.

The hearing on the matter has been postponed until Mr. Nau completes his investigation.

In defining the details of the work of the investigators the court assumed the validity of the service-at-cost franchise under which the traction company is now operating.

City to Co-operate with P. R. T. on Refund

Approval has been given by the committee on transportation and public utilities of the City Council of Philadelphia to an ordinance authorizing the city to join with the Philadelphia Rapid Transit Company in an effort to secure a $5,000,000 income and excess profits tax refund from the government. Provision is also made in the measure that the money refunded or saved through an exemption of the company from similar taxes in the future shall be used only for additions, extensions and betterments of the city's street railway transportation. The railway's appeal for a refund was turned down.

Forty-four per Cent in Wages.—The Philadelphia Rapid Transit Company's employees received in wages 44 per cent of the fares collected in 1923. In *Service Talks*, the official publication of the company, the story of what happened to each 6¼-cent fare last year is shown in graphic form. Four per cent provided the dividend on the $30,000,000 of paid-in capital. Twenty-four per cent was used to pay other operating expenses, including cost of power and maintaining equipment, with 22 per cent paying interest on bonds and rentals. This left 6 per cent going to the city, state and federal governments in taxes.

Municipal Ownership Advocated

A recommendation that the city of St. Louis pass a bond issue of $51,000,000 for the purchase of the United Railways was made by L. R. Bowen, chief engineer of the division of bridges and buildings, Department of the President, Board of Public Service, in an exhaustive report submitted on April 18 to E. R. Kinsey, president of the board.

Mr. Bowen details a plan whereby he contends the city can take over the railway and provide for needed extensions without additional cost to the citizens and with no increase in the present fare of 7 cents with universal transfer. He states that the trend is toward municipal ownership, pointing out that of all the cities that have embarked upon this venture none had the opportunity of taking over a transportation system under the auspicious circumstances St. Louis enjoys.

The presentation of the report caused quite a stir in administration circles. Mayor Kiel and Mr. Kinsey disclaimed the report. The Mayor expressed surprise that Mr. Bowen had submitted the report, stating that the first he knew of it was when he read a synopsis of the report in a St. Louis morning newspaper. Mr. Kinsey, too, declared that he was unaware that Mr. Bowen was to submit a report on his studies of transportation methods in other American cities, and that he certainly did not order it or authorize such a report to be made.

City's Expert Disagrees

Rolla Wells, receiver of the United Railways, declared that the price of $51,000,000 would wipe out the holders of the common and preferred stock in the company. Mr. Wells said:

> I ran for Mayor of St. Louis years ago on an anti-municipal ownership platform. I was opposed to public ownership then, and I have no reason to change my stand now. Mr. Bowen's proposal goes back directly to the utility of municipal ownership. As receiver for the United Railways, I am not in a position to comment directly on the report. I have no authority to sell the property, being simply its custodian for the federal court.

Mr. Watts, chairman of the reorganization committee, pointed out that the $51,000,000 valuation was merely set for rate-making purposes, and that that valuation had no relation to the price which the buyers might pay for it.

C. E. Smith, the city's expert on public utility matters, said that while he was in accord with the principal of municipal control of public utilities he was not ready to say that this could best be accomplished by municipal ownership. He said that St. Louis is not in the same relative position as Detroit to force a low purchase price. In St. Louis the company's principal franchises do not expire until 1929. Other rights do not expire until 1942 and still others not until 1948. Mr. Smith said that after studying the experiences of American cities with their street railways, he was convinced that better results could be obtained through municipal control such as is exercised by the city of Cleveland under private ownership and municipal supervision than under municipal ownership and operation.

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Wage Demands in Pittsburgh Cannot Be Met

The demands of the 3,200 trainmen of the Pittsburgh Railways, Pittsburgh, Pa., cannot be met at the present time, A. W. Thompson, president of the Philadelphia Company, announced in a letter to President Winters of the City Council, without creating a deficit in the revenues of the company. He stated that the increased wages would create a loss which would have to be offset by increased fares. He invited suggestions from the Council on the matter of the increased wage demand.

In a memorandum accompanying the letter and signed by Thomas Fitzgerald, general manager of the railway, it was brought out that all available income was necessary now to meet operating expenses of the system. Mr. Fitzgerald also reported that the meeting on April 21 with the men was largely a repetition of former meetings. He said that no new arguments were being presented by either side.

The conductors and motormen have asked for an increase from 68 cents an hour to 75 and 77 cents for the first and second years respectively. The present wage scale expires May 1.

Buffalo Company Wins First Damage Suit in Dynamite Case

The International Railway, Buffalo, N. Y., has won the first suit brought against it for damages as the result of injuries alleged to have been sustained by a passenger on the Buffalo-Niagara Falls high-speed line interurban train which was wrecked at Ellwood Station in August, 1922, by dynamite claimed to have been placed by strikers. The suit was the first of a series of such actions for $40,000 damages. The case was heard in the United States Court for the Western District of New York. The jury was out two hours and returned a verdict of no cause of action. Counsel for the International argued the company was not responsible for injuries sustained by Mrs. Anna Hanna, Philadelphia, one of the wreck victims. He suggested that the suit should be brought against the Buffalo local of the Amalgamated Association, members of which, he charged, dynamited the track and caused the wreck. The company introduced testimony to show that everything possible was done by the company to protect its passengers.

Texas Interurban Planning to Build

With the completion of organization of the Texas Rapid Transit Company, announcement is made that the construction of an electric interurban line linking Austin and San Antonio, Tex., is assured. The line as contemplated would pass through the towns of Lockhart, Seguin, San Marcos, New Braunfels, Gonzales, Cuero and Yoakum.

The company has taken over all rights held by the Seguin & Guadalupe Valley Railway, organized in 1914, before the World War, by W. B. Dunlap, Beaumont, and Dr. E. W. Brown, Orange. This company has secured much of the right-of-way for its proposed line between San Antonio and Seguin and grading had commenced when operations were halted by the war. The first unit of the proposed Austin-San Antonio electric line will be built between San Antonio and Seguin.

The proposed electric line will be approximately 100 miles long. It is estimated that its completion will require an investment of more than $7,500,000. E. G. Potter, San Antonio, is president of the company.

Settlement of Los Angeles Damage Suit Shown

When the case of Mrs. Julia H. J. Henderson against one of the local Los Angeles railways, was called for argument recently in Judge Fleming's court it was stricken from the calendar. This indicates that a settlement has been effected out of court. The case was considered an important one from a legal standpoint, as it involved the question of whether a traction company can be held liable for damages by permitting more passengers to enter a car than can be accommodated with seats.

Mrs. Henderson sued the railway for $10,150 damages for injuries she asserted she received June 9, 1923, when a car in which she was a passenger, lurched suddenly, hurling her against a rear section. She contended the company was negligent in permitting the car to become overcrowded and with failing properly to provide passengers with seats. In an answer to the suit, the company stated that if the plaintiff became a passenger when the car was overcrowded she did so voluntarily and therefore assumed the risk of possible injury with her own knowledge. The defendant contended that probable injury was to be anticipated at the time Mrs. Henderson boarded the car.

Arkansas City Councils Pass Ordinances

The City Councils of Little Rock and North Little Rock, Ark., have passed the ordinances necessary to permit the Inter-City Terminal Railway of North Little Rock to cross the new Main Street bridge connecting the two cities. Under the plan agreed to the company will charge a 6-cent fare for the privilege of crossing the bridge from any part of either city, but should a passenger desire to proceed beyond the bridge line he must pay an additional 2-cent fare for a transfer.

Officials of the Inter-City company have announced their intention of speeding up the laying of the double track on the bridge so that the service can be put into effect about May 1. The company, which has been granted a twenty-six year franchise for the use of the bridge, will pay Little Rock $25,000 cash and $35,000 in partial payments and also will receive credit for $40,000 for laying the new tracks for the new franchise. The franchise ordinance provides that future interurban lines shall be permitted to use the new bridge on equitable terms, and in the event the railways cannot agree on that point the city shall decide it.

Terminal Plan in Trenton Abandoned

The plan to build a large central terminal in the heart of Trenton, N. J., for the suburban lines of the Trenton & Mercer County Traction Corporation, New Jersey & Pennsylvania Traction Company and the Public Service Railway has been abandoned. The three companies announced that the costs would be prohibitive. The site selected for the proposed terminal has been purchased by the Trenton & Mercer County Traction Corporation and a terminal for that company alone will be built.

The idea of creating such terminal was conceived by Mayor Donnelly of Trenton, and indorsed by the other members of the commission. The plan contemplated by Mayor Donnelly provided for the acquisition of all property along the north side of Perry Street, between North Broad and North Warren Streets, and to whatever depth might be required for the purposes in view. Preliminary surveys made by City Engineer Swan indicated that this location would be well suited to the proposed establishment of a terminal. Fulfillment of the project, it developed, would cost in the neighborhood of $1,500,000 and none of the companies, it was understood some time ago, would agree to enter upon such expensive undertaking.

Free Transportation a Menace in New Orleans

At the request of Commissioner Paul H. Maloney, of the Department of Public Utilities at New Orleans, President Flowers of the New Orleans Public Service, Inc., has sent the commissioner a list of the free trippers for the month of February. The list shows that the holders were given 167,646 rides during the month. At 7½ cents a ride this represents $11,735 for the month. This is a decrease of 2,680 rides from the number of passes issued in January.

Accompanying the list was a communication from Mr. Flowers in which he outlined the policy of the company in regard to granting free transportation to employees of the Public Service, Inc., stating additionally that it is the usual rule of practice with all companies regarding whose practice he has knowledge to give its employees unlimited passes, while New Orleans occupies a unique position in this that the practice is curtailed. He said:

> We give transportation to those of our employees who are required to ride on the cars, or to make visits in the interest of the development of our business. In addition, the contract with the union requires free transportation to employees in uniform and also to all other members covered by the contract. Policemen, firemen, and female members of religious orders in their garb ride without passes.

Mr. Maloney regards every free ride as a factor in preventing the lowering of fare. He has announced his intention of having an auditor check the books of the company for the purpose of determining whether the railway division of the company is being credited with service furnished the other departments.

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Eighty Cents Sought in Detroit

Although the new wage demands adopted April 19 by the motormen and conductors on the Detroit Department of Street Railways have not yet been officially presented to the Street Railway Commission, platform men, according to Herbert Meeker, president of Division No. 26, are asking a wage for two-men car operators of 72 cents an hour for men in their first six months of service, instead of 62 cents as at present; 76 cents an hour for men in their second six months of service, instead of 66 cents, and 80 cents an hour instead of 70 cents after one year of service. For overtime (more than eight hours) time-and-a-half is asked, instead of 75 cents an hour now given; for owl cars the request is 90 cents, instead of the 80 cents now prevailing, and for crews placed in charge of snow plows $1 an hour.

The union also asks that 25 per cent of the runs be straight day runs, 25 per cent straight night runs, 30 per cent of the runs to be completed in eleven consecutive hours, while the remaining 20 per cent must be completed in twelve and one-half consecutive hours. A shift of more than six hours would be considered a full day under the new plan.

Operating expenses of the system would be increased $1,025,000 for the year if the increase asked were granted. This would wipe out the estimated net earnings of $960,000 for the year and probably make it necessary to abandon the program of rehabilitation or increase fares.

In case the formal demands of the men are not met, arbitration will probably be asked of the Street Railway Commission. The city has never recognized a union among its employees on the ground that the charter forbids it.

Washington Railway Men Get Two Cents Increase

At a meeting of the directors on April 19 it was decided to increase the pay of the motormen and conductors of the Washington Railway & Electric Company, Washington, D. C., 2 cents an hour, following a similar increase to Capital Traction employees, which was referred to in the ELECTRIC RAILWAY JOURNAL, issue of April 19. The new scale is 52 cents for the first three months, 56 cents for the next nine months and 58 cents thereafter. Operators of one-man cars will receive 63 cents an hour. In making the increase, the Washington Railway & Electric Company announced that it would abandon the quarterly cash prizes heretofore awarded for safety-first work.

Ordinance Introduced for P. R. T. Bus Line

An ordinance granting the Philadelphia Rural Transit Company, a subsidiary of the Philadelphia Rapid Transit Company, a franchise for operating a motorbus line between Mount Airy Avenue and Germantown Avenue was introduced recently in Council by Councilman Smith and was referred to the committee on transportation and public utilities.

The ordinance provides that the franchise shall not be regarded as an exclusive privilege that would prevent the city any time hereafter operating buses of its own on any of the streets. The fare, subject to the approval of the Public Service Commission, is 10 cents for a one-way trip, with the 3-cent exchange tickets to surface or elevated connecting lines of the P. R. T. Another provision is that the earnings of the Philadelphia Rural Transit Company accruing directly or indirectly to the P. R. T. shall be applicable to the payment to be made to the city under the provisions for the retaking of profits contained in the agreement of 1907.

Oklahoma Union Authorized to Charge Higher Fare

The Oklahoma Union Railway has been authorized by the Corporation Commission to put into effect the same rates of fare that are now effective over the lines of the Tulsa Street Railway between all points in Tulsa and West Tulsa within the city limits. The company has been operating for several years on a 5-cent fare within the city limits and contended that it had been losing money on this fare basis since 1919. On Jan. 15, 1924, it filed an application with the commission seeking an increase in its city fare from 5 cents to 7 cents, or four tickets for 25 cents, the latter rate being the charge that the Tulsa Street Railway had been receiving for city passenger fares. The Corporation Commission finds that for the year ended Dec. 31, 1923, the net revenue of the Oklahoma Union Railway for both city and interurban fares was $17,481. Further, that this amount was not sufficient to pay the interest on outstanding bonds of the company.

The Oklahoma Union Railway is primarily an interurban railway. It also operates about 4 miles of line in Tulsa and handles approximately 1,500,000 passengers a year in that city. The commission also approved an agreement between the Oklahoma Union Railway and the Tulsa Street Railway for transfer exchange at specified points.

Twenty per Cent Increase Asked in Toledo

In a new contract submitted to the officials of the Community Traction Company, Toledo, the employees have asked for a 20 per cent wage increase and changes in working conditions estimated to cost the company an additional $400,000 annually. The men now receive 50, 52 and 55 cents an hour. They demand 60, 63 and 65 cents an hour. The present contract will expire on May 21.

In addition to the direct wage boost the men want two weeks' vacation with pay, closed shop on the entire property, and many changes in working conditions.

Company officials have intimated that they will submit the demands to Street Railway Commissioner Cann and the city officials before they undertake negotiations which might lead to a drastic increase in fares.

Last year's wage increase cost $15,000 a month and resulted eventually in a fare increase.

Fares Advanced in Indianapolis

Seven-cent cash fares with four tickets for 25 cents, double transfers and a 1-cent transfer charge will become effective on the lines of the Indianapolis Street Railway, Indianapolis, Ind., on May 20, under an order issued by the Indiana Public Service Commission on April 18. The company is ordered to extend its service to Broad Ripple by Sept. 1, this year, under penalty of having the increased fare revoked if it does not make the extension by that time. Ten-cent owl fares remain as at present. The commission did not grant the request of Indianapolis city officials for seventeen tickets for $1. The order declares rerouting of the lines is essential both to the railway and its patrons. A decision on new routes is deferred for a supplemental order after the commission obtains suggestions from city officials and other sources. Nothing in the order indicates the period for which it will be enforced.

The present rate in Indianapolis is 5 cents with a 2-cent transfer charge. It was the contention of the company that this rate could not provide sufficient revenue to enable it to rebuild its property. The matter of the need for an increase in the fare of the company has been under discussion for three months under a renewed plea asking relief.

Trial with Reduced Fare in Hornell

Raymond E. Page, new receiver of the Hornell Traction Company, Hornell, N. Y., has asked the Public Service Commission for authority to permit a trial of reduced fares for a period of ninety days. The company is said to have considered the advisability of abandoning operations, but hopes that a reduced rate will stimulate travel and increase revenues. The filing of the formal application with the commission is really a step in the previously announced program to cut rates.

Traffic on the Hornell line has been decreasing. Robert W. Bull, former receiver, resigned on April 3, 1924, and Mr. Page was appointed to succeed him. Mr. Page said:

> I have taken the office of receiver for the purpose of revising the plan of operations, lowering expenses and reducing fares in an effort to continue operations. I believe a reduction of fares will increase the traffic. My desire is to make the effort and ascertain the results. It is of great importance that this be done at once, as delay is injurious in the present situation and the financial condition of the company.

The railroad now operates in two zones with an 8-cent fare in each. A 7-cent fare is to be substituted for the ninety-day trial.

Twenty metal tickets for $1 will be sold by conductors and ten metal tickets for 50 cents at certain places in Hornell and Canisteo. A twenty-ticket book will be sold for $1.40 good in either direction between Hornell and Cook's Switch and between Canisteo and Crittenden. These tickets are good only on Canisteo cars except from passengers boarding local cars at the Erie shops or other industrial establishments and transferring to Canisteo. No commutation tickets will be sold. Transfers will be issued in zone 1.

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News Notes

Seeks Dissolution of Bus Line.—The Washington-Virginia Railway has filed with the State Corporation Commission a petition asking that the certificate of the Alexandria Motor Bus Line, Inc., be revoked. It is claimed by the railway that continued competition of the bus line will make it impossible for the railway to render profitable service.

Difficulties in Wichita.—In order to operate the Wichita Railroad & Light Company, Wichita, Kan., profitably fares will have to be increased or competing buses eliminated. This opinion was recently expressed by A. M. Patten, general manager of the property, before members of the City Commission. He said that net earnings for 1923 showed a marked decrease compared with previous years.

Course for Electric Metermen.—The University of Colorado, Boulder, Col., during the week of March 17 to 22, held its Second Annual Metermen's Short Course. This course is given through the extension division and is in direct charge of Professor C. M. McCormick of the electrical engineering department, who also has charge of the electrical standardizing laboratory. The course was not given for electric railway motormen, as was stated in the ELECTRIC RAILWAY JOURNAL, issue of March 29, but for electric metermen of public utilities and others who wished to attend.

Wages Advanced.—The Morris County Traction Company, Morristown, N. J., has granted a wage increase of 5 cents an hour to all the platform men. The company is now operating all cars with one operator. None of the employees has been laid off. As passengers enter the car the operator hands them identification tickets, which indicate the zone in which passengers boarded the trolley.

Offers Old Car Bodies for Sale.—The Brooklyn-Manhattan Transit Company, Brooklyn, N. Y., is offering for sale to its employees the bodies of single-truck cars that have been withdrawn from service on the surface lines. The bodies may be purchased by employees for $25 each and will be delivered to the purchasers at any of the B. M. T. surface line depots or terminals. The bodies can be converted into livable bungalows or camping quarters.

Expropriation Methods to Get Property.—Ninety-three pieces of property involved in the North Rampart-St. Claude Street cut-off of the New Orleans Public Service, Inc., from Esplanade Street, recommended to be acquired in the Beeler traffic report, will be effected by an ordinance adopted by the Commission Council. The city of New Orleans and the company are jointly to bear the expense of obtaining these sites, to carry out the Beeler recommendations. The Commission Council found, after many efforts were made to reach an amicable settlement of the matter, that expropriation methods would have to be used to compel the realty owners to be more reasonable in their demands. The new route will provide a wide thoroughfare from the upper to the lower section of the city.

Disposes of Jamestown Buses.—The Jamestown Street Railway, Jamestown, N. Y., recently announced that the company was selling six of its thirteen buses to Case & Kane, Middletown, N. Y. Five buses will be kept for use on the west side line in Jamestown and two more will be disposed of at once. A. N. Broadhead, president of the railway, recently withdrew an application for a blanket bus franchise in Jamestown after the City Council and railway officials had failed to agree on a rate of fare for the buses or an adjusted flat rate for both trolleys and buses.

Freight Line to Be Electrified.—The Long Island Railroad improvement plans, referred to in the ELECTRIC RAILWAY JOURNAL, issue of April 5, include the electrification of the freight line from Bay Ridge, Brooklyn, to Fresh Pond, where connection is made with the New York Connecting (Hell Gate route) Railroad. Over this route standard freight cars are interchanged daily between the Pennsylvania and New Haven Railroads. At present steam locomotives handle this traffic.

Fare Tariffs Suspended.—The Public Service Commission, in an order recently issued, suspended the proposed new tariffs filed by the Southern Pacific Railway for its Salem and Eugene railway lines, providing for an increase in fares from 6 to 7 cents. The suspension order will remain in effect until Sept. 22, unless investigations of the proposed tariff are completed before that time. Under the tariff filed by the Salem property conductors would be allowed to sell strips of four tickets for 25 cents and tickets in books of fifty could be purchased at $3.10. The present price of the fifty-ticket book is $3. The proposed Eugene schedule is practically the same as that of Salem.

Maine Road Asks Fare Increase.—The Androscoggin Electric Company Lewiston, Me., has filed a petition with the Public Utilities Commission asking for an increase in its through rate of fare from Portland to Lewiston from 93 cents to $1. The petition asks that the new rate become effective May 14.

Advertisements to Tell the Public.—In furtherance of its plan to solve the traffic problem in the downtown sections of Milwaukee and to awaken public opinion to the need of maintaining open spaces for the loading and unloading of buses in each block of the congested district, the Milwaukee Electric Railway & Light Company and subsidiary, the Wisconsin Motor Bus Lines, are running a series of advertisements in the current Milwaukee daily papers. One advertisement, called "Test of Special Bus Loading Zones Is Working Well," promised a report on various experiments which are being tried out in many cities to bring about traffic relief. Another advertisement described what was being done by traffic experts and other city planners in helping to solve the problem at least cost to the taxpayers. A third advertisement described the parking rules in effect in St. Louis, Detroit and San Francisco and another told what the Milwaukee Safety Commission was doing in this matter for the benefit of all concerned. Incidentally, another purpose of the ads. is to help the movement looking toward procuring a solution of the parking problem.

Complains of Bus Grants.—The Cincinnati Traction Company, Cincinnati, Ohio, has appealed to the State Public Utilities Commission for relief from bus competition in its territory. It filed protests against the granting of certificates to the Valley Bus Company and the Anderson's Ferry Transit Line. Petitions also were filed asking for a rehearing of the cases in which the commission granted certificates to the Red Star Transportation Line and the Wilmington & Norwood Bus Company. Protests also were filed against the granting of the certificates on a rehearing. The traction company contends that it is furnishing adequate service over much of the territory covered or proposed to be covered by the bus companies and that the operation of buses would be detrimental to its service.

Will Provide Bus Service.—The Wisconsin Traction, Light, Heat & Power Company, Appleton, Wis., has obtained an option on the bus line operated by Krautkramer Brothers between Appleton and Kaukauna, paralleling the interurban line. The company plans to extend its bus service from Kaukauna to Sheboygan, connecting with the parlor car electric trains of the Milwaukee Northern Railway running to Milwaukee.

Wants to Increase Rates. — The Waterville, Fairfield & Oakland Railway, Waterville, Me., has petitioned the Public Utilities Commission to increase its zone fare from 7 to 8 cents, with an increase in its strip ticket fare from 70 cents to 80 cents and an increase in its commutation books of fifty coupons from $3.50 to $4. The rate of pupil's tickets in books of forty coupons is increased from $1.40 to $1.60. The proposed schedule would become effective May 12. An increase in the zone fare on this line from 5 to 7 cents was granted by the Public Utilities Commission in the fall of 1918.

Seeks Permission to Increase Fares.—The Honolulu Rapid Transit Company, Honolulu, Hawaii, has petitioned the Territorial Public Utilities Commission for permission to increase fares in Honolulu from 5 cents to 6⅔ cents, or four tokens for 25 cents. The report of operations of the company for 1923 was reviewed in the issue of the ELECTRIC RAILWAY JOURNAL for April 19, page 836.

Bus Permitted Provisionally. — The Public Service Commission recently granted a permit to operate buses between Tonawanda and the plant of the Dunlop Tire & Rubber Co., Inc., but provision is made for the cancellation of the franchise in the event that the International Railway, Buffalo, extends its River Road line to serve the Dunlop plant. Mr. Wooley had two buses in operation on River Road in 1920 until he was stopped by the commission after the International secured an injunction restraining him from further operation of the route in competition with its railway.

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Financial and Corporate

Delaware & Hudson Reports

Electric Lines Under the Albany System Show Both Increase and Decrease in Operating Revenues

The report of the Delaware & Hudson Company, Albany, N. Y., for the year ended Dec. 31, 1923, contains summaries of the earnings of the company's allied electric railway lines, including the United Traction Company, Hudson Valley Railway, Plattsburgh Traction Company and the Troy & New England Railway.

DETAILS OF ALBANY OPERATION

Operating revenues of the United Traction Company from all sources during 1923 were $3,234,149, operating expenses $2,839,937 and taxes $244,500. Operating income was $149,712, compared with $273,366 in 1922, a decrease of $123,654. Operating revenues increased $148,858, or 5 per cent over the preceding year; operating expenses increased $261,712, or 10 per cent, and taxes increased $10,800, or 5 per cent.

Of the gain in operating revenues, $75,521 was principally due to an increase of 1,033,000 in passengers carried and $74,894 to power sold to other companies. Operating revenues would have been greater except for losses of approximately $51,000 from the strike on the Schenectady Railway and $10,000 from a strike of short duration, in June, 1923, on the lines of the company.

Among the increases in items of operating expenses are: Paving, $102,500; removal of snow and ice, $24,000; equipment retired, $74,146; power purchased, $102,500; increased wages, effective June 1, 1923, $84,000; injuries and damages, $33,000, and these are partly offset by the following decreases: Track and roadway labor, $23,000; track and roadway material, $18,000; maintenance of structures, $21,000; miscellaneous equipment expenses, $5,000; maintenance of plant, buildings and equipment, $13,000; power plant supplies, $5,000; superintendence of transportation, $4,500; miscellaneous transportation expenses, $40,000; general office expenses, $26,000.

PAVING PROVES EXPENSIVE

Extensive street paving programs of the municipalities in which the electric railway lines are located forced premature reconstruction of tracks by the company at a cost of $347,208, involving charges to operating expenses of $134,694. The company's proportion of the cost of new pavement laid in 1923 approximated $204,578, of which $50,203 was charged to operating expenses and the balance to capital account. More than $1,000,000 has been spent in paving and repairing Capitol District streets and highways within the last ten years. The company regards the paving charges as needlessly burdensome.

Operating revenues of the Hudson Valley Railway during 1923 were $961,108, operating expenses $878,282, and taxes $67,000. Operating income for the year was $15,826, compared with $82,339 in 1922, a decrease of $66,513. Operating revenues decreased $62,511, or 6 per cent from the preceding year; operating expenses decreased $3,877, or less than 1 per cent, and taxes increased $7,879, or 13 per cent. Extensive use of privately owned automobiles is assigned as the principal factor in the decrease in operating revenues. One-man car operation was established on all lines in Glens Falls and on the interurban lines between Glens Falls, Hudson Falls and Fort Edward. In 1923 the municipality of Glens Falls engaged in a street paving program. The cost of its part of this work to the company was $41,515, of which $6,650 was charged to operating expenses and $34,865 to capital.

Operating revenues of the Plattsburgh Traction Company were $33,244, operating expenses $31,039, and taxes $2,107. Operating income for the year was $98, compared with $1,492 in 1922, a decrease of $1,394. Operating revenues decreased $2,728, or 8 per cent from the preceding year; operating expenses decreased $1,595, or 5 per cent, and taxes went up $262, or 14 per cent.

Operating revenues of the Troy & New England Railway were $30,073, operating expenses $20,990 and taxes $2,001. Operating income for the year was $7,082, compared with $534 in 1922, an increase of $6,548. Operating revenues increased $4,848, or 19 per cent over the preceding year; operating expenses decreased $2,113, or 9 per cent, and taxes increased $412, or 26 per cent.

$3,000,000 Equipment Issue at Pittsburgh

A total of $3,000,000 of Pittsburgh Railways 6 per cent car trust gold bonds was offered for subscription on April 24 by the Union Trust Company, Pittsburgh. The bonds mature serially, $200,000 on Feb. 1, 1925; $200,000 on Feb. 1, 1926, and $200,000 Feb. 1, 1927 to 1939, inclusive, the offering prices being respectively 100.50 yielding 5.22 per cent, 100.75 yielding about 5.50 per cent and 100 yielding 6 per cent.

It is explained that the car trust bonds are to be issued in part payment for sixty single-end, center-entrance, semi-convertible, double-truck, semi-steel passenger cars; 160 semi-steel passenger cars of the multiple-unit type, and sixty-five semi-steel passenger cars of the one-man, two-man type. The cost of this new equipment is estimated at $3,600,000.

The statement of the offering house reviews the new operating agreement with the city and says that this arrangement practically assures adequate revenues. The balance after the payment of fixed charges, including rents of leased properties, is reported at $670,276 for 1921, $555,509 for 1922 and $1,128,750 for 1923.

$3,200,000 Grand Rapids Issue Offered at 7 per Cent Yield

Dillon, Read & Company, Federal Securities Corporation and Spencer Trask & Company, New York, offered for subscription on April 23 $3,200,000 of first mortgage 7 per cent sinking fund gold bonds dated May 1, 1924, and due May 1, 1939. The price was 99½ and interest, to yield slightly more than 7 per cent. The bonds are in the denomination of $1,000 and $500. The proceeds of the sale of the bonds are to be used in refunding bonded debt of the company due June 1, 1924.

The Grand Rapids Railway owns and operates the entire electric railway system in the city of Grand Rapids, serving a population of more than 145,000. It is explained that the bonds are to be secured by a direct first mortgage lien on 69 miles of railway and 193 cars now owned by the company, and on all its tracks, equipment, real estate and other physical property, together with power contracts and franchises.

The bankers point out that the City Commission of Grand Rapids has placed a valuation of $5,500,000 on the properties for purposes of rate making, as of Jan. 1, 1922, and that with additions to property since that date, the rate making base now amounts to more than $5,800,000. Net income after taxes, available for interest and depreciation reserves for the year ended Dec. 31, 1923, was $560,457. This amount is two-and-a-half times the annual interest charge of $224,000 on the $3,200,000 new first mortgage 7 per cent bonds. A sinking fund of 2½ per cent per annum payable semi-annually will be used to retire bonds by purchase up to the current redemption prices or, if not so obtainable, by call at those prices.

The gross earnings of the company in 1916 were $1,297,586. That year bond interest was $143,012. In 1923 the gross earnings were $1,817,606. That year bond interest was $220,000. The net earnings available for interest and depreciation increased from $469,561 in 1916 to $560,457 in 1923.

Approves Security Issues in Birmingham Reorganization

Transfer of all properties of the Birmingham Railway, Light & Power Company, Birmingham, Ala., and of the Tidewater line to the newly organized Birmingham Electric Company was approved by the Alabama Public Service Commission and formal orders were issued following a hearing in Montgomery on April 16. Authority was also granted to the Birmingham Electric Company to issue $8,000,000 of refunding mortgage gold bonds bearing 6 per cent interest and maturing in 1954, 19,990 shares of no par value cumulative preferred stock and 799,990 shares of no par value common stock.

The railway properties to be transferred include the Norwood Street Railway and the Edgewood Street Railway, in addition to the Birmingham Railway, Light & Power and Tidewater lines. The petitions were amended at the hearing to include the Tidewater lines and the other properties.

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Initial Dividend on B.-M.T. Preferred Stock

The directors of the Brooklyn-Manhattan Transit Corporation on April 21 declared an initial dividend of $1.50 a share on preferred stock for the quarter ended March 31, 1924, payable on May 15 to stockholders of record on May 1. The dividends on this stock do not become cumulative until July 1, 1926.

Gerhard M. Dahl, chairman of the executive committee, says that this dividend is to be considered in the nature of interest on money contributed by stockholders at the time of the reorganization, nine months ago, and is not to be taken as an indication that the company is earning a fair return on its actual investment or on a fair valuation of its property.

Mr. Dahl declared that the city by reason of its failure to build subways called for by the dual subway contracts was responsible for the present overcrowding of the rapid transit lines and had handicapped the company seriously. He asserted that the city had also defaulted in its obligation to supply the company with yards and shops and added that it was the policy of the present management of the company to give the best service possible under existing conditions.

Mr. Dahl said in part:

Before the directors, however, had taken any action in recognition of their obligation to the preferred stockholders, they did everything within their present power to provide adequate transit facilities for the public. Since the organization last June, for example, the directors have appropriated approximately $4,000,000 for new cars and equipment for rapid transit lines alone, despite the fact that the net income from the operation of the rapid transit lines would not justify so large an investment in improvements. Furthermore, on its surface lines this company is continuously making changes and adding improvements which seek to better the service.

The B.-M. T. is ready now, as it has been at all times in the past, to increase its rapid transit service and to decrease the necessity for the present dangerous and unhealthful congestion but it is powerless to do anything more so long as the city of New York defaults under its contract with this company and refuses to carry out contract No. 4, which provides for the completion of the Fourteenth Street eastern line, the Nassau-Broad Street extension and the construction of new shops and yards.

The city and the company together have invested in our rapid transit lines the sum of $295,000,000. On this amount for the first nine months of operations the earnings were 2.4 per cent.

For eleven years taxpayers and investors have combined to pour money into rapid transit lines and equipment, and this huge investment is earning less than 3 per cent without allowing any return on the $60,000,000 worth of elevated lines.

Kansas Lines Participate in Terminal Line Purchase

The Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan., has been authorized to acquire control of the Kansas & Missouri Railway & Terminal Company through the purchase of 8,000 shares of stock without nominal or par value, issued or to be issued by the Terminal company under authority granted by the Interstate Commerce Commission's order of Feb. 16, 1924.

The commission dismissed that part of the application of the Kansas City, Kaw Valley & Western seeking to acquire first mortgage bonds of the Terminal company and the application of the Kansas City Southern to acquire one-half of said bonds, the principal amount of which is $379,000.

The Kaw Valley operates an electric passenger and freight road between Kansas City and Lawrence, Kan., and connects at Kansas City with a line formerly owned by the Kansas City, Outer Belt & Electric Railway, and through an arrangement with the receiver of the Outer Belt Road, the Kaw Valley is able to interchange freight with other carriers, including the Kansas City Southern. The Outer Belt also owns a partly constructed line, extending from a connection with the Kaw Valley to a point near the mouth of the Kansas River, which line the Terminal company was instructed to complete and operate, together with the lines formerly owned by the Outer Belt. The lines of the Terminal company will be operated by electricity, with some of the equipment, power and employees of the Kaw Valley.

The cost of the Terminal company's securities to the Kaw Valley and the Kansas City Southern, which participated in the purchase, is $388,636. The cost of rehabilitation and construction of the Terminal company's lines is placed at $421,000, or a total estimated cost of the lines when completed of $809,636.

Largest Balance for Dividends in Holding Company

Standard Gas & Electric Company, Chicago, reports for 1923 the largest balance available for dividends in the history of the company. The payment of dividends on the common stock at the rate of $2.50 per share per annum was started for the quarter beginning April 1, 1923. Common dividends were increased to the rate of $3 per share per annum for the quarter beginning Jan. 1, 1924.

Net revenue of the company for 1923 was $5,103,425, compared with $4,652,126 in 1922. The company includes in its earnings only amounts actually received or in process of collection. The balance before preferred dividends in 1923 was $2,940,829 compared with $2,811,422 in 1922.

Gross earnings of the operated public utility companies for 1923 were $46,165,533 and net earnings were $18,711,033. These figures represent an increase in gross earnings of 9.72 per cent and an increase in net earnings of 16.4 per cent over 1922.

The interests of the stockholders have been substantially improved, according to President H. M. Byllesby, by certain changes in the capital structure, authorized at a special meeting of the stockholders on March 19, 1924, at which the recommendations of the directors for an authorized issue of 7 per cent cumulative prior preference shares and 6 per cent non-cumulative stock were approved. This action enables changes in the outstanding capitalization which, together with the conversion of debentures into common stock, will result in reducing the proportion of funded debt to the total capitalization. Upon completion of this financing the company will have no secured funded debt.

The construction budgets for 1924 are estimated at $32,672,000, representing additions and extensions. New construction in 1923 required an expenditure of $31,471,106.

The Standard Gas & Electric Company operates the electric railways in Fargo, N. D., and Fort Smith, Ark. During the year it took over the Wisconsin-Minnesota Light & Power Company, operating about 25 miles of city and interurban railway.

Conspectus of Indexes for April, 1924

Compiled for Publication in this Paper by

Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Street Railway Fares* 1913 = 4.84	Apr. 1924 **6.94**	Mar. 1924 **6.93**	Apr. 1923 **6.89**	May 1921 **7.24**	May 1923 **6.88**
Street Railway Materials* 1913 = 100	Mar. 1924 **164**	Feb. 1924 **163**	Mar. 1923 **174**	Sept. 1920 **247**	Sept. 1921 **156**
Street Railway Wages* 1913 = 100	Apr. 1924 **219**	Mar. 1924 **219**	Apr. 1923 **207**	Sept. 1920 **232**	Apr. 1923 **207**
Steel—Unfilled Orders (Million Tons) 1913 = 5.91	Mar. 31 1924 **4.78**	Feb. 29 1924 **4.91**	Mar. 31 1923 **7.40**	July 31 1920 **11.12**	Feb. 28 1922 **4.14**
U.S. Bank Clearings Outside N. Y. City (Billions)	Mar. 1924 **15.12**	Feb. 1924 **14.71**	Mar. 1923 **16.36**	Mar. 1920 **18.54**	Feb. 1922 **10.65**
Business Failures Number	Mar. 1924 **1,652**	Feb 1924 **1,578**	Mar. 1923 **1,677**	Jan. 1924 **2,258**	Sept. 1923 **1,280**
Liabilities (millions)	**61.33**	**73.75**	**60.62**	**109.1**	**27.50**

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Eng. News-Record Construction costs 1913 = 100	Apr. 1924 **221.6**	Mar 1924 **221.7**	Apr. 1923 **213.5**	June 1920 **273.8**	Mar. 1922 **162.0**
U.S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Mar. 1924 **150**	Feb. 1924 **152**	Mar. 1923 **159**	May 1920 **247**	Jan. 1922 **138**
Bradstreet's Wholesale Commodities 1913=9.21	Apr. 1 1924 **12.66**	Mar. 1 1924 **12.90**	Apr. 1 1923 **13.93**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
Dun's Wholesale Commodities 1913 = 120.9	Apr. 1 1924 **186.8**	Mar. 1 1924 **190.7**	Apr. 1 1923 **193.1**	May 1 1920 **263.3**	July 1 1921 **159.8**
U.S. Bur. Lab. Stat. Retail food 1913 = 100	Mar. 1924 **144**	Feb 1924 **147**	Mar. 1923 **142**	June 1920 **219**	Mar. 1922 **139**
Nat. Ind. Conf. Bd. Cost of living 1914 = 100	Mar. 1924 **163.2**	Feb. 1924 **163.9**	Mar. 1923 **159.2**	July 1920 **204.5**	Aug. 1922 **154.5**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen and conductors on 105 street and interurban railways in the United States, operating more than 100 passenger cars each, and weighted according to number of cars.

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Power Rights Acquired.—Thomas S. Wheelwright, president, has announced the purchase by the Virginia Railway & Power Company of the property of the Roanoke Rapids Power Company, Roanoke Rapids, N. C., owner of valuable water rights, some of them undeveloped, north of Weldon, N. C. Instead of adding to its steam power equipment the Virginia Railway & Power Company plans to build a high-tension line connecting with the Virginia cities.

Interurban Involved in Purchase.—An option on the controlling interest in the common stock of the Toledo & Indiana Traction Company, Toledo, has been taken by the Lake Shore Power Company, a new holding corporation, organized here with Charles T. DeHore of the General Electric Company as president and L. V. Van Ness, president of the Maumee Valley Lines, and other local capitalists associated with them. The Toledo & Indiana operates from Toledo west to Bryan, a distance of about 50 miles. It has $1,040,000 of common stock and $400,000 of bonds outstanding. The railway does a power and lighting business.

Net Earnings of Porto Rico Company Lower.—Net earnings of the Porto Rico Railways, Ltd., Ponce, Porto Rico, for 1923 were $433,353, compared with $516,638 for 1922, due to heavier operating expenses. Disbursements included $119,020 interest on first mortgage bonds, $64,483 interest on refunding mortgage bonds, $70,000 dividend on preferred stock, $100,000 reserve for depreciation. Including balance of $557,405 at credit of profit and loss, there was carried forward $651,221. Current assets decreased from $503,081 to $453,627, and current liabilities from $355,625 to $242,183, an improvement of $63,987 in liquid position.

Hearing Set in Reorganization Contest.—Action in a contest to set aside the reorganization of the San Francisco-Oakland Terminal Railways, Oakland, Cal., as the Key System Transit Company, was taken on April 15 when Superior Judge John D. Murphey set April 25 as the date for hearing of several motions and demurrers to the suit brought against the company by Frederick Olschweski. One of the charges is that the committee in charge of the reorganization conspired to wipe out the interest in the company which were represented by the ownership evidenced in the issue of common stock outstanding.

Confirmation of Sale Before Judge.—The sale of the Electric Short Line, which runs westward from Minneapolis, Minn., by the mastery in chancery for $275,000 has been placed before Judge W. F. Booth of the Federal court for confirmation. The line was sold at public auction by Master Howard S. Abbott to the bondholders represented by W. H. Thorp, chairman of the reorganization committee. The line has cost more than $2,000,000 and prospective extensions have not yet been completed. A foreclosure decree was entered in January. Willard J. Hield and Erle D. Luce are receivers for the property. The purpose in reorganization has been to reduce the bonded indebtedness to such a ratio to assets as to make it possible for the Interstate Commerce Commission to give authority for a bond issue to finance extension of the line of the company, to points west of Lake Lillian, the present terminus.

Cannot Delay Tax Payments.—The United States Court of Appeals at St. Louis reaffirmed its former ruling that the Denver Tramway, Denver, Colo., now in receiver's hands, cannot list taxes owed to the city of Denver as "an ordinary debt to take its turn with other debts." The company owes the city $220,000. It ceased paying right after the 1920 strike.

Suburban Railway Discontinued.—In his annual report to the shareholders of the Dominion Power & Transmission Company, Hamilton, Ont., President J. R. Moodie states that with the exception of the railway department a steady advance was enjoyed in 1923. During the year just ended the board decided that it was necessary to discontinue operating the Hamilton & Dundas Railway and on Sept. 5, 1923, this decision became effective. Nothing is known yet as to the disposition of the property. The statement says that bonds to the amount of $231,000 have been redeemed. According to the report the total of the reserves and profit and loss accounts have been increased by the sum of $283,559, bringing this total to the amount of $3,900,021.

Equipment Trust Certificates Offered.—Mention is made in an offering of $17,640,000 of Southern Pacific Company 5 per cent equipment trust certificates, Series G, of the fact that five electric locomotives, fifty steel center-entrance electric street cars, twelve steel one-man, two-man electric street cars, and six steel electric motor coaches are included in the equipment covered by the deed of trust. The offering was made by Kuhn, Loeb & Company, New York, on April 24. The certificates are being offered at 99½ and accrued dividends to yield an average of 5.08 per cent. They mature in equal annual instalments from May 1, 1925 to May 1, 1939 both inclusive. There is vested in the trustee title to equipment costing not less than $22,050,000.

Railway Service to End.—After a controversy of many weeks the Chicago, Burlington & Quincy Railroad, Deadwood, S. D., has given notice that trolley service between Deadwood and Lead will be discontinued and that a bus line will be substituted to operate between the two cities, which are about 4 miles apart. David Keffeler, Lead, S. D., will run the bus line between the two cities for a period of three years, which is the unexpired term of the franchise with the city.

South Carolina Company Reported Under Option.—Stone & Webster, Inc., Boston, are reported to have an option on the Columbia Railway, Gas & Electric Company and associated utility properties in and near Columbia, S. C., with a view to possible purchase of these properties and the development of additional power for central South Carolina. It is further said that a proposition has been made to the Columbia Canal Commission to pay the state $200,000 for settlement of the pending litigation over proposed completion of the canal. The offer is said to have been made by George J. Baldwin, Savannah, Southern associate of Stone & Webster and Benet, Shand & McGowan, Columbia, and T. Frank Watkins, Anderson, counsel for the company.

Seeks Line Discontinuance.—The Illinois Power & Light Corporation, Chicago, Ill., has applied to the Illinois Commerce Commission for permission to discontinue service on its line between Galesburg and Knoxville in Knox County.

Service Suspended.—The York Utilities Company, Sanford, Me., recently suspended service between Kennebunk and Wells. This suspension was in accordance with the announcement made a few weeks ago by the company. So far as is known no efforts are being made to resume service.

Purchase of Long Island Branch Recommended.—The New York Transit Commission has revived negotiations for the purchase for the city of the Whitestone division of the Long Island Railroad from Whitestone Landing to Flushing, L. I. The commission proposes to make the line an integral part of the city's rapid transit system, connecting it with the extension of the Corona elevated-subway line at Flushing. Vice-President LeBoutillier, acting head of the Long Island Railroad, is said to look with favor upon the proposal if suitable terms can be arranged. The city's Corona line now is nearing completion into Flushing. The extension would be connected physically with the Whitestone line, forming continuous trackage to the Borough of Manhattan.

J. C. Easley New Director at Richmond.—John C. Easley Richmond, was the only new director elected on April 16 at the annual meeting of the Virginia Railway & Power Company Richmond. He replaced P. M. Chandler, Philadelphia, resigned.

Merger of Subsidiaries Approved.—The Wisconsin Railroad Commission has approved the merger of six Wisconsin electric companies into the Eastern Wisconsin Electric Company, operating both city and interurban railways. The Eastern Wisconsin Company has controlled the six companies and in the petition to the Railroad Commission asking permission to merge the company declared that it was seeking more economical and uniform operation of all the companies and with the merging it would be in a position to improve service and carry out financing through one corporation instead of seven. The companies merged with the Eastern Wisconsin are the Wisconsin Light, Heat & Power Company, Madison; Janesville Electric Company, Mineral Point Electric Company, Badger Electric Company, Wisconsin Utilities Company and Middle Wisconsin Power Company. The Railroad Commission has authorized the Eastern Wisconsin Company to issue $2,115,900 of bonds for the purpose of retiring bonds of the companies taken over.

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Personal Items

R. E. Danforth Consultant

Former New Jersey Official, After Complete Rest, Will Engage in Traction Work as Expert

Richard E. Danforth, who on April 1, 1924, retired from the vice-presidency and the general managership of the Public Service Railway, Newark, N. J., will retain a permanent consulting relation with the Public Service. He will make his headquarters for the present at Skaneateles, N. Y., but will visit Newark as may be necessary in the interests of the railway. Mr. Danforth has actually been away from his office for five months and does not intend to engage in any work for the remainder of the year other than such service as he may be called upon to perform for the Public Service. At the end of that time, however, he plans to establish himself as consultant, not only for the Public Service, but for banking and bond houses, and for other railways.

For this work Mr. Danforth has had remarkable experience as railway manager, engineer, and consultant, covering thirty-two years. After he was graduated from Cornell University in 1891, Mr. Danforth was for a year an apprentice with the Buffalo Railway; then for five years superintendent of the Buffalo, Bellevue & Lancaster Railway. With this preparation he became superintendent and purchasing agent of the Buffalo Railway, remaining as superintendent of the Buffalo lines of the International Railway after the formation of that company in 1899. In 1901 he designed the railway terminal for the Pan-American Exposition, a kind of work which he especially enjoyed. He left in that year, however, to become general manager of the Lake Shore Electric Railway. This property was handicapped by lack of funds and when it went into receivership, early in 1902, Mr. Danforth went to Rochester, N. Y., where he spent five years, first as assistant general manager, then as vice-president and general manager of the Rochester Railway.

Seventeen Years Service in New Jersey

Beginning in 1907 he was for exactly seventeen years general manager of the Public Service Railway, and for a considerable part of this period vice-president as well. As manager in New Jersey he succeeded Albert H. Stanley, now Lord Ashfield, who on April 1, 1907, sailed to assume the management of the Underground Railways of London. The Public Service property is enormous, but neither this nor the intricacy of the detail problems which were presented daunted Mr. Danforth. It is obvious that behind the remarkable career of the man there must be a strong personality. There is. Slight of frame, Mr. Danforth is characterized by keenness of mind, alertness of manner and great driving power. A strict disciplinarian, he has always tempered discipline with the kindliest of dispositions. One of his greatest satisfactions has been the affection with which his associates, including the rank and file of his employees, have regarded him. He has always been an approachable chief, and has been quick to give to department heads credit for their share in the results achieved by his department. His well known interest in vocational education is a natural corollary to his interest in men.

Mr. Danforth has always insisted on the best of accounting practice, stores accounting and operating detail records, and has been quick to avail himself of such records as a means to economical operation. These records were of great value to him in the activities of the past few years. He spent the better part of 1918 to 1922, inclusive, as an expert before courts and the Public Utility Commission or in the preparation for this work and in assisting attorneys in cross-examining opposing witnesses. At the same time he kept a close rein on the affairs of the Public Service Railway, carefully watching revenues and expenses. A tribute to his work in this connection is the reports of appraisers of the property who found it in 100 per cent operating condition in 1916, 1919 and 1921-22, in spite of strenuous cuts in the expenses made necessary by rising costs and limited rate of fare.

In accepting Mr. Danforth's resignation, President McCarter and the other directors of the Public Service expressed appreciation of the value of his efforts to keep the property safe and intact during the trying years of the war, and the almost equally trying years that have followed during the period of readjustment.

Dr. Ambrose Swasey Awarded John Fritz Medal

Dr. Ambrose Swasey, Cleveland, inventor, manufacturer, philanthropist and dean of the American engineering profession, has been presented with the John Fritz gold medal, one of the highest distinctions in world engineering. The ceremonies took place on the evening of April 23 in the Engineering Societies Building, New York, in the presence of distinguished engineers, scientists and educators from all over the country.

The award was made in recognition of Dr. Swasey's achievements "as a designer and manufacturer of instruments and machines of precision, a builder of great telescopes, a benefactor of education and the founder of Engineering Foundation."

The medal was originally established by these four national engineering societies in honor of a great American metallurgical engineer, John Fritz of Bethlehem, Pa. It has since become an international institution, and is now regarded as the highest engineering honor in America. This is the first time in four years that the medal has been awarded to an American.

J. W. Delaney has been appointed assistant to the master mechanic of the Market Street Railway, San Francisco, Cal. The master mechanic is J. M. Yount.

Frank P. Flinn has become master mechanic of the Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute division. The new appointee will relieve M. M. Nash, superintendent of the city lines, of all duties in connection with the maintenance of car equipment, giving him the opportunity of devoting all of his time to the traffic department. Mr. Flinn has been superintendent of the American Car & Foundry Company plant at Terre Haute for some time. Previous to coming to Terre Haute he was connected with the Westinghouse Machine Company and the Heyl & Patterson Engineering Company of Pittsburgh, Pa.

J. R. Abercrombie, secretary-treasurer of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., has been made secretary-treasurer of the Capital Gas & Electric Company, Topeka, Kan., formerly known as the Consumers Light, Heat & Power Company. Mr. Abercrombie was associated with the St. Joseph property for twenty-two years.

Eugene E. Stringer, who has been connected with the La Crosse, Wis., office of the Northern States Power Company as commercial manager, has been appointed acting manager of the company at Chippewa Falls to assume the duties of Albert Smith, formerly in charge of the electric railway, electric and gas departments.

Oscar B. Smith of Knox, Ind., has been appointed by Gov. Warren T. McCray of Indiana as a member of the Indiana Public Service Commission to succeed Oscar Ratts of Paoli. The appointment is effective May 1, with the expiration of the term of Mr. Ratts. Mr. Smith is one of the leading attorneys of northern Indiana. He is a former member of the State Senate, where he represented his own and another county. He has been Republican chairman of his county for six years.

N. S. Cumming, superintendent of the Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont., has been transferred to Toronto to superintend the Toronto Suburban Railway. He became superintendent of the St. Catharines property more than four years ago, succeeding W. R. Robertson, who resigned to accept a position with the Ontario Hydro-Electric Power Commission. Mr. Cumming before this appointment was chief clerk of the railway department of the Dominion Power & Transmission Company, in Hamilton. A farewell to him was attended by his many employee friends in the railway business, who presented to him a gold watch and chain. In commenting on Mr. Cumming's success as a railroad operator, E. W. Oliver, general manager of the Canadian National Electric Lines, stressed the many difficulties which Mr. Cumming had surmounted while in charge of the property. He said that he had arranged for his transfer so that the Toronto Suburban Railway might have the benefit of his services.

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Obituary

Arthur Warren

Arthur Warren, representative of the committee on public relations on the memorable tour of the country taken by members of the executive committee of the American Electric Railway Association in 1912, died in Bermuda on April 16. As it turned out, Mr. Warren and the members of that committee became the precursors of the more modern movement to place the case for the electric railways directly before the public. For the part that he took in this work Mr. Warren was particularly well qualified. He was London correspondent of the Boston *Herald* from 1887 to 1897, editorial and special writer for the same paper from 1897 to 1907, associate editor from 1907 to 1909 and dramatic critic of the New York *Tribune* from 1909 to 1912. He was also for many years associated in a confidential capacity with George Westinghouse, and had a great deal to do with formulating the publicity policy of the Westinghouse company in the early days. Mr. Warren was born in 1860, and besides his journalistic work was the author of a book, entitled "London Days," in which he described his British impressions.

Col. Robert Kirkup, ninety-two years old, pioneer brass foundryman and president of Robert Kirkup & Company, Cincinnati, one of the oldest manufacturers of brass castings in the Middle West, died at his home in Avondale, a suburb of Cincinnati, on April 12. Mr. Kirkup's death was due to injuries and shock suffered when he fell down stairs in his brass foundry in February. Mr. Kirkup was colonel of the Fifth Ohio Volunteer Infantry during the Civil War. He was born in Scotland and came to this country when he was twenty-eight years old.

Arthur Field, sales manager of the Standard Motor Truck Company, Pittsburgh, Pa., is dead.

Miss Sarah R. Harvey, auditor for the Trenton & Mercer County Traction Corporation, Trenton, N. J., died on April 18. Miss Harvey had been connected with the company for thirty years. She was a member of the Professional and Business Women's Club and the First Presbyterian Church, Trenton.

George W. McNulty, a builder of subways and conduit street railways, died recently in New York City at the age of seventy-three years. He was a civil engineer of note. After assisting in the construction of the Brooklyn Bridge he went into business for himself as a contractor. Then he became chief engineer of the Metropolitan Street Railway in New York and supervised the installation of the cable system on Broadway. Later he helped to build the subway from Times Square to Columbus Circle and was engineer for the Sunnyside Yard for the Pennsylvania Railroad. Still later he served with the Holbrook contracting firm in the building of many sections of the New York subways. He was one of the oldest members of the Engineers' Club.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Code of Business Ethics Formulated

Principles that Will Avert Restrictions Set Forth by U. S. Chamber of Commerce

A committee of the Chamber of Commerce of the United States has worked out a code of business ethics based on the "material needs of mankind" and the necessity of "increasing the wealth of the world and the value of happiness of life." The code will be submitted to the convention of the chamber at Cleveland on May 6. It follows:

The foundation of business is confidence, which springs from integrity, fair dealing, efficient service and mutual benefit.

The reward of business for service rendered is a fair profit plus a safe reserve, commensurate with risks involved and foresight exercised.

Equitable consideration is due in business alike to capital, management, employees and the public.

Knowledge—thorough and specific—and unceasing study of the facts and forces affecting a business enterprise are essential to a lasting individual success and to efficient service to the public.

Permanency and continuity of service are basic aims of business, that knowledge gained may be fully utilized, confidence established and efficiency increased.

Obligations to itself and society prompt business unceasingly to strive toward continuity of operation, bettering conditions of employment and increasing the efficiency and opportunities of individual employees.

Contracts and undertakings, written or oral, are to be performed in letter and in spirit. Changed conditions do not justify their cancellation without mutual consent.

Representation of goods and services should be truthfully made and unscrupulously fulfilled.

Waste in any form—of capital, labor, services, materials or natural resources—is intolerable, and constant effort will be made toward its elimination.

Excesses of every nature—the inflation of credit, overexpansion, overbuying, overstimulation of sales—which create artificial conditions and produce crises and depressions are condemned.

Unfair competition, embracing all acts characterized by bad faith, deception, fraud or oppression, including commercial bribery, is wasteful, despicable and a public wrong. Business will rely for its success on the excellence of its own service.

Controversy will, where possible, be adjusted by voluntary agreement or impartial arbitration.

Corporate forms do not absolve or alter the moral obligations of individuals. Responsibilities will be as courageously and conscientiously discharged by those acting in representative capacities as when acting for themselves.

Lawful co-operation among business men and useful business organizations in support of these principles of business conduct are commended.

Business should render restrictive legislation unnecessary through so conducting itself as to deserve and inspire public confidence.

The report was prepared by Judge Edwin B. Parker, umpire of the German-American Mixed Claims Commission of Washington; Paul W. Brown, editor of *America at Work*, St. Louis; William Butterworth, president of Deere & Company, Moline, Ill.; Henry S. Dennison, president of the Dennison Manufacturing Company, Framingham, Mass.; Noble Foster Hoggson, president of Hoggson Brothers, New York; James R. MacColl, president of the Lorraine Manufacturing Company, Pawtucket, R. I.; Henry T. Noyes, Rochester, N. Y., and George Rublee, Washington.

Trade Association Activities

Three Proposals to Define Right of Such Bodies Will Be Discussed at Commerce Meeting

Much still remains to be done to fix the exact status of the trade association with respect to its right to collect and disseminate information. Some precedents have been established and the correspondence of the National Lumber Manufacturers' Association, made public in February last, has helped the situation. In fact, one of the letters in the correspondence of that association was accepted as constituting the first public statement on behalf of a national association in interpretation of the requested informal opinion on the subject given to Secretary of Commerce Hoover by Attorney-General Daugherty. But that did not dispose of the situation. So in their own behalf members of the Chamber of Commerce of the United States have decided that trade associations and their activities shall go on the program for the Cleveland meeting, May 6 to 8.

In this connection three separate proposals concerning trade associations have been submitted by member organizations of the national chamber for consideration at the convention. Thus the Memphis Chamber of Commerce proposes that the national chamber should advocate creation of a commission which would define the rights of trade associations and their members in all respects, including their rights to discuss operating expense, sources of supplies for materials, prices, trade competition, etc. A study of anti-trust laws and of the Federal Trade Commission's powers and activities would be included. The purpose would be to establish recognized principles which would remove handicaps under which trade associations now operate, through fear that they may violate some law, rule or regulation and be called before a commission or the courts upon a criminal or civil charge the existence of which, regardless of the merits, is detrimental.

New Quarters for Westinghouse Interests in New York

The Westinghouse Electric & Manufacturing Company has moved its New York executive offices from 165 Broadway to 150 Broadway. The new building is known as the Westinghouse, and all departments of the company will hereafter conduct business from there. The Westinghouse Electric International Company and the Westinghouse Lamp Company will move into the new

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building next week-end. The Westinghouse interests will utilize the upper twelve stories of the twenty-three-story structure, the total space amounting to approximately 100,000 sq.ft.

New Metal for Car Building Promised

W. W. Atterbury, vice-president in charge of operation of the Pennsylvania Railroad, appeared before the Senate agricultural committee on April 19 in behalf of the Hooker-White-Atterbury offer for the government plant in opposition to that of Henry Ford. Mr. Atterbury promised the manufacture at Muscle Shoals of a new metal "that will revolutionize transportation." The scheme advocated by Mr. Atterbury looks to the manufacture of freight and passenger cars from a new metal that he discovered abroad during the war.

Mr. Atterbury said the new metal would be lighter than steel and almost as strong, and could be manufactured with waterpower much cheaper. He declared it could be used in the construction of both freight and passenger cars and he predicted that these would take the place gradually of those now in existence. Mr. Atterbury added that the new cars would cost less than those used today.

Almost at the same time that Mr. Atterbury was making his remarks discovery of a new alloy metal to take the place of steel in the near future was predicted by Dr. Arthur A. Hamerschlag, president of the Research Corporation. Dr. Hamerschlag said:

> We are on the threshold of an era of changes in the great field of metallurgy. Steel has ruled king of industry. Its position is being threatened by those who have been pioneering in the fields of the alloys. The inventor who can produce a new metal with the strength of steel, non-corrosive, lighter in weight, already is on the horizon.

Metal, Coal and Material Prices

Metals—New York	April 22, 1924
Copper, electrolytic, cents per lb.	13.437
Copper wire base, cents per lb.	15.875
Lead, cents per lb.	8.075
Zinc, cents per lb.	6.487
Tin, Straits, cents per lb.	49.625
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.20
Somerset mine run, Boston, net tons	2.175
Pittsburgh mine run, Pittsburgh, net tons.	1.875
Franklin, Ill., screenings, Chicago, net tons	2.175
Central, Ill,, screenings, Chicago, net tons.	1.90
Kansas screenings, Kansas City, net tons..	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.65
Weatherproof wire base, N.Y., cents per lb.	17.50
Cement, Chicago net prices, without bags.	$2.20
Linseed oil (5-bbl. lots) N. Y., per gal.	$0.93
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	12.25
Turpentine, (bbl. lots), N. Y., per gal.	$0.99

Rolling Stock

Salamanca, Olean & Bradford Railway, Salamanca, N. Y., has applied to the Public Service Commission for permission to place a bond issue to finance the purchase of three one-man safety cars.

Cincinnati, Georgetown & Portsmouth Railroad, Cincinnati, Ohio, has asked the authority of the State Public Utilities Commission to issue $17,000 of equipment trust certificates for the purpose of purchasing two interurban cars.

New Orleans Public Service, Inc., New Orleans, La., has contracted with the Perley Thomas Car Company, High Point, N. C., for fifty-five modern cars at an approximate cost of $700,000. The cars will be delivered this fall. The contract for the motor equipment and the air brakes was split between the Westinghouse Electric Company and the General Electric Company. The New Orleans property has also placed an order for four additional buses with the Yellow Coach Manufacturing Company, Chicago, Ill.

Track and Line

Madison Railways, Madison, Wis., will soon begin the double tracking of its line on University Avenue and Breeze Terrace.

Savannah Electric & Power Company, Savannah, Ga., is replacing the old track around the city market with new 114-lb. rail. The job when completed will cost approximately $5,000, of which $1,500 will be for repaving between the track and 2 ft. on each side. More than $250,000 will be spent on improvements during 1924. To complete the 1923 construction program it will cost $41,863, while the new work for the year which has just been approved is estimated to cost $275,111.

Trenton & Mercer County Traction Corporation, Trenton, N. J., will install steel ties in the Borough of Pennington.

Tri-City Railway, Davenport, Iowa, has completed approximately 4,000 ft. of new track. The proposed project consists of 2,675 ft. of double track and 1,300 ft. of single track. The company also reports progress on the Rockingham Road project, where new track is being laid preparatory to the paving of the street.

North Carolina Public Service Company, Greensboro, N. C., is improving its track between Spencer and Salisbury by lowering the rails almost on a level with the surface of the street.

Department of Street Railways, Detroit, Mich., will start track extensions on May 1, which will be carried to conclusion during the month of May. The extensions include laying of tracks on Livernois Avenue from Fenkell Avenue to Six Mile Road, as an extension of the Trumbull Avenue line. This has been referred to as the most important project recently announced. Three extensions are proposed for construction beginning May 1, and still another program of extensions and improvements of service is to be made public for June 1, it was announced. The East Warren line will be extended from St. Jean Avenue at least 1 mile farther east if the Department of Public Works proceeds with the grading and paving. Construction between Toledo Avenue and Michigan Avenue on the Scotten Avenue line will begin on May 1, and the Scotten line extended between Fort Street and Michigan Avenue. This line was commenced last year and construction work carried on between Fort Street and Toledo Avenue. When completed this will form a link in the loop for the Clairmount and Grand Belt cars.

United Railways, St. Louis, Mo., has been granted a permit by the St. Louis Board of Public Service to lay some 3 miles of T-rails to replace existing track in various parts of the city.

Shops and Buildings

Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa, suffered a loss of $8,000 when flames threatened its carhouse. Four cars were damaged.

Trade Notes

American Steel Foundries, Chicago, Ill., has moved from the McCormick Building to the Wrigley Building, 410 North Michigan Avenue.

K. D. Hequembourg, at one time director of exhibits and vice-president of the American Electric Railway Manufacturers' Association, has been appointed state commissioner of Missouri for the National Association of Builders' Exchanges. His duties will consist of acting as state representative of the national association, looking after state and local affairs. He will have the power to organize local associations. He has lately been executive secretary of the Builders' Exchange of St. Joseph, Mo.

Buda Company, Harvey, Ill., is extending its railway switch plant.

Economy Electric Devices Company, Chicago, Ill., has received an order from the Key System Transit Company, Oakland, Cal., for the equipment of all of the motor cars on that property with Economy meters. This order will call for about 450 meters.

J. M. Pneuman, Berea, Ohio, has been appointed sales agent for the Transit Equipment Company, New York.

Union Switch & Signal Company will move its New York office from its present location in the Benenson Building, 165 Broadway, to the new Westinghouse Building, 150 Broadway, on May 1. The new quarters occupy the greater part of the twenty-second floor of the Westinghouse Building. They are larger and better arranged and can be reached more conveniently.

William Lintern, president of the Nichols-Lintern Company, Cleveland, Ohio, manufacturer of railway, vehicle and mill supplies, sails for Europe May 8 for an extended business trip.

New Advertising Literature

Heine Boiler Company, St. Louis, Mo., has issued Bulletin 54, an illustrated pamphlet on the bent-tube boiler V-type.

Tide Water Oil Sales Corporation, New York, N. Y., has issued "An Unusual History of Petroleum." The book is a reprint of twelve mailing pieces which were used during the past year in a direct advertising campaign among users of lubricating oils and greases.

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New York, May 3, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 63
Number 18

Clean-Up Week Is Here Again

WHILE in some parts of the world May Day is the signal for strikes and anarchistic demonstrations, in this country it heralds the opening of the annual spring cleaning week that has become national in character, being sponsored by the United States Chamber of Commerce. Not only for the individual household, but for business and industry generally, there is a need to dispose of the accumulated rubbish of the winter and prepare for the open season.

It is not merely an esthetic urge that causes civic bodies to stand back of the movement. A definite relationship has been established by the insurance interests between cleanliness and fire prevention. Litter and accumulation of rubbish are every year directly responsible for the destruction by fire of hundreds of thousands of dollars worth of property. So clearly is this recognized that a penalty is included in the standard fire insurance policies for poor "housekeeping."

So let this be the signal to start the best clean-up that ever has been staged on your property.

Even New York's Subway Is 40 per Cent Elevated

MUCH discussion about the obsolescence of elevated railways has arisen in the New York press in connection with two reports on the Brooklyn elevated railways presented by three city and three independent engineers. These reports were called for because of the accident last June when two cars left the track and fell off the structure, and the engineers were instructed to report particularly on the safety of transportation on these lines. They have made several helpful suggestions and have recommended the strengthening of the structures in a number of ways because of the increased traffic carried over them.

Nowhere in either report, however, is there any indication that elevated railway travel cannot be made safe, or that an elevated structure provides an obsolete method of city transportation. Traveling is certainly much pleasanter in the open air than underground, and the figures in New York City, even with the old forms of elevated railway there in use, show that the running time is not much different between elevated and subway.

Since an elevated railway can be built for very much less per mile of track than a subway, the former is possible in a great many places where a subway would not be financially practicable. When built in developed districts, the cost of an elevated railway is increased by the extent to which damages can be collected by abutting property owners. This may be a very considerable addition. But even if such damages amount to as much as the cost of construction itself, the cost would still be only about half to two-thirds that of a subway.

Because of the expansion of the subway system in Manhattan Borough, many municipalities where the traffic is not so great believe that the only rapid transit system suitable for their condition is the subway. The fact is that in New York 61 per cent of the entire rapid transit system is elevated, and that even the so-called subway division of the Interborough Rapid Transit Company includes elevated lines to the extent of 40 per cent. So if these cities wait until they can afford subways, they may wait a long, long time.

Recent Financial News Is Significant

FINANCIAL history is being made fast by the electric railways this year. Not only have the Pittsburgh and Birmingham receiverships been lifted, but material progress has been made toward restoring the properties in both St. Louis and Kansas City to their owners. Best of all, however, are the evidence of greater willingness on the part of bankers to participate in electric railway offerings, the decided increase in interest in railway issues among investors, and the ability of the companies to do their financing at rates that may be regarded as reasonable.

Within the past few days a test has been furnished in financial circles by an offering of $3,200,000 of 7 per cent bonds of the Grand Rapids Railway sold at 99½ to yield 7 per cent plus, followed by an offering of $3,000,000 of Pittsburgh Railways 6 per cent car trust gold bonds, sold to yield 5.22 per cent to 6 per cent. The Grand Rapids issue took well. The alacrity of the investor to participate in the Pittsburgh issue was so great that the subscription books were closed in an hour.

Similarly an offering of Southern Pacific Company 5 per cent equipment trust certificates was readily subscribed on a 5.08 per cent offering basis. More than sixty street cars for use on the electric lines of this company's subsidiaries were included among the equipment pledged to secure this loan.

In the light of these and other recent developments significance attaches to the recent comment of an investment banker to the JOURNAL that gradually the impression among investors is being eradicated that electric railway securities are selling on a bankrupt basis. As a matter of fact, the securities of the electric railways are not financially far out of line with respect to other issues. A study made recently of eighteen fairly representative issues, including some of the highest priced as well as some of the highest yielding issues, shows an average basis of 6½ per cent. The high of this list is 8.40 and the low 5.41 per cent.

The evidence of betterment along these lines shows the improvement to be gradual, but it is sounder because of that fact. The reasons behind it are fundamental and we may therefore look for continued progress.

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The Desirability of Even Headways

IN AN EDITORIAL in the March 15 issue, under the heading "Make Your Headways Sell Your Service," this paper pointed out the desirability, where possible, of scheduling city car lines with even parts of the hour as the spacing between cars. This was urged on account of the greater ease in remembering leaving times with such an arrangement, and was based on the sound logic that the easier it is for the individual to know when he can get a car, the more likely he is to use it.

Issue is taken with several of the points made in the editorial refered to by Joe R. Ong in a communication published in the JOURNAL, issue of April 26, page 656. He cites a number of specific instances where he feels that it is unwise to determine the headway from the standpoint of the convenience of the passengers. Mr. Ong's discussion of time-table construction is quite worth bringing out, but most of his examples are such as were carefully excluded from consideration in the previous JOURNAL editorial by the premise, "When the service is infrequent....."

It is true that conditions will arise in working out the schedules for any system which limit the application of even headways. The main thing to remember is that if the headways are such that the spaces are even fractions of the hour, the cars will leave at the same points on the clock, hour after hour.

In other words, with certain numbers of scheduled cars per hour, the spaces are easier for the passenger to remember. Thus, four, five and six cars per hour correspond respectively to headways of 15, 12 and 10 minutes. It is easy to keep in mind that the cars run every quarter-hour. If they leave, say, three minutes after the hour this can be carried through in the mind of the passenger with little difficulty. Such even fractions of an hour are not difficult to remember. But an 11-minute headway, for instance, does not recur on the same minutes for eleven hours, and the rider just has to stand on the corner and wait for the car to come along.

While it is desirable in some cases to give suburban service by extending out occasional cars on a city line, it does not necessarily follow that it must lead to odd headways. The point made in the previous editorial was that the problem should be studied to see if it is at all possible to schedule such cars so that the headways will be even. This cannot be done economically in every case, but it certainly is worth an effort to try to effect some such combination. Furthermore, it may be quite desirable in specific cases to separate completely the suburban service from the city service, as a measure of making the former more reliable.

The difficulty with the time-table expert sometimes is that he has the technical point of view only. He fails to see that in gaining the last one-tenth per cent of efficiency he may cause the loss of patronage. For instance, the time-table department that operated a 13-minute line in the more thickly populated district and a 26-minute line to a suburban terminal (an actual case, by the way) certainly had little thought for making the service readily salable. Knowing the line, it seems quite possible that it would have been practicable and decidedly better to operate cars on 15 and 30-minute headways with a saving over what actually was operated.

The spacing of trains and single cars on a line, particularly during the rush hours, was not considered in the editorial referred to above. It is a special subject and has little bearing on the question raised. Of course, as coupling the cars together into trains increases the size of the units, this will increase the spacing in handling a given traffic. This naturally makes even headways more desirable.

Mr. Ong brought interurban service into the discussion. In this, it is perhaps a good thing to have the cars on various routes spaced out so as to divide up the hour evenly. But in some cases there is a very positive advantage to the interurban road by making connections between lines at the terminal. A relatively small advantage like reduction of the maximum power demand or increase in the capacity of the passenger terminal may easily be outweighed by the disadvantage of missing connections. Many a traveler has changed his route in order to avoid a 40 or 50-minute wait at an interurban station, and has gone to the steam road, which, although the service was less frequent and the fare higher, adhered to a time-table which provided for direct connections.

Birmingham Starts Auspiciously Under a New Deal

SO FAR as its principal utilities are concerned the city of Birmingham, Ala., is starting in afresh under a new deal. The reorganization of the Birmingham Railway, Light & Power Company has been effected, and the successor company, the Birmingham Electric Company, has begun to function under conditions that promise much for the future, both to the company and the city.

Under the terms of the settlement expiring franchises covering short sections of line have been unified with respect to their future maturity; most of the so-called Tidewater lines, threatened with extinction, have been retained; the financial set-up of the successor company has been placed on a modern basis with respect to provision for future financing; fares have been reduced at a saving to the public of about $500,000 a year, made possible largely by removal of the jitney menace, and arrangements have been made to substitute double-entrance cars, with partitions separating the races, for the single-entrance cars, thus settling a race question without the matter becoming a public issue.

This is a bare outline of some of the outstanding accomplishments. Commissioner William L. Harrison has pointed to them for the benefit of the people in a statement which he has just issued. His pride in the part played by the body of which he is a member in consummating the settlement is pardonable. It is too bad that it is not given to more city officials to see the utility situation as Mr. Harrison sees it, for a city is judged largely by its utilities. Mr. Harrison has aptly said that the functions which the utilities perform reflect themselves into every household and family in the city, into every commercial and business interest and into the very life, development, progress and prosperity of the city. Cognizant of this, both sides to the negotiations in Birmingham were prepared to make concessions. Best of all, the spirit of amity and good will which marked the negotiations has been carried over in working out the details of the settlement problems and gives every evidence that it will continue.

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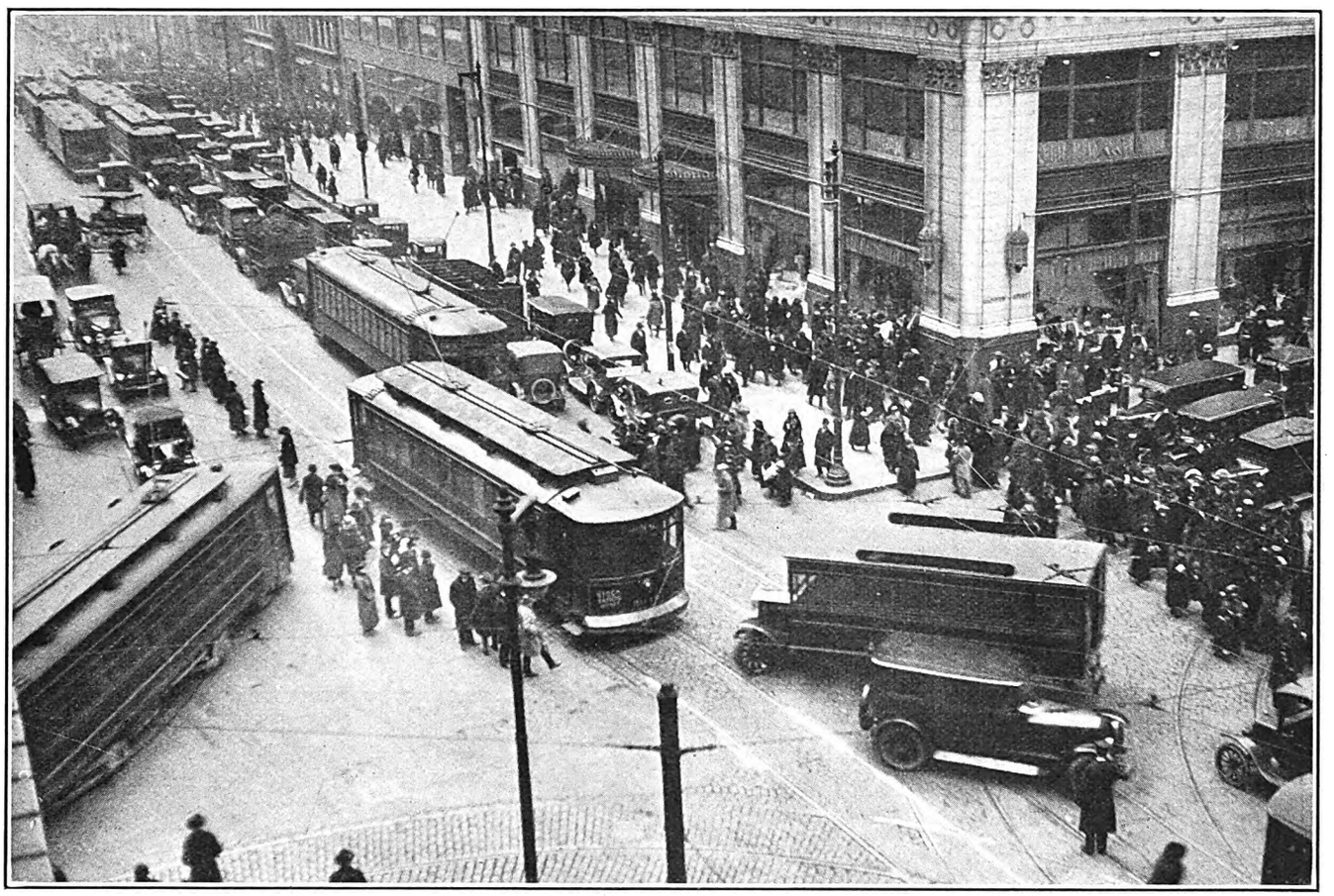
Chicago Loop Rerouting Would Increase Capacity for Cars 30%

Reduction of Number of Left-Hand Car Turns and Rearrangement of Lines to Give Maximum Relief in Traffic Interference with Minimum of Inconvenience to Street Car Patrons Proposed in New Rerouting Plan for Chicago Surface Lines



A Third Track for Three Blocks on State Gives a Loop for the Heavy Madison Street Line and Other Lines Without Interference with the Through Lines on State. A Clear Example of the Evil of the Left-Hand Turn for Vehicles Is Seen in This Picture

REROUTING of lines in the downtown Loop district of Chicago, with a view to relief of traffic congestion in so far as it is created by the operation of street cars, is recommended in a report by Major R. F. Kelker, Jr., to the committee on local transportation of the City Council. This report was prepared at the direction of the chairman of the committee and with the cooperation of the board of supervising engineers and officials of the Chicago Surface Lines. It aims to present a means of relieving traffic congestion without an elaborate track rebuilding program, and at the same time it offers the possibility of increasing the number of cars entering the downtown district by 30 per cent.

The following improvements in conditions within the downtown district would result with the installation of the new plan, according to the report:

	Present	Proposed	Decrease Number	Decrease Per Cent
Ltft-hand turns	25	5	20	80
Right-hand turns	38	26	12	34
Sub-terminals	3	1	2	67

The general plan proposed has been to eliminate as many left-hand turns as possible and at the same time cut down the number of right-hand turns required inside the congested area. This is accomplished for north and south side cars entering the Loop district by routing them on through the congested area before looping them back. Cars from the west side of the city are looped on Dearborn Street instead of on State Street, thus making the southbound track on Dearborn Street virtually a terminal track for westbound loops.

The proposed rerouting will eliminate the use of the third track on State Street between Lake and Madison, will eliminate stub-terminals at two of the busy corners, namely, at Adams and State and at Van Buren and State, and will eliminate all "round the block" loops.

The proposed plan will place outside of the district bounded by the Chicago River and Harrison Street 80 per cent of the left-hand turns and 34 per cent of the right-hand turns now in effect within this district. This has been accomplished by increasing the size of the various loops and, where possible, routing the north and

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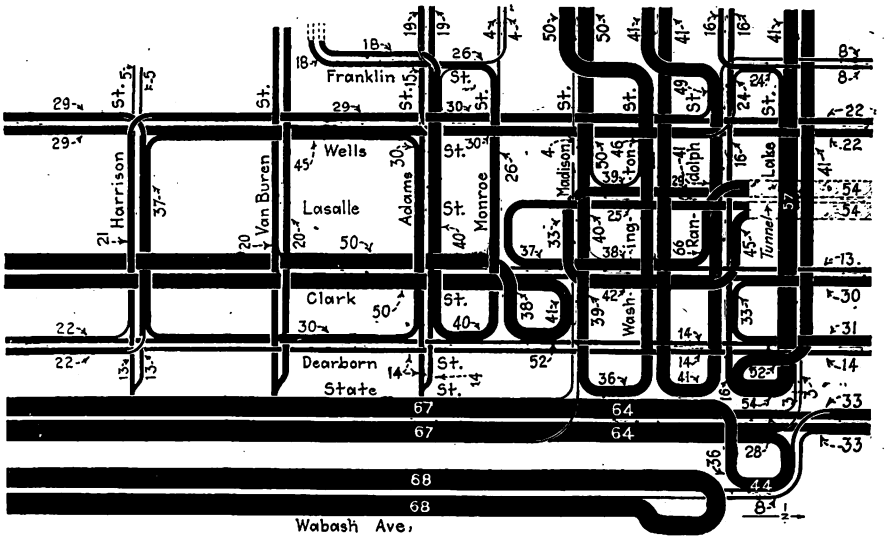
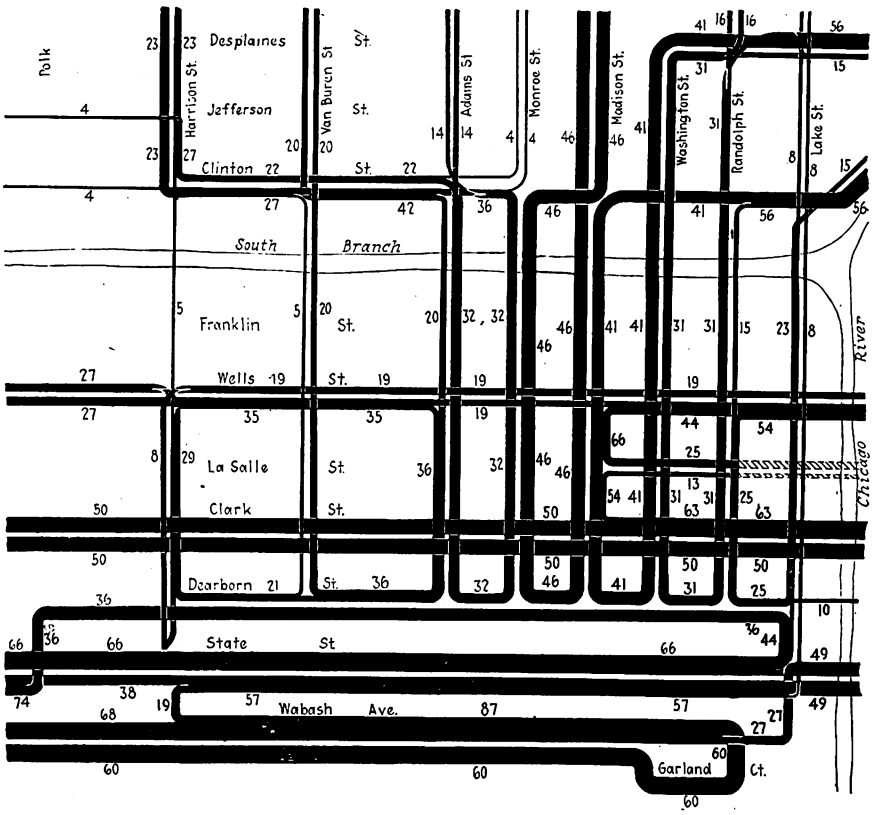
south through-route cars through the congested area without turns. The two stub-terminals will be replaced with loops.

The proposed loops have all been laid out to be one block wide and several blocks long, the latter dimension being in the general direction of the destination of the route. All loops have been laid out for one left-hand turn and three rights, and, as far as possible, to have the outbound side of the loop on the street from which the route derives its name.

In all, twenty-one routes which at present terminate within the downtown district are to be rerouted. Eleven through-route lines are also to be rerouted in order to bring the routes through the downtown district on a less congested street or without turn in the district.



Present Surface Car Routing in Chicago Loop District, Showing Number of Scheduled Cars on Each Section of Track



Proposed Loop Routing, Chicago, Which Would Eliminate Turning Movements from State Street and Move Many Turnbacks to Points Beyond Congested District

REMOVING CARS FROM LOOP DISTRICT ALTOGETHER HAS SERIOUS DISADVANTAGES

Because of the constantly increasing volume of pedestrian and vehicular traffic in the congested area, the subject of removing all surface street car routes from the Loop district has been frequently discussed. Major Kelker's analysis showed such a scheme to be impracticable because of the following disadvantages:

1. The street car using public (approximately one-half of the daily occupational population of the downtown district) would be seriously inconvenienced in getting to and from their places of business or employment.

2. The concentration of traffic at points on the edge of the district to which the street cars were moved would be such as to create seriously congested conditions at loading points.

3. The congestion would not be lessened in the Loop district for the reason that it requires only about 10 seconds for from 40 to 100 persons to be carried across a street intersection in a street car (from one-tenth to one-quarter of a second per person). It would require about 13 seconds per person on foot even if there were no vehicular interference. This conclusion is based on actual traffic studies.

For these reasons it was thought clear that the possibility of reducing traffic congestion by moving the street car terminals closer to the edge of the Loop district would not furnish a solution of the problem of congestion. This left two alternatives: (1) Complete through routing of all lines, and (2) removal of the terminal loops, particularly of the west side lines, to a point where they would cause the least interference with other lines, and through routing of north and south lines as far as it was consistent with economical operation and maintenance of good service.

Complete through routing was considered impracticable not only from an operating point of view, but also from the standpoint of maintaining regularity and adequacy of service. In addition, through routing of west side lines with north and south side routes and vice versa would give no material reduction in right-hand turns and would actually cause a considerable increase in the number of left-hand turns.

Careful study of the traffic situation in the Loop area, bounded by Lake Street, Wabash Avenue, Van Buren Street and Wells Street showed that under the present routing street cars interfere both with their own movements and with the movement of all other traffic because of a large number of left-hand turns at important intersections. In addition, it was found that the movement of the street cars is retarded by pedestrian and vehic-

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ular traffic, and vice versa, on the west side of State Street at the intersection of Randolph, Washington and Madison Streets, because of the existence of right-hand turns on the important west side routes operating around these intersections. It was also found that the north-bound track on State Street was being used beyond its reasonable capacity, particularly when the number of different routes operating over it and the congested condition of the streets was considered. Still further analysis showed the stub-terminals on Adams Street at State Street and on Van Buren Street at State Street to be a serious hindrance to the proper movement of both street cars and other vehicular traffic.

Advantages of Rerouting Summarized

The chief advantages of the proposed routing are summarized as follows:

1. Greater facility of movement of all classes of traffic at the heavy traffic intersections.
2. Operation of cars serving the same section of the city are carried over a common route in the downtown district in so far as practicable.
3. The number of interlocking loops in the downtown district is reduced to a minimum. The disadvantage of an interlocking loop is pointed out to be that a car failure at certain points on one loop rapidly blocks traffic on the connecting streets so as to tie up adjacent interlocking loops and consequently may tie up many lines.
4. Substitution of loops for stub terminals in the heavy traffic area.
5. Elimination of practically all left-hand turns from the most congested part of the heavy traffic area as well as a reduction in the number of right-hand turns.
6. Removal of curve movements from heavily congested intersections as far as possible. Under the new plan, within the district bounded by Lake Street, Wabash Avenue, Van Buren Street and Wells Street, curve movements are confined to Dearborn Street with the exception of comparatively few on Monroe Street.
7. The proposed plan practically accomplishes the results that through routing of north and south side lines would accomplish in so far as traffic movement in the congested section would be affected by such through routings.
8. Presents an improved opportunity for emergency routing without causing delays to other lines.
9. Effects the greatest utilization of east and west streets having the widest roadways and provides better balancing of traffic.
10. Provides for the operation of three of the principal middle southwest side lines closer to the center of the business district without increasing congestion.
11. Reduces the number of passengers transferring in the heavy traffic area.
12. Makes provision for better service between the Union Depot and the center of the downtown district.

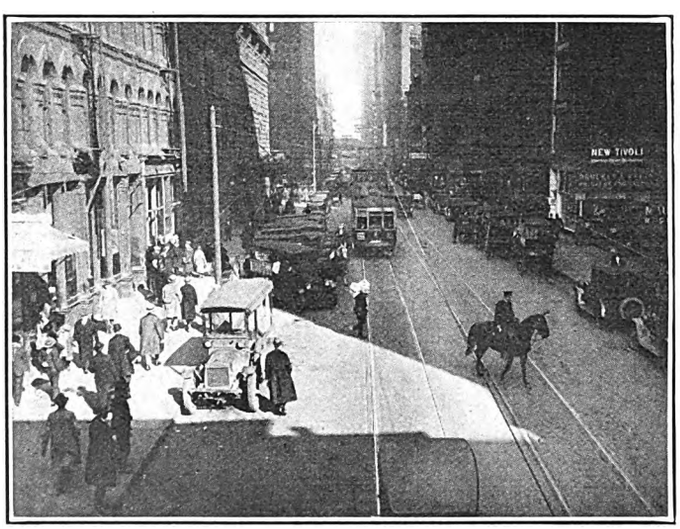
Disadvantages of the Proposed Plan

1. The transferring of passengers in the downtown district between the Ogden, Elston and Division Street lines and the State Street lines and through routes 1 and 3 would be eliminated; also between the Milwaukee, Armitage, Madison, Harrison and Van Buren Street lines and the State Street lines.
2. Passengers using the Southport, Sedgewick-Dearborn and Riverview-Larrabee lines to and from points lying south of Kinzie Street would be required to transfer.
3. Passengers using the Canal-Twenty-first Street and Fulton Street lines to and from points east of Clinton Street would be required to transfer.
4. Passengers traveling from the north to the Polk Street Depot, excepting those using the Clybourn lines, would be required to use cars operating on State Street or Clark Street.
5. Some of the patrons of a few of the lines operating in the loop district would have to walk an additional block or two to board cars.

General Observations on Proposed Plan

In no case have the cars on a heavy traffic line been removed more than one-sixth of a mile (880 ft.) from their present route, and in the majority of cases the change is only one-twelfth of a mile (440 ft.)

Although the elimination of transfers between certain west side lines and the State Street line and through routes 1 and 3, mentioned under the list of disadvantages, would appear to be objectionable, it would only entail a slight inconvenience to a comparatively few and



On Madison Street, Which Is 80 Ft. Wide, Parking Seriously Interferes with the Movement of Vehicles. It Is Totally Prohibited During the Morning and Evening Rush Hours. Looking East from Wells Street

Fortunately State Is a Good Wide Street and Will Accommodate a Very Heavy Flow of Traffic, but the Numerous Great Department Stores Which Are Located on It Overtax Its Capacity

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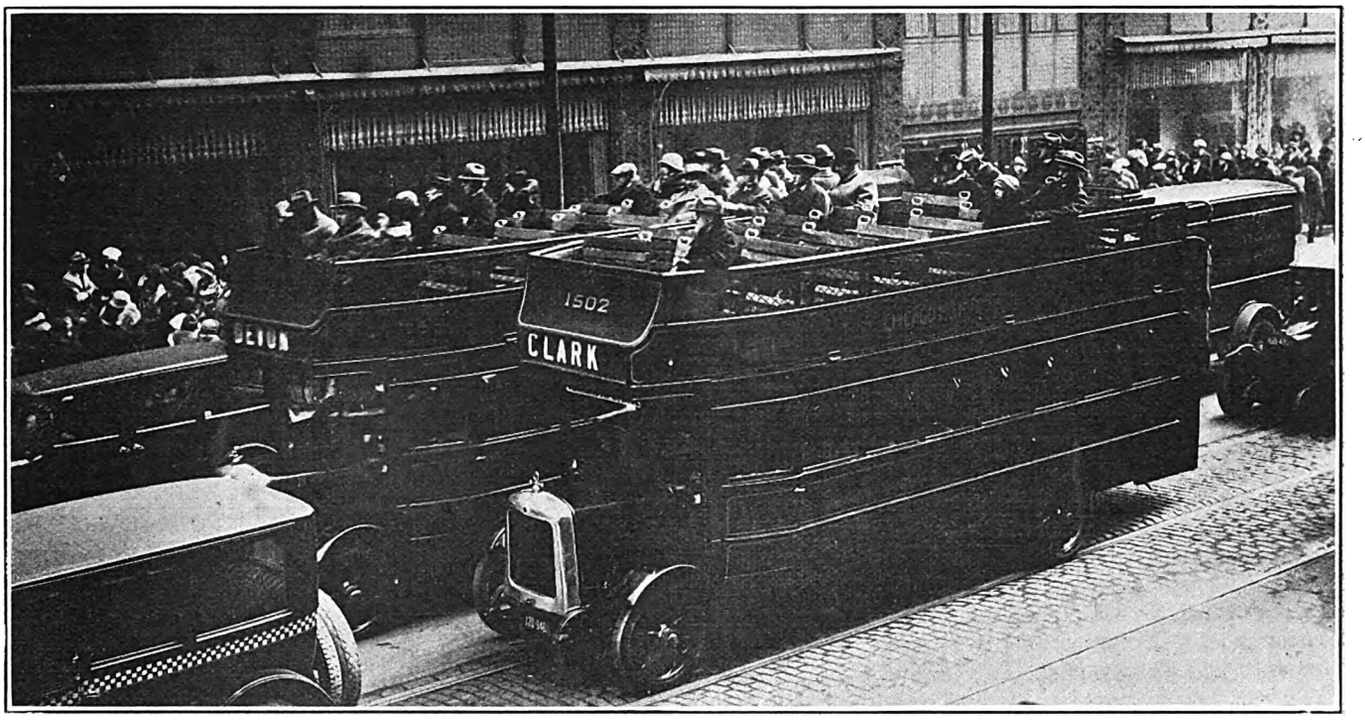

Buses, While Carrying Many People, Also Add to the Congestion on Car Line Streets in the Loop

no passenger would be prevented from reaching his destination for one fare.

TIME STUDIES IN TRAFFIC MOVEMENT

From a number of traffic studies made in the Loop district, it was found that in general the traffic interval at street intersections is governed by the vehicular traffic flow and that this traffic interval with respect to time allowed is about evenly divided between traffic moving north and south and traffic moving east and west. Street cars must move coincidentally with vehicular traffic, and therefore the amount of time required to move street cars past the north and south or east and west controlling points at an intersection must not exceed 900 seconds in any half hour.

It was determined from checks made at various times that the amount of time necessary for a street car to make a straight crossing, right-hand turn and left-hand turn is, on an average, 10 seconds, 15 seconds and 20 seconds, respectively. These time allowances were applied to the number of cars scheduled to operate through the intersections to find the total time required to move cars during any period of time and were considered in laying out the routing shown on the proposed plan.

As stated above, the total time for east and west or north and south traffic movements should not exceed 900 seconds, or a total of 1,800 seconds for movements past the intersecting points in all directions in any half-hour period. A study of the conditions existing at several important terminals under the present routing disclosed the following situation:

TIME NECESSARY TO MOVE CARS IN MAXIMUM HALF-HOUR DURING EVENING RUSH

Intersection	Seconds
North and South Lines	
Wabash and Washington	980
State and Lake	950
Dearborn and Lake	1070
East and West Lines	
Wabash and Randolph	1200
Clark and Madison	990
Clark and Monroe	1020

Thus there are now six intersections in the heavy traffic area where the time necessary to move the cars is in excess of the time allowed for vehicular traffic. This causes these points to be limiting points so far as the operation of street cars is concerned and they consequently are sources of congestion.

In addition, therefore, to the elimination as far as possible of left-hand and right-hand turning movements, the problem of reducing the limiting points in the heavy traffic area to a minimum presented itself. This problem was carefully considered in the rerouting plan proposed and the number of limiting points was reduced from six to three. The points remaining are as follows:

	Seconds
North and South Traffic	
Wabash and Washington	900
Clark and Monroe	935
East and West Traffic	
Wabash and Randolph	1200

The limiting points have been removed from the heavy traffic area to points nearer the edge of the downtown district and in some instances to points outside of the district at which places the movement of street cars and not the movement of vehicular traffic governs the traffic movements at intersections. The time necessary to move cars at each intersection in the heavy traffic area has been made more uniform and the extremes have been reduced to a minimum. This indicates better balancing of street car traffic at the intersections. Although the time required at some of the intersections for east and west or north and south movements is in excess of 900 seconds for the maximum half-hour, the traffic at the intersections where this occurs is such that street cars will have free movement because vehicular traffic does not govern the total flow as it does at some of the more heavily congested intersections.

In addition to a reduction in left-hand and right-hand turning movements, the proposed routing has been laid out so that heavy straight crossing movements will be made at intersections without turning movements.

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Interborough to Have Enlarged Shops

An Area of 26½ Acres Will Be Occupied with New Office Buildings, Repair Shops, Service Buildings and Separate Yards—Additions to the Present Shop, Not Including Equipment, Will Cost About $2,000,000

WITH the continual increase of rolling stock necessary to carry the traffic on the lines of the Interborough Rapid Transit Company, New York, has come a pressing need for more adequate shop facilities. Accordingly, the company is now making additions to its 148th Street shop. When completed an area of 26½ acres will be occupied by the present and new shops, office buildings, service buildings and storage yards. The new buildings will extend from 147th Street to 151st Street between Seventh Avenue and the Harlem River, and additional storage space will be available between Lenox Avenue and the Harlem River as far south as 145th Street. The Lenox Avenue subway has a station at 145th Street and two tracks will run from this into the shop yards.

To secure additional space and provide facilities for receiving materials the bulkhead line along the Harlem River is being extended by permission of the War Department. A large amount of heavy supplies come by water, such as castings, rails, ballast, sand, car wheels and timber. The location of the yards along the Harlem River is particularly convenient for receiving such supplies.

The buildings now nearing completion constitute the third addition to the 148th Street shop. The first consisted of an extension of the shop east toward the Harlem River. The second was an addition to the south side of the shop throughout its entire length to provide facilities which, with the new arrangement, will be used as a blacksmith shop, mill room, wheel shop and repair shop for wrecked cars. The third addition, which is now under construction, consists of the general repair shop, an administration building, section for electrical and machine repairs, together with two service buildings, one for the stores department and the other for the way and structures department. The accompanying plan shows the arrangement of the shops and yards and indicates the various additions. The first and second are now completed, the third is under way and will be finished by midsummer.

The original shop and the first and second additions are now being used for maintenance work. The equipment in these portions at present will be rearranged as soon as the third addition is completed. The arrangement shown on the accompanying drawing is for the shop as it will ultimately be equipped.

A new administration building for use of the transportation, mechanical, electrical and track departments is being constructed at the northeast corner of Seventh Avenue and 147th Street. The building is of reinforced concrete throughout and has five stories and a basement. The first floor is on the street level. The general shape of the office building is that of an L, which extends along Seventh Avenue for a distance of 105 ft. and along 147th Street for 136 ft. The basement will be taken up by storerooms and an instruction room for the car equipment department. The first and second floors will be used principally by the transportation department; the third will be occupied by the offices of the mechanical, electrical, and economy departments; the fourth, by the engineering department and statistical and test departments; the fifth, by the assistant general manager and his assistants. A large lecture room is provided on the first floor, which will be used for general instruction purposes, when it is necessary to assemble a considerable number of men.

The third addition to the general repair shop will be of steel and reinforced concrete construction. It will have a total width of 200 ft. and a length extending along 147th Street of 512 ft. There will be three bays. The first bay along 147th Street will be but 18 ft. high, as this part will not be provided with overhead traveling cranes, but instead will be served by an overhead telpher system with 4-ton telphers. This bay will be partitioned off for use as an air room, a machine shop and a department of electrical repairs.

The second and third bays will have a height of 45 ft. The front portion will be used as a general repair shop and the rear for truck repairs. Four tracks are to be provided in each bay with pits the entire length. The tracks will be laid with 15 ft. between centers and entrance will be from the storage yard at the Seventh Avenue end. When completed, the shop will be equipped with four 25-ton traveling cranes.

Sixteen 3-ton floor-controlled bridge cranes will be installed in the truck overhauling shop. In addition, an overhead telpher system will serve the truck shop at either end and connect with adjacent departments.

A small open transfer table will be provided along the east end of the truck and wheel shops. This will be used only for moving trucks and supplies for the wheel and truck shop and is not intended for shifting cars. The location of machines and equipment for the wheel and axle department, which is adjacent to the truck shop, has not been definitely decided, but wheel press and wheel lathe locations have been laid out and double-track connections perpendicular to the sides of the shop are being arranged to each machine. The telpher system, which is to serve this department, has been laid out so as to provide a continuous movement of material without interference.

One of the outstanding features of this shop design is the absence of transfer tables for the shifting of cars. This is accomplished by the use of ladder tracks at the Seventh Avenue end of the shop. Inside the shop the tracks are provided with pits, with the floor between pits constructed flush with the top of the rails. An accompanying drawing shows the construction.

The lighting circuits for the machine shop have been laid out in two ways to include both alternating and direct current circuits. There are alternating rows of 100-watt lamps with the wiring capacity arranged so that 200-watt lamps can be used if required. In addition, there are rows of direct-current, 40-watt side light clusters. The d.c. clusters will be spaced 16 ft. apart and the a.c. lamps will be located 14 ft. apart. The

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purpose of having the two systems of lighting is so that if one should fail the shops would not be in darkness.

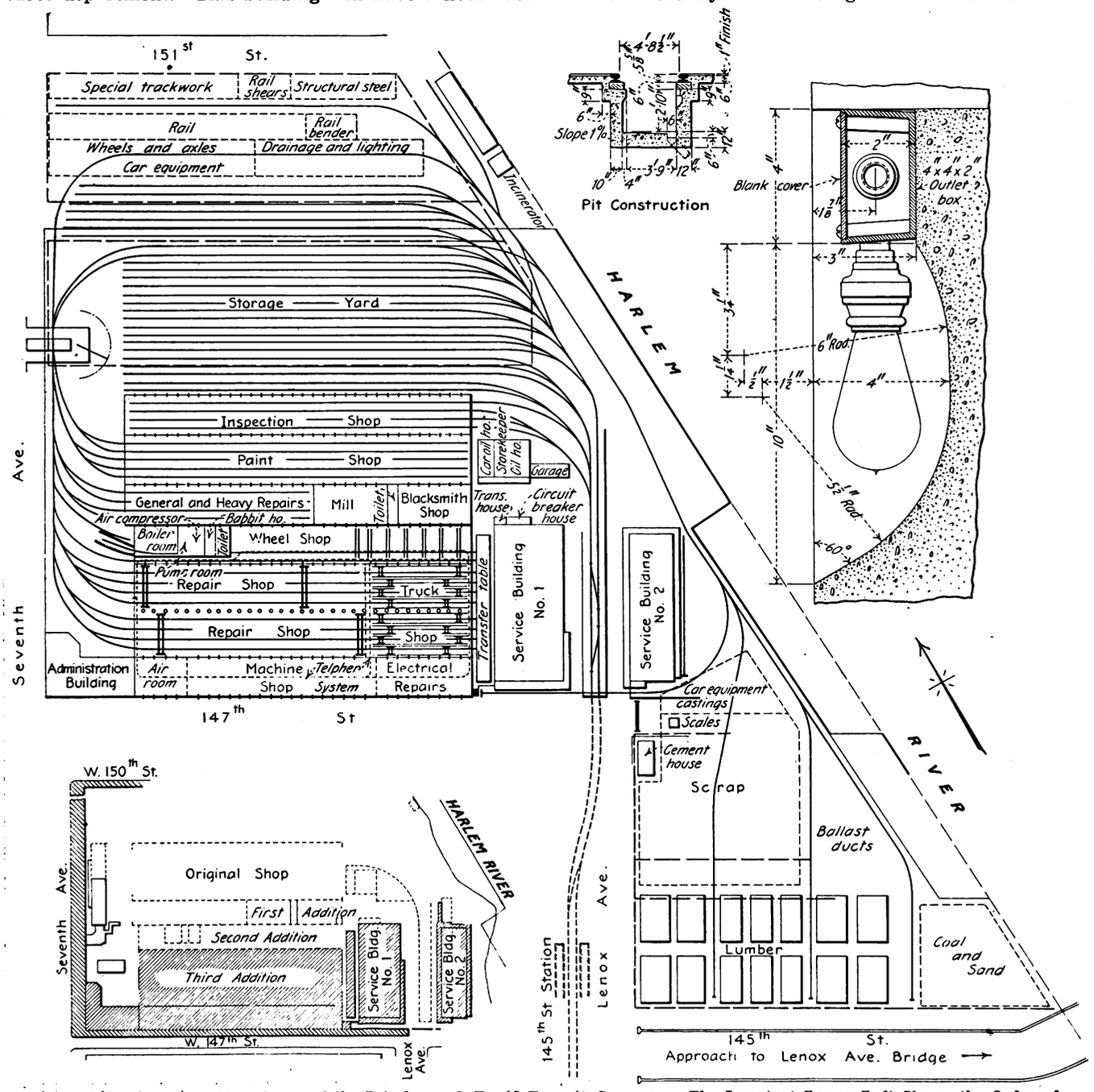
In addition to this general lighting, drop lights and hand lighting is provided at machine tools. The floor of the section, which will be used as a machine shop and department for electrical repairs, will be constructed of 2½-in. creosoted wood blocks.

Just east of the third section of the repair shop is a three-story building, which has been designated as Service Building No. 1. This will have a floor area of 235 x 106 ft. and will be used almost entirely by the stores department. The first floor will be taken up by a storeroom, a yardmaster's office and lunch, locker and washrooms. The second floor will be occupied by the stationery and lost property departments and the third floor will be used as a storeroom.

Another building, which is designated as Service Building No. 2, is essentially for the track and structures department. This building will have a floor area of 225 ft. x 66 ft. and will be two stories high. The first floor will contain a plumbing and tinsmith shop, a paint room, blacksmith shop and provision for the lighting department, track department and road engineers' offices. The second floor will have a carpenter shop and space for the signal department.

The foregoing details of building construction give a general idea of the extensive provision that is being made to take care of maintenance work for the subway division of the Interborough Rapid Transit Company. Considering the space for buildings and yards, this will be one of the largest electric railway shops in the world.

Preliminary tentative layouts of the tools and equipment for the enlarged shop have been made, but are not as yet ready for publication. The general arrangement, however, has been planned with the object of permitting the greatest possible economy of operation by a minimum movement of men and materials. A description of these layouts will be given in a future article.



General Layout of the New Shops of the Interborough Rapid Transit Company. The Insert at Lower Left Shows the Order of Construction. Upper Right, Pit Construction and Arrangements for Lighting

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Boston Patrons Leave 44,000 Articles a Year on Cars

RECENT figures issued by the Boston Elevated Railway show that through carelessness patrons on its cars leave approximately 44,000 articles a year in the cars, trains or stations of the company annually. Approximately 75 per cent of these articles are returned to the owners. The practice followed in the lost and found department of the company is as follows:

Articles are turned in to the carhouse or division headquarters by the men finding them, and unless of considerable value they are sent to the lost article department at headquarters. At the same time a report is made out in duplicate, one copy being retained at the division headquarters and the other copy accompanying the article to the lost article department. In the case of money, jewelry or other valuables, the article, after being held three days at the division, is forwarded directly from there to the treasurer's office. In the meantime a report of the find is sent to the lost and found department.

Every effort is made to locate the owner of the found article. If there is any mark or identification on it, this is followed up. The lost and found article clerk also examines each day the lost and found advertisements in the papers and checks them with the records of his department.

All articles found are classified after they reach the department into ten different classes as listed below:

Class 1. Valuable articles, such as money, pocketbooks, jewelry, mortgages, deeds, other valuable papers, etc.
Class. 2. Personal belongings, such as keys, eyeglasses, pipes, buckles, etc.
Class 3. Gloves and mittens.
Class 4. Umbrellas, parasols, canes, etc.
Class 5. Books, photographs, printed matter, etc.
Class 6. Clothing of all kinds.
Class 7. Bags, suitcases, lunch boxes, etc.
Class 8. Hardware and heavy articles, tools, etc.
Class 9. Food, perishable property, etc.
Class 10. Miscellaneous—anything not included in above or anything containing articles of two or more different classes.

A card index of these articles is arranged chronologically, which makes it possible for the clerk to ascertain readily if an article has been turned in.

Money, jewelry or other valuable articles are held for a period of six months, and if unclaimed during that period, are then returned to the finder. Other articles are held for a period of sixty days before the return to the finder if unclaimed.

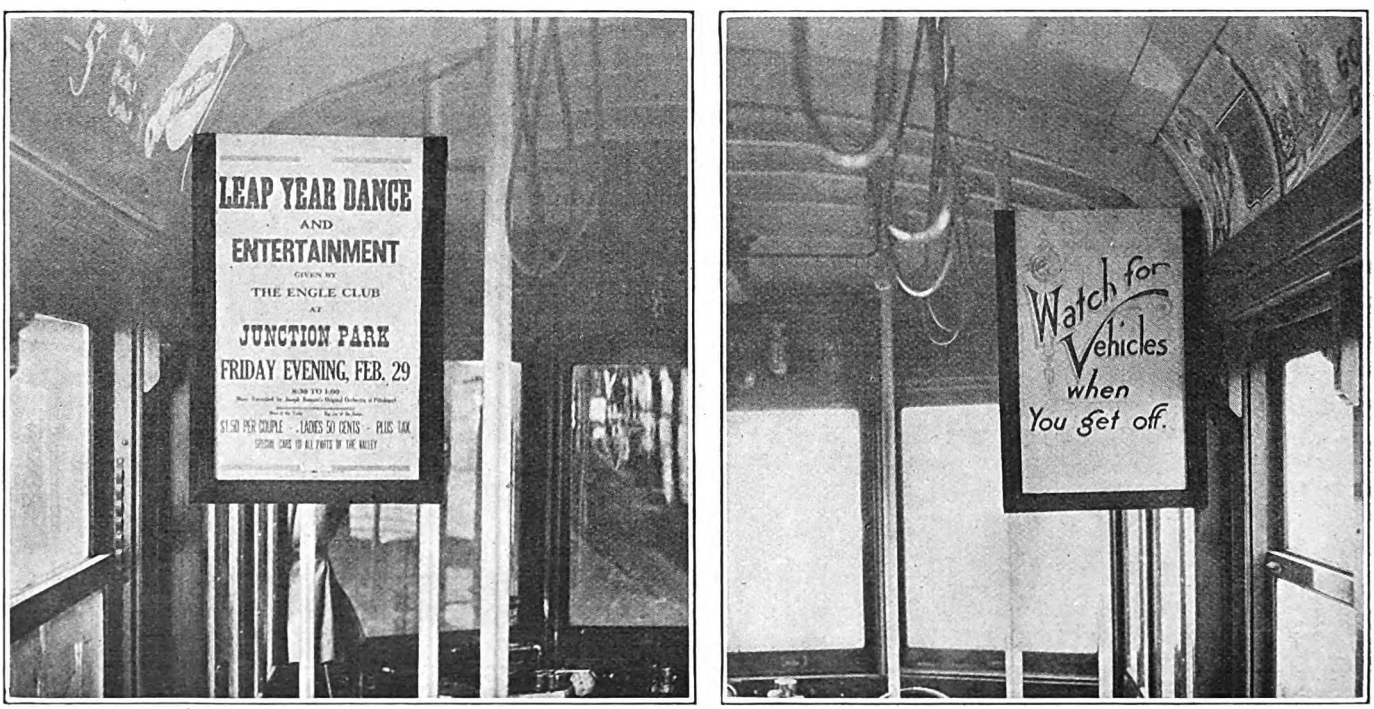
The company estimates that it costs about $1,800 a year for labor, printed matter and postage to maintain the lost and found department.

A Motto on the Background of the Signboard

ADVERTISING racks for company use have recently been placed in the new double-truck one-man cars of the Beaver Valley Traction Company, New Brighton, Pa. The only convenient location where these racks could be installed was between the stanchions and the door posts at the ends of the car, as shown in the accompanying illustrations. In this position the cards are visible from anywhere within the car. The racks carry various signs used for the promotion of traffic. Care is taken to see that not more than one card of a particular kind is carried in any car.

Since the routine of inserting these cards in racks sometimes is interrupted, and in order to avoid the careless appearance which would be presented by an empty rack, the railway hit upon the idea of having a motto permanently painted on the back side of the signboard. If the card is missing the passenger reads the motto.

Near the exit doorway the permanent sign or motto reads "Watch for vehicles when you get off." On the reverse side of this sign, where it will be seen by passengers boarding the car, has been painted "We thank you for your patronage."



Traffic Promotion Cards, as Shown Above, Are Carried in These Advertising Racks on the Beaver Valley Cars. If the Advertising Card Is Omitted a Motto Painted on the Background of the Signboard Appears. This Warning Sign Is Placed on the Board Near the Exit Door

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Engineers Report on Brooklyn Elevated

Ridgway-Swain-Klapp Committee Discusses Desirable Track and Equipment Standards in Its Report Just Finished on Brooklyn Elevated—Functions and Requirements of Guard Rails Considered at Length

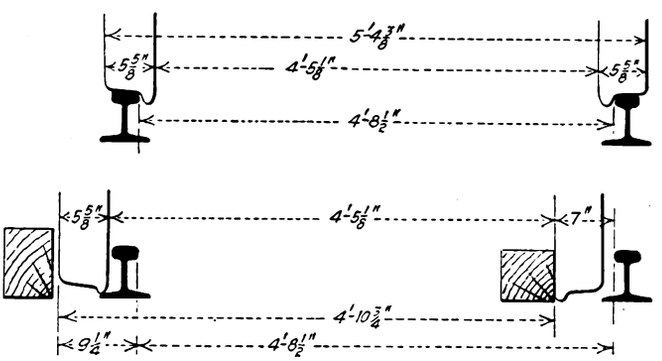
SOME suggestions on track and car maintenance, with comments on the condition of Brooklyn's elevated railway system, are contained in a report just made to the Board of Estimate and Apportionment, New York, by George F. Swain, Eugene Klapp and Robert Ridgway. These engineers represented respectively the Board of Estimate and Apportionment, the Brooklyn-Manhattan Transit Corporation, and the New York Transit Commission. This committee was appointed in July, 1923, after an accident on the Brooklyn elevated railways, in which both cars of a two-car train left the track, and the committee was instructed to report on "the present condition of the cars and road equipment in use on all of the elevated railroad lines in the city of New York." The present report relates to the lines of the Brooklyn-Manhattan Transit Corporation, which aggregate 46.861 miles in length. As many of the suggestions contained in the report are of application to other rapid transit lines, a brief summary of these general points will be given:

Guard Timbers and Ties

The standard elevated railway track construction of the company on tangent calls for longitudinal timbers outside and inside of each rail, known as "guard timbers," of a 6 in. x 6 in. section. The outside guard timber is placed with its inner edge 11 in. from the inner or gage line of the rail; that is to say, about 8½ in. from the outside of the head of the rail, while the inner guard timber is placed 6 in. in the clear from the gage line of the rail. These guard timbers are bolted to alternate ties, the inside guard timber being bolted to the ties to which the outside guard timber is not bolted. If a derailment occurs, the function of the guard rails is to guide the derailed trucks.

The inside guard rail can do this better than the outside guard rail, for two reasons. The first is that if an axle with its wheels is derailed, the wheel which comes in contact with the inside guard rail will have its flange running along that guard rail, while if the other wheel is being guided by the outside guard rail, the outside of the tread will be running along that guard rail. It will be much easier for the wheel running alongside the outer guard rail to climb over it than for the other wheel to climb over the inside guard rail. In the second place, if a derailed wheel is guided by the inside guard rail, it is being retarded, while the other wheel on the same axle, if not against the guard rail, is not retarded. The effect of retarding the wheel which is running against the inside guard rail is to twist the axle in such a way as to turn the wheel toward the rail from which it fell. On the other hand, if the other wheel were running against the outside guard rail, that wheel would be retarded, and the effect of this retardation would be to twist the axle in such a way as to turn the wheels from the rails from which they fell and to facilitate their climbing over the guard rails. To enable the inside guard rail most effectively to guide a derailed truck, it should be smoothed, round and even on the side toward the track rail, no matter how uneven it is on the other side.

If the guiding is to be done by the inside guard rail, the clear distance between it and the track rail should be at least as great as the thickness of a wheel, or 5⅜ in. To allow some clearance for joints, etc., the inside guard rail should be not less than 7 in. from the track gage line. If so placed, the outside of the opposite wheel, as shown in the engraving, will be 9¼ in. from the gage line of track, so that the outside guard rail must be spaced at least this distance away in order that the inside guard rail may guide the derailed wheels. In fact, wherever the inside guard rail is placed, the outside



Diagrams Showing the Action of Guard Timbers on Derailed Wheels

guard rail should be at least 4 ft. 10¾ in. distant, measured from the inside edge of the inside guard rail.

What then is the function of the outside guard rail? It is twofold. One function is as a precaution in case the inside guard rail should fail. The outside guard rail also holds the ties at the proper spaces and prevents their becoming bunched. The inside guard rail, however, is more important, and as its inner surface should present a smooth continuous surface to guide a wheel running along the ties, it is better to use steel rails as inside guard rails rather than timbers. These inside guard rails may be used rails and should be spiked and otherwise securely fastened to every tie, and placed at such a distance from the track rail that a wheel can roll freely between the two and will be guided by the steel rail before the other wheel on the opposite side of the same axle touches the outside guard timber.

There are other advantages of steel inside guard rails over wooden rails. The maintenance should be less, and they can be used, if desired, as an additional return circuit. Again, as the company substitutes new running rail for worn rail, the latter can be moved inward and used as a guard rail. At the approach to curves the committee recommends a change from this inside guard rail, 7 in. from the track rail, to the usual form of check rail, bolted to the inside running rail. At its outer ends this check rail should be curved outward toward the center of the track and an inclined casting placed be-

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tween it and the track rail. This will provide a sort of rerailer to replace a derailed wheel on the track.

Ties may be renewed in two ways. According to the first method, if any single tie needs renewal, it alone is replaced. This method is suitable on steam roads, because the roadbed is elastic and each tie can be tamped to bring its top to the proper level. With the method of complete renewals all ties in a considerable length of track are renewed, though some of these ties may have some service life remaining. In general, this method is better for elevated railroads than the first method. On such lines if a single tie of a standard dimension is put in to replace a decayed one, it will seldom exactly conform to the level of the adjoining ties, and being new and sound, it will be more rigid than the adjoining ones under the application of the load. This means that it will lead to undue wear or deformation of the rails and fastenings, especially if the new tie is a joint tie, where the adjoining tie and others near it are poor.

Where this method is used, some of the good ties removed may be used again in other places, as in yards or footwalks, or where the track is on the ground.

The rigid enforcement of one system of repairs to the exclusion of all others is not advocated in the report. There may be many cases of split ties, burnt ties, or prematurely rotten ties, which it would be advisable to take out and replace during the fifteen or sixteen years of life fairly assignable to any considerable stretch of ties.

Car Equipment and Repair

The company's rolling stock consists of 648 wooden motor cars, 259 wooden trail cars and 900 steel motor cars. The present report covers only the wooden cars, and the condition of the steel cars will be considered later. The report is based on an inspection of 10 per cent of the wooden cars, which were taken as typical of all.

The company's rules require that each car shall have a general overhauling once in fifteen months. At such times the trucks are removed from the cars and the motors from the trucks, and all parts of the body and truck are thoroughly cleaned, tested and put in good repair. Each motor car has a regular periodical inspection after 1,000 miles and every trail car after 1,400 miles, with an allowance of 150 miles above and below the specified mileage in each case. If this mileage is not made, the cars are arbitrarily ordered in for inspection, every sixteen days for the motor cars and thirty days for the trail cars. When a condition is found that is considered dangerous, the cars are ordered to be kept out of service until repairs are made.

The shop facilities of the company have not kept pace with its needs. This is shown in the accompanying table:

TABLE SHOWING INCREASE IN SHOPS AND ROLLING STOCK

Length in linear feet of:	1907	1923	Increase Per Cent
Passenger cars	45,190	104,892	132
Track in inspection sheds	6,122	8,192	34
Track in repair shops	3,864	4,344	12
Track in total shop facilities	9,986	12,536	26

The company could well consider the matter of offering bonuses to employees who discover defects in any important part of the equipment.

Throughout the report the committee makes certain recommendations of a general nature or specifically in regard to portions of the system.

Under track the committee specifies a number of places at which renewals of rails, ties, guard timbers, etc., should be made. It says that all of the company's track and decking is safe at present, but if not sufficiently maintained some parts will become unsafe. As regards the structures, it says that many of them, having been constructed a number of years ago, involve details which would not be considered good design now. Reinforcement is considered desirable in view of present stresses. Attention should especially be given to the protection of the column bases and to painting the structure. The recommendation for the rolling stock includes the grounding of the frames of all electric heaters, the interconnection of the dead man's button with the brake system to stop a train, a change from clear glass to an opaque material in the side window in the motorman's cab to prevent his attention being diverted by passing objects, more rigid inspection and a hastening of the construction of the proposed Coney Island repair shop.

Report of City Committee

The report of this committee of engineers was transmitted to the Board of Estimate by a committee of city engineers, made up of J. H. Delaney, G. P. Nicholson and A. S. Tuttle, making some additional recommendations. This report declares that a large amount of reconstruction will be required to the structure before it can be used for the operation of steel cars. A number of changes in the equipment were also recommended.

Cash Register Issues Tickets

A NEW ticket-issuing cash register recently adopted by the Milwaukee Electric Railway & Light Company effects a considerable saving in labor. At the end of the day it gives the amount of sales for the day by companies and by ticket agents as well as the grand total of sales. It shows the number of tickets sold, the number of half fares, the number of full fares and much other accounting information. Moreover, it prints the tickets themselves. This machine is similar to the type used by the Chicago, North Shore & Milwaukee Railroad, use of which was described in ELECTRIC RAILWAY JOURNAL of Nov. 11, 1922, page 773.

Because of the large number of stations to which tickets are sold on the Milwaukee company lines it was found necessary to substitute key numbers for names of stations on the tickets which the machine prints. The ticket shows the date of sale, the serial number, the destination as indicated by a key number and the amount paid. The ticket is perforated at the top and when the conductor collects it and issues a receipt he tears off the upper part and uses that as a hat check. The lower or larger part is canceled by the conductor and turned in to the accounting department of the company.

Company Tells Where to Spend Week-End

AS A feature of the regular publicity material of the Underground Electric Railways of London, England, mimeographed sheets are furnished the press giving the locations where various events taking place over the week-end will occur, and the best routes on the company lines for reaching them. For special events, such as the annual boat race, similar information is furnished.

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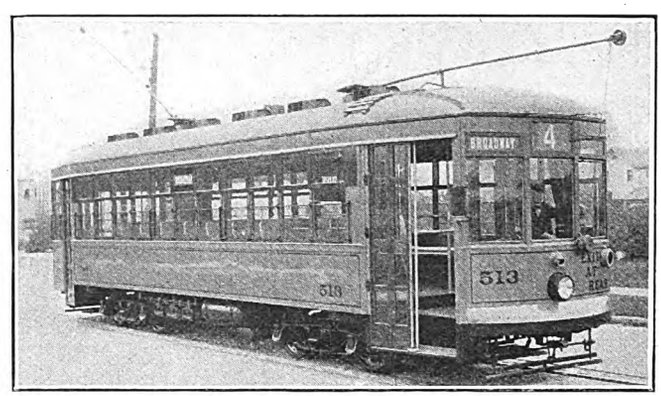
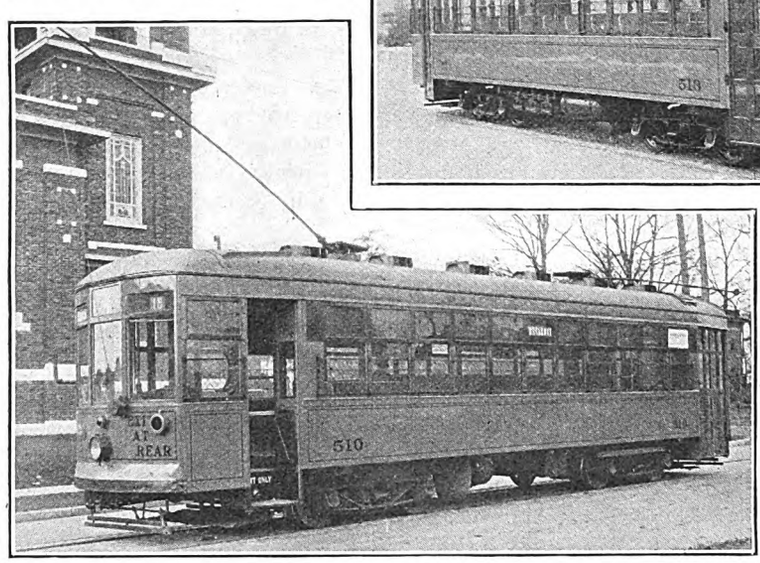
Rear Exit Expedites Passenger Movement

One-Man, Double-Truck, Light-Weight Cars for Fort Wayne Have Rear Exit and Inclosed Steps—Body Construction of New Cars Similar to Earlier Single-Truck Cars, Which Will Be Rebuilt with Rear Exit

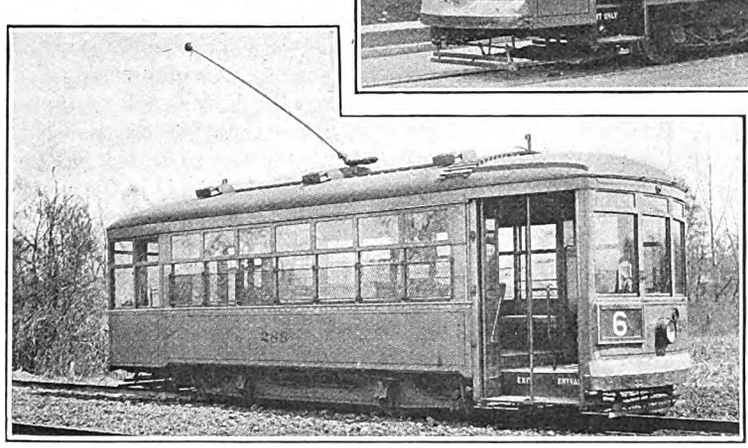
SPECIAL attention was given to operating requirements in the design of the new double-truck, one-man cars built by the St. Louis Car Company and recently placed in service in Fort Wayne by the Indiana Service Corporation. A rear exit door, controlled and supervised by the operator, has improved passenger movement within the car and has decreased the time of passenger interchange. This rear exit became necessary when the company increased the size of the equipment from a 32-passenger single-truck car to a 44-passenger double-truck car. Even on the smaller cars congestion at the forward end greatly interfered with the movement of passengers. With the larger cars this congestion would have been more pronounced, therefore a rear exit door was installed in order to induce the passengers to go back to the rear of the car. The cars have proved so satisfactory that fifteen more have been ordered. Furthermore, the earlier equipment, consisting of 65 single-truck cars, will be rebuilt to include the rear exit.



Above—New Double-Truck, One-Man Cars with Rear Exit for Fort Wayne City Service. These Are Attractively Painted in Canary Yellow



At Right—The Rear Exit Door Is Controlled from the Front End. The Operator Supervises the Rear Step Through Mirrors, and the Rear Step Is Illuminated by a Bank of Lamps in the Riser



Type of Single-Truck Car Used Heretofore in Fort Wayne Which Will Be Rebuilt to Include a Rear Exit and Other Improvements as Installed on the New Equipment

In general appearance the new double-truck cars are similar to the single-truck cars. They have arch roofs, straight sides, inclosed steps and 26-in. wheels. An effort was made to have the structural details of the two cars as nearly identical as possible. Platforms, body and roof construction are the same with minor exceptions caused by the difference in lengths of the two bodies. This similarity in construction was prompted by a desire to standardize the maintenance and repair work on the rolling stock.

The car is operated by one man, which is standard practice in Fort Wayne, and is double-end equipped. Air-operated folding doors inclose the steps at front and rear. The double doors at the front may be opened individually or simultaneously. The rear door mechanism is interlocked with the controller circuit in such a manner that it is impossible to start the car with this door open. The forward doors are not interlocked with either the controller circuit or air brake apparatus.

The car is mounted on St. Louis arch bar trucks with 26-in. wheels. Four G.E. 264-A motors are inside hung on the trucks and are controlled by K-35 double-end control. The underframe is made up of 3-in. x 3-in. x $\frac{5}{16}$-in. angle side sills with 3-in. 6-lb. channel cross sills. The side sills extend from body corner post to body corner post, where they are bent to form the end sills, and are spliced at the center of the car. Cast-steel platform knees are fastened to the end and side sills and are designed to allow room for the lower step within the platform area. Additional support is given to the platforms by two sills which extend from the end sills to the bumper channel. The double flooring of $\frac{11}{16}$-in. maple laid on $\frac{3}{8}$-in. yellow pine is fastened to furring attached to the cross sills.

The side posts are of $1\frac{1}{2}$-in. x $1\frac{1}{2}$-in. x $\frac{5}{16}$-in. tees and extend from the side sill angle to the side plate and letter board. These are spaced at 2-ft. $4\frac{1}{2}$-in. centers and are riveted to the side sheet, belt rail and letter board. The inside of the posts is furred to

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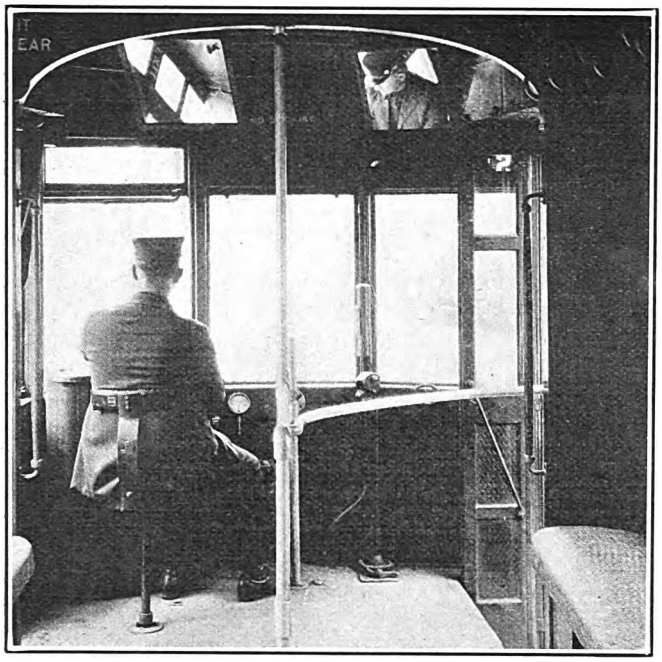


Mirrors Mounted on Each Vestibule Ceiling Provide a Means of Supervising Rear Exit. Double-End Operation Requires Two Sets of Mirrors

The operator, looking into the mirror at his right, sees the rear exit as reflected by the mirror above the rear step.

hold the truss plank, side lining, inside trim and sash and curtain guides.

Carlines of 1½-in. x ⅜-in. steel mounted on edge are bolted to the side plate at each side post. A ⅞-in. poplar roof covered with canvas extends over each vestibule. The car weighs 31,000 lb.

Attractiveness has been attained by streamlines and the use of rich canary yellow paint striped in black. Numbers on the sides and dash and a sign on the dash indicating that the car has a rear exit are the only lettering on the exterior. Eleven windows have been provided on each side of the car body. The lower sash are brass and arranged to raise; the upper sash are of wood and all eleven are framed in one piece. With the narrow side posts and the brass sash, the obstruction to vision has been reduced to a minimum. Window guards, in three sections of 2-in. wire mesh screening, cover the lower sash. The vestibule windows have brass sash. The upper sash in the center and right hand windows of the vestibule contain a route number and destination sign, respectively. On each dash is mounted a headlight, marker light, trolley retriever and "Oskelite" stop light. This latter is mounted to be just below the belt rail under the right window on the rear end.

Two trolley poles and 12 Garland exhaust type ventilators are mounted on the roof.

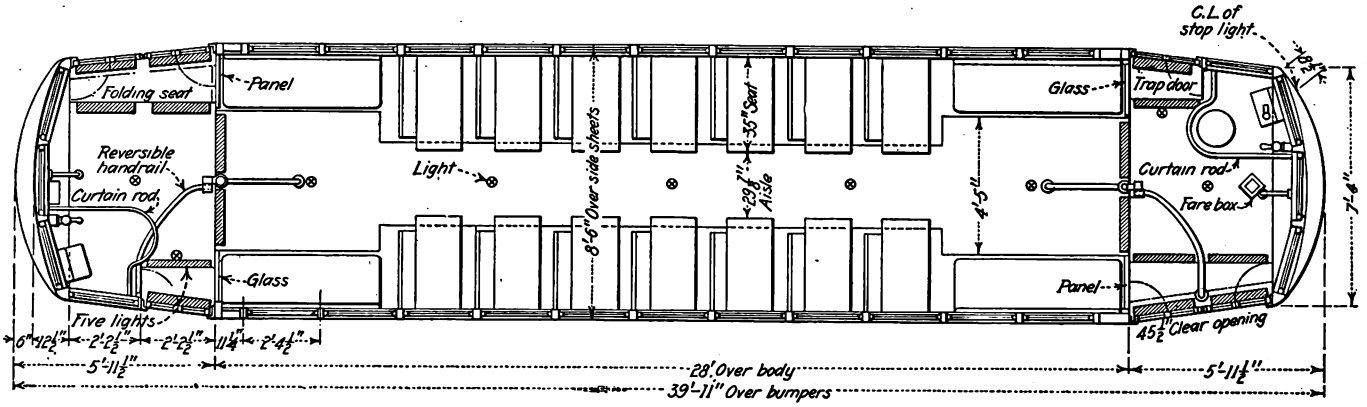
Double folding doors serve as an entrance and exit on the front platform, while a single folding door, adjacent to the body corner post, is used as an exit at the rear. These doors are pneumatically operated by National Pneumatic door engines. Control of the two engines for the forward doors is mechanical. The rear door is controlled by an air valve at the operating or front end of the car. This latter control is interlocked with the motor control circuit. Additional safety is given by an indication lamp at the operating end of the car, which indicates the position of the rear door.

All steps are within the platform area. The step wells are closed by trapdoors when the steps are not to be used. These trapdoors fold back and are fastened to the vestibule side of the bulkhead. Step heights from top of rail to car floor are 14 in., 13 in. and 6 in., giving the floor of the car an elevation of 33 in.

Aluminum stanchions divide the wide step at the forward end of the car and the opening between the vestibule and car body into an entrance and an exit passageway. A curved movable railing connects these two stanchions. At the rear door post is a fixture to receive one end of this railing. In the first position the railing acts as a guide to passengers entering and leaving at the forward end. In the second position it serves as a guide to the rear exit door and also acts as a guard to the rear exit step well. One of these railings is provided at each end of the car and is changed about when the operator changes ends. In addition, a permanent double railing extends from the body stanchion down the center of the car for a distance of 30 in.

Light finish is used throughout the interior of the car body. The white maple floor, rattan seats, birch finished trim and bulkheads and a white enamel headlining give the car a clean, cheerful appearance. Fourteen Hale & Kilburn reversible cross seats and four longitudinal seats give the body a seating capacity of 44. The cross seats have spring cushions and backs and are spaced seven on each side of the car on 2-ft. 4½-in. centers. At each corner of the car body is a longitudinal seat extending along the two end windows. The back of this seat is brought up to the bottom of the window capping. Two brass window guards cover the lower sash of these two windows and serve as a continuation of the seat back. Additional seating facilities are provided on the platform by folding seats which extend along the combined entrance and exit doors. These are hinged to the bulkhead and fold up out of the way when the doors are in use.

Thermostatically controlled electric heat is furnished by a heater under each seat and one on each platform.



Floor Plan of the New Fort Wayne Double-Truck Cars, Showing Seating Arrangement and Platform Equipment

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Those in the body are of the cross-seat type, suspended from the seats. A deflector pan is placed just above each heater to prevent the warm air from being pocketed under the seat. The thermostat is placed at the center of the car on a side post just below the advertising rack.

The side lining from the truss plank to the belt rail and the headlining are of ¼-in. Agasote. The ceiling closely follows the curvature of the low-arched roof and extends from curtain roller to curtain roller between the bulkheads. The usual advertising racks occupy a portion of the ceiling. The headlining contains the registers for controlling the ventilators, four "Rico" hand straps over each longitudinal seat and five shaded lamps. These are 100-watt lamps with clear glass, holophane shades and are spaced over the aisle. A panel effect has been given to the headlining by the birch cross strips which hold the Agasote in position and by decorating each section.

Each platform has the usual control apparatus and air-brake piping with valve. The three door control levers are mounted on a shaft, one above the other, in such a manner as to be convenient for individual or simultaneous operation. A Cleveland fare box is mounted on a stanchion close to the operator's position at the left forward corner.

In order that the operator may see the rear exit door and step from his seated position, mirrors are mounted in each vestibule. These are 15-in.x15-in. plate glass wood-framed mirrors placed overhead on strap-iron framework fastened to vestibule carlines. One mirror is located above the double step at the forward end of the car, and the other is located above the rear exit. These are set at the proper angle so that the operator in looking to his right into the forward mirror sees the rear step and car aisle as reflected by the mirror at the rear. Thus he gets a clear view of the rear exit even though the car is crowded. Also, a window placed in the left side of the bulkhead allows the operator a direct view of the rear exit if he should so desire.

As an aid to the operator and the passenger, a bank of five lamps has been placed behind clear wired glass in the exit step riser. The lights are controlled by the door-operating mechanism and illuminate the step and adjacent pavement when the door is open.

To call the passenger's attention to the rear exit door a sign has been mounted on the inside of each bulkhead over the aisle. These signs read "Exit at Rear." They are of green glass and are illuminated from behind by two lights which are connected in series with the "Oskelite" stop light on the rear. This circuit is controlled by the power controller. When the power to the motors is cut off the stop light and these signs are illuminated.

Converting the 65 single-truck, double-door cars into the same type of car as the new double-truck cars was simplified because of the same platform size and construction. The single door and step is placed at the rear without changing any of the structural features of the car. The panel was removed and a drop-framed step angle fastened to the end sill and platform knee. The most important change was made in the location of the control circuit conduits. These formerly followed the side sill from the center of the car to the dash. Now they are located about 1 ft. inside the sill in order to clear the step. All of the signs and lamps described as part of the double-door equipment have been made standard for the property and placed in the rebuilt small car as well as in the new double-truck cars.

The Readers' Forum

How One Small Road Gets By

April 16, 1924.

To the Editors:

Being the operator of a small road, I was particularly interested in the article published in the issue of the ELECTRIC RAILWAY JOURNAL for Feb. 23 entitled "Saving the Small Road." Even Mr. Crawford's property is about four times as large as the one with which I am connected, so naturally I have been forced to adopt different methods to keep the wheels turning. At the risk of appearing ridiculous I will mention a few of them.

This property is in a Southern agricultural town of about 20,000 people, more than half of them black. Our problem, however, is not with the black people, as they are better car riders than the whites. The real problem is with the generous automobile owners, who in several cases that have come to my notice are always willing to furnish free transportation to any acquaintance, be it ever so slight.

We operate about 8 miles of track originally laid with 45-lb. T-rail on long-leaf heart pine ties spaced on 2-ft. centers. Quite a little of this has been relaid and paved too. But paved streets in a small town are only speedways for the automobile owner, and, as such, work a hardship on the small car line, when it must pay for the very thing that cuts its throat. Part of our track in paved streets is laid on Carnegie steel ties and part of it is laid on ties made of old T-rail cut and drilled to bolt to the track rails. We find that they make very good ties, the bottom bearing surface being larger than some steel ties on the market today.

Naturally we cannot buy the latest thing in cars or equipment and must furnish service with motors, trucks, etc., of rather ancient vintage. Frequently the writer has heard the old Westinghouse 12-A maligned by the more up-to-date operator, who really did not know what a good motor it was, unless he had been placed in our position of having to make it do anyhow.

Armature bearings on every car are inspected once a week. Axle bearings are replaced as needed. Owing to the sandy top soil in a large part of the town, and with old style motors, whose axle bearings are not protected from dust and mud, it is very hard to prevent excessive wear. We have no wheel grinder, but the writer has rigged up one that does very good work, so that we grind out all small flats as soon as we find them.

This being a one-man road, the writer is general factotum, doing anything that is necessary, including winding armatures, machine work, office work, and looking after the whole property generally. We only have two and one-half men employed for every car we run, including car operators, shop force, track force, supervision and all others connected with the road, even the attendant for the converter station. The substation man only works half of each day, being able to find enough odd jobs around town to take up the rest of his time.

This is one of the very few roads in the country that are enabled to make a few extra dollars by handling the baggage, scenery, etc., for theatrical people to and

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from the theater. Another item of revenue is handling the material needed in paving the streets used by the street cars. We have physical connections with all the steam roads entering the city and are enabled to get quite a little business this way. For instance, a large hospital was built at the end of one of our lines. We hauled over our track in the steam road cars all the material used in the building, amounting to 125 carloads.

Some of the curves on this line were of 65-ft. radius. In handling these cars, which the writer did himself, it was found that only three of the steam road cars would not take the curves on this line. Frequently we found the steam road cars down on the side bearings, so that before we could attempt to move them we would have to jack them up and shim the center bearing up to clear the side bearings. We have had very few derailments with this heavy equipment, but find careful inspection is the answer to that problem.

We have one car that does nothing but meet trains. Owing to favorable train schedules we are enabled to meet every train that arrives in the city. There are fourteen passenger trains arriving and fourteen departing every day. After 8 p.m. this one car charges 10 cents for this service. It is readily appreciated by the traveling public.

We are careful to keep our aims before the public, using our own cars, picture-show screens and newspaper space to do this.

We find that a street railway must depend on only one thing for its existence in a community, and that is service. Serve the public and impress on them that your cars are on time all the time and they will ride with you, unless there are too many free automobiles to contend with. But don't attempt to fight the automobile owner—just keep your own affairs in shape and your car wheels turning all the time.

SUPERINTENDENT.

Association News & Discussions

Service as the Basis of Public Relations

Railway Men of Southwestern Public Service Association at Fourth Annual Convention Discuss Methods of Securing Public Good Will—Way Matters, Shop Practice, and Accounting Were the Subjects of Separate Meetings

THE importance of giving good service and advertising it, as seen from the viewpoint of the transportation, mechanical and publicity departments, was strongly emphasized at the sessions of the street and interurban railway section of the Southwestern Public Service Association during the joint convention with the Southwestern division of the N. E. L. A. at New Orleans, La., April 22-25.

The keynote on the subject of service was struck at the meeting on Wednesday afternoon by A. B. Paterson, vice-president New Orleans Public Service, Inc., who spoke on the importance of careful selection and training of trainmen, and of keeping up the physical condition of the railway because of the bearing of these things on public relations.

The education and development of employees so that they have a thorough understanding of the railway business was urged by W. E. Wood, manager Houston Electric Company. The public has a right to know the facts concerning any utility company, according to Mr. Wood, and the employees certainly have an equal right to this information. They must understand what the company is trying to do and the methods that are being followed to accomplish the desired end. They are then in a position not only to do their own work better but also to inform the public as to how the company is working to give good service. Regular monthly conferences are the means used by the Houston Electric Company to bring the officials and employees together for the purpose of furthering this work.

Ways of telling the public about the efforts of the railway to give good service were discussed at a joint meeting of the public relations and transportation sections on Thursday afternoon. C. J. Crampton, Dallas Railway, told how that company had popularized the slogan "Ride the street car and save the difference." Five media are used for advertising. In newspaper advertisements a full page once in a while has been found to be more effective than smaller space used more frequently. An effort is made to place the railway advertising on days when other advertisements are comparatively scarce. That gives it more prominence and also gratifies the newspapers. Interior bulkhead cards, dash signs and dodgers in the cars are used. It is the practice of the Dallas Railway to change the bulkhead card at one end of the car one week and at the other end the next week, thus leaving each card in the rack for two weeks.

Billboard advertising, although not widely used by electric railways, is thought by Mr. Crampton to be very valuable. It is especially worth while in connection with track construction work to tell the public how much the job is costing, etc. Miscellaneous advertising in theater programs, booklets and the like is used somewhat at Dallas. The most important medium, however, is the personal touch contributed by the employees of the railway in their contact with the public.

In the discussion that followed, Mr. Grant, Houston Electric Company, brought out the point that service must be the basis of good public relations. W. H. Sawyer, president East St. Louis & Suburban Railway, explained the methods which he had followed to secure newspaper co-operation. An important point in the advertising policy of this railway is the display on a bulletin board in the carhouse of every advertisement published in the newspapers. This shows the men what the company is trying to do and encourages them to do it.

The Dallas Railway always sends full reports of accidents to the newspapers, Mr. Crampton said during the discussion. W. E. Wood outlined the participation of the Houston Electric Company in all civic affairs and spoke of the success that had attended the efforts of the company to swing public opinion to a more favorable position.

Good service as the master mechanic sees it, was the subject of a paper presented on Friday morning by R. M. O'Brien, superintendent of equipment New Orleans Public Service, Inc. He told something of the routine and inspection and repair methods followed by the mechanical department which have helped in reducing the number of car pull-ins in the last 3½ years from one per 1,380 miles to one per 217,728 miles in March, 1924. This will be given fuller treatment in an article prepared for an early issue of this paper. At the same meeting an address on the relation of bus operation to street railways and the outlook for the future, which was prepared by W. B. Tuttle, was read by J. P. Griffin, vice-president Texas Electric Railway, on account of the illness of Mr. Tuttle. This appears elsewhere. L. C. Singleton, claim agent

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Eastern Texas Electric Company, read a discussion on accident prevention that had been prepared by W. A. Robertson, superintendent of railways, who was unable to be present.

At separate sessions on Thursday afternoon the mechanical, maintenance of way, and accounting divisions discussed their special problems. A discussion on the use of electric and acetylene welding in shops was led by Walter Silvus, superintendent of equipment Texas Electric Railway, Dallas. J. T. Porter, master mechanic Northern Texas Traction Company, Fort Worth, led a discussion on shop organization and maintenance practice. F. J. Bennett, master mechanic Houston Electric Company, led a discussion on the wear of carbon brushes in ventilated motors.

R. J. Tabor, Northern Texas Traction Company, Fort Worth, led a discussion on the cost of various types of paving. He said that from 7 to 10 per cent of the six billion dollar investment in electric railway properties is in paving. He pointed to this as a reason why this item of the railway plant should receive more study and attention. It is time for the industry to combine its efforts to correct some of the sad experience that has resulted from use of paving unsuited for the conditions and because too many railway engineers are ready to accept the specifications of the city engineer. He emphasized the fact that paving should be designed primarily to carry vehicular traffic.

He pointed out also that 45 companies have been granted relief from paving burdens in recent franchises and predicted that this policy will eventually spread over the entire country; but even if it does, the railway engineer will still have great responsibility in seeing to it that a proper design of paving is installed, not only as a protection to the railway, but as a matter of civic betterment. He said that his company had recently gone to the use of concrete paving as the best practice.

R. B. Fehr, Rail Welding & Bonding Company, Cleveland, presented a paper of seam welded joints which will be treated in a later issue. Creosoting and other methods of preserving ties and poles was discussed by J. P. Logan, National Lumber & Creosoting Company. Cast steel and alloy steel vs. manganese for special trackwork was treated by E. B. Entwisle, Lorain Steel Company, and James H. Budd, Bethlehem Steel Company. Mr. Budd's paper appears elsewhere in this issue and that by Mr. Entwisle will be covered in a later issue. B. H. Taylor, Houston Electric company, led a discussion on the foundation and paving of crossings.

At a meeting of the accountants, R. E. Loup, Northern Texas Traction Company, Fort Worth, discussed the use of machines in accounting work. A. D. Dufour, New Orleans Public Service, Inc., discussed the subject of transportation department payroll accounting.

Obtaining Car Mileage

The methods used by the Dallas Railway in obtaining and recording car mileage were described by N. R. Burns, assistant secretary-treasurer of the company. The principal features of the system are as follows:

(1) The mileage on each schedule, by runs, is determined before the schedule becomes effective; (2) each conductor or operator is furnished a set of mileage cards to enable him properly to prepare his trip sheet; (3) space is provided on the trip sheet for showing mileage by trips, and the total for the run; (4) the actual mileage operated is reconciled with the schedule mileage; (5) by the use of a series of forms the mileage of each car and the total mileage on each line are recorded daily.

Sheets which show the passenger car mileage scheduled for each line each day are provided for (1) Sunday (2) Saturday and (3) other week days. The mileage sheets are prepared by the traffic department and checked by the accounting department before the schedule is put into effect. Copies are posted at the carhouses so that each conductor may know before going out on his run the amount of mileage in the run provided it is operated completely.

Each conductor is furnished with mileage cards which show the distances between various switches, turnouts, termini and other points on the line where a car might turn back. Blank spaces are provided on the trip sheet for showing "schedule miles" and "miles operated." As the conductor completes his trips he fills these from information on the mileage cards. At the end of his run he totals up the trip mileage. If the miles operated do not agree with the "schedule miles," the conductor explains the difference on the back of the trip sheet.

Early each morning the trip sheets for the day before are sent to the accounting department, where the mileage clerk adds the mileage shown on the trip sheets on each line, and checks it against the scheduled mileage, making allowance for variations from the schedule as reported by the conductors. The corrected mileage for each line is entered on a daily summary sheet, from which it later is transcribed to a monthly summary. A recapitulation of the monthly line totals gives the total passenger car-miles operated during the month.

The daily mileage of each car is transcribed from the various trip sheets to a form on which the numbers of all cars appear. This is forwarded to the office of the master mechanic, where the information is transcribed to individual mileage cards, which show the operations of each car for one year. From the information appearing on these cards, the master mechanic is able to maintain proper control of the inspection of the cars.

Non-revenue mileage, which includes service cars, "pull-ins," etc., is kept by the maintenance of way and mechanical departments. It is of relatively little importance, as it represents only about two-tenths of 1 per cent of the total mileage operated by the company's cars.

Among the papers presented at the general sessions were three by J. W. Welsh, W. H. Sawyer, and E. F. Wickwire, which appear elsewhere in this issue.

An attendance of more than 500 was recorded for the joint convention, about a third of whom were railway men. Among the social events were the annual reception and ball on Tuesday evening, complimentary to the associations by the supply men's division; a dinner-dance on Wednesday evening, and an "Old Plantation Night" at Spanish Fort on Thursday evening. A trip around the harbor was made on Friday afternoon. Card parties and luncheons for the ladies took place during the four days.

At the conclusion of the sessions of the railway section a vote of thanks was extended to the New Orleans Public Service, Inc., for its efforts in making the convention so successful. W. E. Wood, manager Houston Electric Company, was unanimously elected chairman of the street and interurban railway section for the coming year.

Training the Supervisory Force*

By W. W. Holden

Superintendent Transportation and Equipment San Antonio Public Service Company

STREET railway inspectors are up against a real man-sized job and in most instances are given very little instruction and assistance in handling it so as to get the best results. The inspectors are in so much more intimate contact with the trainmen that they can do more than any others of the supervisory forces toward improving the service that is given.

The manufacturers of power-saving devices started a new line of thought when they recommended a special inspector to follow up the power-saving work. Each street railway that has adopted some method of power saving has placed some one especially in charge, whose duties have been to compile data on power saving, to investigate methods by which power saving may be improved, to instruct the inspectors in these methods and to inform the inspectors as to which of the trainmen are especially in need of such instruction.

Following up this idea, the San Antonio Public Service Company has tried out the plan of having several other special inspectors to make similar studies of other phases of street railway operation.

While it is not new to street railway men to make a study of safety work, it is perhaps new to have one of the inspectors in charge of it. It is believed that an inspector who naturally is intimately acquainted with operating conditions is well prepared to study accidents and to lead in safety work. Whenever possible, the safety inspector visits the scene of each accident, measures up the marks on the pavement, the distance from the curb lines, and scratches on the automobile and street car. These are all reported to the claim department as well as the superintendent of transportation. In the

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case of derailments, the track, the car wheels and the marks of the derailment are all examined and the mechanical and track department given a copy of the report. A monthly analysis of the accidents is made and given the inspectors. A daily detailed report of accidents and an accident map showing the classification and location of accidents is kept posted for the inspectors and trainmen. About twice a week a cartoon on accident prevention is prepared and posted for trainmen and inspectors.

Instruction Is a Continuing Process

It is believed that no street car man knows all there is about running street cars and that none of the trainmen should pass entirely out of the jurisdiction of the chief instructor, although most of his work is that of instructing new men. Any man failing to put up his car properly or to cut out motors at the right time is referred to the chief instructor. He also investigates cases where a trainman requests a "pull-in." Frequently a "pull-in" request is made when the car is in good condition, but the trainman does not understand some apparent trouble. Also it frequently occurs that a car is in bad order, but the shop tests will not indicate the true condition. When this is properly explained to them by the chief instructor, necessary repairs can be made and further pull-ins for a misunderstood trouble prevented. His study has assisted the mechanical department in its campaign to reduce pull-ins.

One inspector has been assigned to the improvement of fare collection and accounting by conductors. He follows up trip sheet errors and turn-in errors made by the conductors and instructs them in the proper way to do this work. We stole a page from Mr. Plummer's book in Dallas and started a "Penny Man Bulletin" under the direction of the conductor inspector, who also has charge of the rest of the secret checking work.

One inspector has been assigned to the checking of delays. Where a car is late enough to turn back or the line gets a setback it is reported by the dispatcher. The delay inspector follows these up. Where one man or one trip is frequently the cause of delays, the delay inspector tries to get at the cause and to take the necessary steps for correction. He also checks watches to see if all men have provided themselves with suitable watches.

The chief inspector has charge of the road inspectors, and they are divided into three teams. Two teams have charge of the inspection on one-half of the lines each and the third team is used as reserve and for general inspection. The chief inspector instructs the road inspectors as to the proper method of handling cases of delay.

At each of the weekly inspectors' meetings one man presents a paper on some subject regarding street car operation. The idea back of this plan is to have the inspectors instruct each other, and by having specialists in certain lines they become better qualified to instruct along the lines on which they have specialized. Part of the work of specializing includes trips to other cities to study their methods and to broaden the viewpoints of the inspectors.

A lot of statistics could be produced to show the results of this method of arranging inspectors' work, but I will only say that the results have been unbelievably good. Delays were reduced from 1,228 in March, 1923, to 823 in March, 1924. We feel sure that we have only started to reap the benefits of this specialization and expect to show some real results after it has been in operation for a year or so more.

Why Car Fares Differ*

By James W. Welsh
Executive Secretary American Electric Railway Association, New York

WHY does Boston have a 10-cent fare, Cincinnati a 9-cent fare, Washington an 8-cent fare, New Orleans a 7-cent fare, Minneapolis and St. Paul a 6-cent fare and Los Angeles still the original 5-cent fare? With this range in fares you are all familiar, but these are only a few of the actual differences that exist. There are 650 cities and towns in the United States in which electric railways operate. Conditions differ in all of them, and it is the purpose of this discussion to show you why in each there is a different rate for service.

Comparisons of city street car fares are frequently made, especially by politicians who seek to discredit the rate in one locality by quoting a lower rate elsewhere. The fact that some other city has a lower fare is put forth as conclusive proof that the local fare is too high. Not that there is any serious contention that street car fares ought to be equal in all cities, but that in the city of so and so the company is making money on a 5-cent fare. Why should the people of the local city be inflicted with a higher fare? Now you see this argument very cleverly assumes that a car ride is the same, whether in Kalamazoo or New York City. To the average person who has troubles of his own, without bothering about the street car company's problems, this looks plausible enough. To you electric railway officials and public utility experts, just to state such a proposition is to indicate its absurdity. You know that not only is there a wide variation in the cost of what the company has to buy in producing a car ride, but that there is even a greater divergence in what the company offers in the form of a car ride, i.e., the service furnished, which varies both in quantity and quality, reflecting the utmost difference in local conditions.

Now while the man on the street may vaguely realize, if he stops to think about the matter at all, that costs of labor and material vary somewhat in different places, this is about the extent of his knowledge, and it doesn't begin to explain to him the existing great variations in fares.

Railway Men Speak an Unknown Language

You gentlemen who are running this business know what are the elements in the cost of a car ride. You think of wages and working conditions; maintenance and depreciation; cost of power, materials and supplies; taxes and other imposts. These things have a familiar sound and to you convey some idea of the significant factors that vitally affect fares. This is an unknown language, however, to the average car rider. He just simply doesn't know the meaning of such terms as car-miles, load factor, headways, peak loads, riding habit. Now if these things are essential to an understanding of why car fares are not the same, how are you going to explain them? Some may ask "Why explain anything? We have no agitation about fares; why stir the matter up?" Experience has demonstrated that sooner or later, and more or less frequently, every company will have to defend its fare schedules before the public. When it does it will find opposition or intelligent consideration in proportion to the degree of understanding that exists as to its problems.

The ascertainment of a just rate of fare is such a technical matter that it cannot be done quickly, even by experts. The public rarely understands the matter, and there is always the danger that it will think the company is trying to put something over. A receptive attitude of mind on the part of the people is much more likely to exist if there has been adequate preparation.

In Cleveland when the service-at-cost franchise was being considered in 1910 every man, woman and child became an interested student of the street car problem; they attended mass meetings and heard the questions explained almost nightly, and the papers were full of the story continually.

Not only is it an advantage to keep before the public the facts about local fares from a favorable viewpoint, but the simplest possible language should be used in explaining them. The more elementary the form in which this is put the greater are the chances of its being understood by the average car rider. I have endeavored to do this in the following:

Five Factors Affect Fares

Let us consider five factors only which affect fares; there are others, some of which in certain places are important, but for the purposes of illustration these five will do. They are: Speed; wages; length of haul; density, and investment.

First, Speed

How does speed affect fares? If you increase the speed; that is, make the cars run faster, they will complete their trips in less time. If the car completes its trip in less time it will be ready to start its next trip sooner than

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otherwise, and thus will take the place of some other car that otherwise would be required. Increasing the speed, therefore, permits the same service to be performed with fewer cars. Fewer cars mean fewer men to operate them. It means smaller carhouse space to store them at night, less shop facilities and fewer tools, fewer men to keep them repaired. Thus increasing the speed reduces the investment in cars, carhouses, shops and tools, and reduces the number of trainmen and shopmen to operate them. Hence speed is the very essence of transportation. In one city with wide and level streets, where traffic regulations are enforced by highly co-operative city officials, the cars have an average schedule speed of 12 m.p.h. In another where traffic conditions are far from ideal the speed is as low as 6 m.p.h. Traffic congestion places a limit on speed, and thus many a community handicaps its fares and its service.

The Second Factor Is Wages

Electric railways employ approximately five men for every car operated throughout the day. Remember, there are two shifts of men, one for the morning and one for the evening rush hour, and besides there are the men employed in the carhouses, shops and offices, on the track and in the power houses. Taking account of all this, 46 cents out of every dollar collected, or approximately half the car fare, goes to labor. Conditions differ widely in different parts of the country as regards cost of living and other elements that influence wage rates, and as a result this factor varies considerably. The prevailing rate for labor in each locality is usually the determining influence, so here again a factor that depends upon conditions within the community has a great bearing on the rate of fare.

The Third Is Length of Haul

Length of haul does not mean the longest ride a person can possibly take for a single fare. A wealthy banker of Yonkers rides down town each day on the subway to Wall Street, a distance of 14 miles, for a nickel and boasts about it. Mr. Hedley doesn't like it and says it costs the company 15 cents or 20 cents for such a ride. Obviously if everybody rode this far the company could not meet expenses. But for every such long rider there are several short riders who bring down the average. One will pay 5 cents and ride from Brooklyn to downtown New York; he gets off and his space (you will note I did not say his seat) is taken by another who rides to Times Square; here he is replaced by a third cash customer, and again at Ninety-sixth Street another interchange occurs. From this point outward the pressure gradually diminishes.

The same space in the car is thus sold to three or four persons each paying a 5-cent fare, the result to the company being the same as though one person had ridden the entire trip and paid a 15-cent or 20-cent fare. The greatest length of any one ride on the New York subway is 26 miles, but the actual average length of ride is 6 miles. On the surface lines in New York the longest route is 12 miles, but the average length of ride each passenger takes is 2 miles. In other words, on the surface lines it is possible for the company to sell the space in its cars six times on each trip, and this is the same as though each passenger rode all the way and paid a 30-cent fare. Incidentally in New York the actual cost of service on the rapid transit lines is 7.31 cents, the taxpayers and investors losing the difference above the 5-cent rate.

The maximum possible ride either with or without a transfer is therefore a matter of no significance whatever as a measure of a company's service. Yet frequently the statement is made that a person can ride for 25 miles in New York or Chicago for one fare, and this is put forth as an argument of the superior service in these places. The length of haul, however, or the average distance each person actually rides, is a most significant factor. For if the haul is short even though the route be long, the same space in the car may be sold several times over.

Density Is the Fourth Factor

By density is meant the greatest possible use of all the facilities and service furnished. It means the carrying of the most passengers with the fewest cars, miles of track, etc. It doesn't necessarily mean overcrowded cars, for high density can be secured by an even distribution of normal loads. Density touches the very heart of the transportation problem. It embraces the fitting of all of a company's service and facilities to the demands of traffic.

To start with, density determines whether there should be a double track or a single track; density determines whether tracks should be laid upon parallel streets a block apart or six blocks apart; density decides whether cars should be run every minute or every ten minutes. Density dictates the economical size of cars, whether of 30-seat capacity or 60-seat capacity, and whether or not cars should be run in trains or with trailers; also whether cars can be run economically all day long in 18-hour service, or whether there are just a couple of hours each day in the rush hours for which cars, men and power must be kept in reserve but without income. Density will be high if cars run in both directions of traffic equally well loaded, instead of loaded in one direction and empty in the other.

Briefly, the effect of these elements on fares is as follows:

If rails are laid on one street only through a community, the investment in track will be less than if rail lines are installed in several parallel streets to serve the same district. In either case approximately the same total number of passengers may be carried, but if the tracks are laid on several streets, a wider area and greater population may be more conveniently served. Here is opportunity for wide variation in practice. American cities have always provided twice as much trackage for a given population as do foreign cities.

Again, large cars and trailers will carry a great many more passengers per trip at a relatively slight increase in cost over small cars. Hence if the traffic justifies the large cars, this cost can be divided among many more people than with the small cars.

Rush-Hour Service Costly

In the same way, if there is a steady traffic all day long, then the cost of cars, labor, maintenance and power can be divided up among the large number of people who have used the cars during the 18-hour service. For those cars for which the traffic justifies operation only a few hours in the rush period, almost these same total costs will have to be met, since men must be paid a day's wage in any event and extra power and shop facilities must be provided for the cars operated during the morning and evening rush hours. Since approximately the same costs are divided among a few passengers in the latter case, the cost per passenger will be several times as high as for the 18-hour cars. In most cities about half the cars lie idle during the day, being used only during the rush hours.

In Detroit, where large numbers are employed at the automobile factories on the three-shift-in-24-hour plan, the cars carry loads in both directions. The same car that brings one shift to the factory takes another shift home. In those communities having one central business district and outlying residential areas the cars carry loads usually in but one direction, i.e., toward the business district in the morning rush hour, and run empty in the opposite direction. Where a number of smaller business centers with intermediate factory and residential districts exist, there is usually traffic in both directions, frequently during the greater part of the day. Such conditions are favorable to short haul and high density of passenger traffic. The two factors, length of haul and density, when combined measure the degree of usage made of the service. Together they determine the amount of service constituting a car ride for each community.

A One-Cent Car Line

In Cleveland several years ago much publicity was given to a one-cent fare that prevailed on one route running from the Municipal Pier to the Public Square. The explanation was the short haul. The line was purely an experiment and was abandoned as representing an unsound principle. It shows what would happen, however, if fares were fixed separately for each route. In a system of any size equally great variations between routes will be found as now occur between cities.

I have taken several typical cities as illustrations of this and have determined the total cost of the service furnished on each of its routes. I have assumed that this cost should be divided equally among the riders actually using each route and that the result is the fare they might properly be asked to pay. In other words, each route is made to stand by itself and the fare is fixed by the traffic it carries.

In a city of over 700,000 population where the average fare is approximately 7 cents, the rates on one route would be 5 cents and on another 12 cents. In a similar city the rates on individual routes would vary from 4 cents to 24

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cents. In several small cities of less than 100,000 population where the average fare is approximately 7 cents the individual route fares would vary from 5 cents to 14 cents. In two cities of approximately 2,000,000 population each, which I have taken as an example at the other extreme, the individual route fares would vary from 4 cents to 28 cents.

Variations such as these in the necessary rates of fare to meet the cost of service between individual routes illustrate the folly of the bus advocate who concludes from the successful operation of some favored motor route at a low fare that service could be provided to all parts of the system at an equally low fare. Most communities have decided that there should be a uniform rate of fare applicable on all routes and that, rather than abandon operation on the more costly routes, sound public policy demands that their increased cost over the average of the system should be borne by the more profitable routes.

THE FIFTH AND FINAL FACTOR—INVESTMENT

The reason for including investment as the fifth factor is not so much because of its importance in influencing the rate of fare as that this is the reason chiefly advanced by the politician as the cause of high fares under the name of "overcapitalization" or "watered stock."

On the average, from one-fifth to one-fourth of the car fare goes to pay the interest on the investment. This is a higher percentage of the cost of service than is required in many other industries. The reason is that the investment in electric railways is much higher in proportion to the receipts than in other businesses. For every dollar the electric railway receives in fares the investment in cars, track, shops and power is at the very least $5 or $6.

For every dollar received in sales by the merchant, on the other hand, his investment rarely exceeds $1 and frequently is only half or a quarter of a dollar. A very small portion, therefore, of the merchant's dollar will pay a good rate of interest on his low investment, while it takes a much higher percentage of the electric railway dollar to pay even a small return on its high investment.

Assuming, for argument, some electric railway company should be overcapitalized 100 per cent and that it is now paying an adequate return on twice the actual investment, letting out the water would decrease the fare 10 per cent on the basis of national average or ¾ cent per passenger. This is the same amount, or portion, of the rider's fare that now goes to pay taxes and other imposts such as paving, etc. Investment, therefore, is one of the least of the factors affecting the rate of fare.

Summarizing, any one alone of the four factors—speed, wages, length of haul and density—could more than account for existing variations in fare. Combine them, and the wonder is not that fares range only from 5 to 10 cents but that they do not reach far wider limits.

Attracting Good Men to the Industry*

Railways Should Have Enough Competent Talent to Give Responsible Department Heads Time to Think and to Study Better Practices and to Co-operate in Industry Activities—Better Pay an Essential

BY W. H. SAWYER
President East St. Louis & Suburban Railway

FEW appreciate the importance of the responsibility of the public utility executive and his assistants. Take, for instance, the New Orleans property, which is valued at approximately $55,000,000. Fifty-five million dollars is a lot of money. Look over the capitalization of the different banks in this city. I venture the statement without even checking it that all of them put together have not a capitalization of $55,000,000. With this comparison you will commence to get an appreciation of the magnitude of the job which devolves upon the executive of such a corporation, and particularly of the responsibilities when viewed in connection with the complexities of electric railway operation.

There are very few, if any of us, who have the amount of direct assistance that we should have to carry forward such gigantic propositions. Our associates are, generally speaking, not paid in accordance with the importance or responsibility of their work. Follow on down the line. Take our maintenance of way engineer and our master mechanic as typical examples. Stop for a moment and figure out how much money is spent under the direction of each of these two men and then note what their salaries are, and particularly note what little technical assistance they have in the efficient expenditure of this money. Neither the bankers nor the public have ever fully appreciated either the magnitude or the intricacies of electric railway operation, and I might add that I do not believe that we executives have fully appreciated that it is our duty to surround ourselves with more men, better men and better paid men than has been the rule in the electric railway industry.

If you will take the total salaries paid to all officials and sub-officials of the average electric railway and then take the amount of money expended under the direction of these officials and compare it with other business—business not as complex as the electric railway business—you will find that the amount spent in the electric railway industry toward this supervision, toward bringing about better efficiencies, is absurdly small. We all want to do the things which should be done and we have all felt the handicap under which we were continually working, but if we are to do the job in the way we really know it should be done we must make fair comparisons with other business and look the matter fair and square in the face.

This thought came to my mind in connection with my seeking ways to bring about more active co-operation with the American Electric Railway Association. There should be enough men on a property so that a portion of their time can be devoted to the education which comes about from contact with outside organizations. We all stay too much in our own town because we have not the time to get over to the neighboring town to find out what our neighbor is doing. All wrong. We must have enough help and assistance so we will have time to find out what our neighbor is doing, and then we can take advantage of the experience of his neighbor and make changes and improvements due to information acquired through this personal contact.

Today many of us have not the time to take care of our important work right at home. We know that if we were able to work the whole twenty-four hours we could do a far better job than we are doing today. That being a fact, why should we not surround ourselves with enough capable men who are paid salaries commensurate with their responsibility, so that the important work can be done each day?

Once we fully appreciate the responsibility resting on us we will attract to the industry a more highly skilled type of man than has been attracted of late years. Many bright engineers with a real liking for electric railway work have gone to other fields, and the reason has been, not altogether the fact that we did not pay them enough, although this has been an important factor, but that we did not give them the opportunity to broaden and better themselves, such as bright men desire. In order to broaden himself a young man must have some time for study and some time to analyze. He cannot do his best work if he is continually goaded by the necessity of keeping the wheels turning.

MODERNIZE AND MERCHANDIZE

The electric railway man has always been ambidextrous; he has always been efficient, but there is unquestionably an opportunity for us to be even more efficient. During the period preceding the war and during the war we left undone any number of things which efficiency demanded should be done. The mere fact that the efficiency produced would pay for the improvement was altogether secondary when we did not have the money to spend, but generally speaking, money is today available when needed for proper expenditures for better efficiency.

The manufacturer tells us today that there are too many obsolete tools around our car shops; that there are too many obsolete motors under our cars; that there is entirely too much obsolete machinery and apparatus scattered over our properties. I believe the manufacturer is right. I believe

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that we must recognize that we are a going concern, that we will continue to be a going concern and that we must put and keep our house in order, so that, taking into account fixed charges and operating expenses, and looking at it from every angle, we can show that our properties are operated as efficiently as is practicable.

We have, however, only started toward our duty when we surround ourselves with enough able associates and when we have efficient machinery and apparatus with which to work. Our first though must be to satisfy our customers. That may be a trite saying, but I use it because it means just what I want to say. The 1924 executive really wants to satisfy his customers; we all want to give the kind of service that our customers want us to give, but even today none of us is doing too good a job along this line.

Our customers are rightfully entitled to satisfactory operating service and to publicity service. They have a right to know all the facts concerning our business. Moreover, we have a duty to our customers and to our potential customers to sell our service to them. There are many ways of giving this publicity service, but the best way is by newspaper advertising. Other business gives its customers facts and information. Other business seeks through newspaper advertising to sell its products and its service, and to my mind there is no more important department in the 1924 electric railway company than its advertising department. I thoroughly believe in newspaper advertising in the electric railway business and I know of no electric railway company which cannot afford to do more, rather than less, newspaper advertising.

Indirect Taxes Need Attention of Railway Executives

Assuming that the electric railway executive has his enlarged and more efficient organization, has put into effect increased efficiencies of operation, has co-ordinated bus service with electric car service, is advertising in the newspapers and is, within reason, really satisfying his customers as to service, he has in many cities still another important duty. That is to co-operate with his car riders toward a reduction in car fare, assuming, as I said, that the service has been brought up to a satisfactory standard, for to my mind satisfactory service is practically always more important than a lower rate of fare.

The underlying basis of regulation today is that the car rider must pay the actual cost of the car ride, and no more, the cost of the car ride including, of course, the cost of money. The car rider naturally desires as low a rate of fare as is compatible with good service. One expense which the car rider is paying today which adds to the cost of the car ride but is not a proper portion of the expense of the car ride is the amount paid for indirect taxes, taxes which other business is not called upon to pay.

The general figures available for New Orleans show that these indirect taxes paid by the street car rider amount to more than $700,000 a year. The records show that the New Orleans Public Service, Inc., carried approximately 107,000,000 passengers in 1923. You will thus note that out of the 7-cent fare at least two-thirds of a cent was for indirect taxes. New Orleans has, I believe, something like 400,000 population. The amount paid in indirect taxes would, if paid direct to the community, give every man, woman and child in the community nearly $2 per year. I assume that the car rider would just as soon have this money paid out in paving and other indirect taxes as to have it distributed pro rata among the people of the community, but the important point is that the car rider should not pay out for the benefit of the community at large any such amount as $700,000 a year over and above regular taxes. In most of the newer franchises these indirect taxes are largely eliminated, and rightfully so, because in order that an electric railway may be of the greatest benefit to the community it should give the best service possible at the lowest fare practicable, and this means the elimination of all such unnecessary expense. The indirect taxes referred to do not make for better service, and I venture the prediction that the day will come when all such indirect taxes will be very largely eliminated.

The important point to the electric railway executive is that among his many duties to his customers is his duty of informing them of the amount of these indirect taxes. The car rider is entitled to this information, and further, he is entitled to the unstinted co-operation of the electric railway company in bringing about the elimination of these indirect taxes. If, as is true in some cases, the car rider is not at the present time paying the fair cost of the car ride, including the cost of money, the company is entitled to the elimination of these indirect taxes in order that it may make a fair return, for no business can continue properly to function for the benefit of its customers unless that business receives a fair return.

"Friendlyizing" the Public*

Another Wickwire Contribution to the Industry Thinking on Public Relations Work—The Utilities Would Be Poor Picking for Pilferers if All Directly Interested Would Do Their Part

By E. F. Wickwire
Vice-President Ohio Brass Company, Mansfield, Ohio

THE industry is recognizing more and more the fact that favorable statistics follow favorable public opinion as surely as the tail pursues the dog. Service is the foundation upon which we must build the structure of public good will, by making a vigorous, intelligent and intensive effort along sales and educational lines.

There never was an article made that was good enough successfully to sell itself to the public, and the "commodity" known as utility service is no exception to that rule. "Performance plus publicity" is an excellent slogan for the utility industry. But the utility which expects publicity alone to remedy all its ailments is expecting too much. Publicity unsupported is like the whistle on a peanut stand — it makes a lot of noise, but it doesn't roast any peanuts.

However, when publicity is backed by an efficient service, and these two elements are tied together and reinforced by a strong sales effort on the part of the entire utility organization, satisfactory public relations are pretty sure to follow.

The utility can well afford to "tune up" every employee who comes in contact with the public to a realization of the fact that they are more than ticket sellers, or inspectors or platform men—that every time they meet a customer there is a chance to cement a friendship for the company, and much to be gained by always remembering that "A soft answer turneth away wrath."

By sales effort I am not only referring to the business of selling power, light, heat and transportation to the public, but also to that more intangible and more difficult task, which, for want of a better name, I will term "sales promotion." Or, we might coin a word and call the process "friendlyizing," or "utilityizing" your customer—the public. In other words, the successful utility must not only sell its service, but it must sell itself to the public.

This point is of vital importance to us because the very nature of the utility business seems to lay it open to the mistrust of a suspicious public. A mistrust which has been carefully nurture by the prevaricating political pollywog (who is such a liar that he has to get somebody else to call his dog when he wants to feed him), aided and abetted by his ally, the inflammatory nuisance newspaper, and applauded by the radical element generally.

It is this element which is continually trying to instill suspicion into the minds of the public in respect to the utilities; and, as Northcliffe once said, "You can't disarm the nations until you have disarmed suspicion." Why does the trusting chap who would never suspect the "receiving teller" of a one-night side show, treat the utility as if it operated under the name of "Jesse James, Inc."?

It is for the purpose of winning back the confidence of the people that public relations work is being advocated and practiced by many leaders in the industry, who realize that the most important phase of this work lies in schooling their own employees, who come in daily contact with the public.

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The active head of a large utility syndicate recently emphasized the point that, unless we in the industry tell our story effectively to the public, the other side will continue to get away with its distorted version. He emphasizes three fundamental rules, which are "know your public," "know your employee," "know your press."

Sales Executives as Well as Production Executives

Recently a prominent investment banker who is heavily interested in the utility business said he was convinced that it takes just as able and high powered an executive properly to handle public relations—to "friendlyize" the public—as it does to direct operation, and that the operating executive must produce the class of service that the sales executive can successfully sell to the public.

He cited as a comparison manufacturing concerns with one vice-president directing sales and publicity, and another vice-president in charge of production, with close co-operation and team work.

This line of reasoning is creating an increasing demand for the sales executive in the utility business. The type of man who is able to make friends with the people, because he is a thorough student of human nature, has real "sales personality," and knows the knack of getting along with people even when they are disagreeable by nature.

Like the lawyer in the country court who was quoting from Blackstone. "I don't care what Blackstone says" thundered the "hick" magistrate; "I'm running this court and I know the law." "Certainly, you're absolutely right, Your Honor," said the lawyer, "I was simply trying to show you what a darn fool Blackstone was."

There is a way to penetrate every "hard shell"—even the type of fellow who won't even eat anything that agrees with him. Like the fellow I heard about recently who had never agreed with anybody in all his life, until he was shipwrecked on an African island—and he agreed with the cannibals.

A seasoned selling executive of heavy caliber doesn't make the mistake of justifying his position because he "has the best of the argument" with his customer. He knows that it is a peculiar kink of human nature that we all resent "iron clad" rules and we like to see them broken on occasions. So he permits a rule to be broken when he thinks it's good policy—or at least bends it enough to make a strong friend out of a possible enemy. It pays at times to make an exception to the most hard and fast rule. For instance, the old adage about "always starting at the bottom" is generally a good rule to follow. But it's wise to make an exception to that rule—when you're learning to swim.

People always respond better to suggestion than to demand. This perhaps applies even more to the masses than to the more intelligent classes.

Like the couple who came to a movie theater which displayed a big electric sign—"The Woman Pays." And the girl walked right up and bought the tickets without a murmur.

But I don't think it's true that "the woman always pays"—or why are so many men broke all the time? But I do know that it is true that the utility always pays a big price when its customers are entertaining misunderstandings and petty grievances.

A great many utility companies have turned to local ownership of stock as a means of closer contact with their customers. And I have recently heard more than one observing utility man advocate strong representation on the board of directors of local prominent citizens, for obvious reasons—not the least of which is to offset the popular propaganda of the peanut politician, who poisons the public mind by artful reference to the "pernicious practice" of outside ownership.

Public service securities, when properly presented, are attractive to small investors. As one fellow puts it, he can reassure himself about the safety of his money by merely sticking his head out of the window and watching a car go by, or he can press the switch and when the light comes on it is the signal that "all's well,"—or, he can console himself by turning on the gas.

If He Owns an Interest, He Takes One

When the public owns an interest in a utility, it is pretty apt to take an interest in that utility. Local ownership is a shield against the unscrupulous politician, who in his "pitiful pleading" for the "dear peepul" is just about as sincere as the colored lady who was devouring a watermelon when she was interrupted with the news that her husband had been killed. "Land o' goodness," she remarked, "Jes' yuh all waits 'til ah gits thru wid dis heah watahmelyun an' yuh'll heah de mos' awfulest wailin' yuh evah heeard."

The howlings of the tricky politician wouldn't make a dent in a community where the utility company was giving good service, and a large percentage of the citizens were interested in seeing the company get a square deal.

Of course we all admire the utility that stands up and fights a lone battle, but unless backed by public good will, its protests are about as effective as the flea who was walking up the gangplank into Noah's Ark ahead of the elephant. "Hey there," shrieked the flea, "look out who you're shoving."

But when the tremendous bulk of public sentiment joins the utility's side the leaders of the opposition are not so aggressive. Looting the lonesome public utility and pilfering the property of the voters are two entirely different matters. The fat-tummied office seeker is courageous enough when he thinks his side is strongest—he'll try to get away with "murder" if he thinks nobody cares about the victim—but he never argues with real opposition when he recognizes its power.

Unless the work of sales promotion —or "friendlyizing"—is carried on vigorously, how can the public understand how to discount the distorted statements of the shrewd enemies of the utilities? Often the public is as gullible as the old lady who asked the clerk, "If this shirt is all wool, why is it labeled cotton?" The clerk replied, "Just to deceive the moths, madam."

Looking Back on the Akron Disaster

During the Akron disaster, as many of the people up our way termed the suspension of street car service in that city last February, the utility company expressed a willingness to have its books audited by any disinterested party. The opposition insisted on one party only and when the company objected, published the plausible half-truth, "Company Refuses Audit of Books."

Again, when the company said it could not operate without a loss at 5 cents with universal transfer and offered to accept a rate of fare to be established by an audit of its books, the opposition immediately shouted in print "Company Refuses to Operate Except on Own Terms."

The Akron Mayor made a campaign pledge to give Akron a straight 5-cent fare, with universal transfers—his slogan was "Nickel or Nothing." After election he notified the traction company to get off the streets or continue to operate at a loss on a straight 5-cent fare. He stated publicly that plans were all made and that the city could be "motorized" completely on short notice. The company operated something like 125 city cars and 25 city buses, with universal transfers. There were only two things for it to do and, in the language of the Pullman porter, "Bof of dem was wrong." So they chose the lesser of the evils and vacated the streets.

The Mayor promptly started to organize the promised bus system and confidently asserted that within three weeks he would have an adequate rubber-tired transportation system—and if there ever was a town where such a system was given a chance to succeed, it was Akron—"The Rubber City." The Mayor was reported as saying that he had no cost figures on bus operation, but knew that it could be done for a 5 cent fare, with free transfers. His confidence must have been somewhat shaken when responsible bus men from other cities told him that it couldn't be done profitably for less than twice 5 cents, with universal transfers.

Meanwhile transportation in Akron was part joke and part tragedy. A few good buses were operating, but many of them were wrecks that had given up the fight in other cities and were looking for a soft place to light. They drifted in from all quarters. If anybody with the wanderlust finds it inconvenient to "join the Marines and see the world," I would suggest that he "buy a bus and see America."

There is one nice thing about the present plan of forming these independent bus organizations in our section. Several bus owners get together, combine resources and form a "corporation." If one member of the organization becomes dissatisfied, he fills up his gasoline tank and drives off—with

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his share of the "corporation." He has no power house, track, overhead or other "immovable investments" to delay his departure.

The women of Akron finally exerted a strong influence upon the settlement of the controversy and a return to the more sane and sensible combination street-car and bus transportation system. They didn't seem to fancy the administration's independent bus transportation scheme—one female rider, after a trip on an owl bus, said the driver should have his stop signal inside the car.

When the affair was settled the Mayor claimed victory, which sounds like the fellow who had been having an argument with another chap and said he "was just going to hit him when everything got dark." "When it got light again," he said, "he felt sorry for his opponent, whose knuckles were all swollen and bleeding, where he had been hitting them with his chin."

Commenting on the return of the street cars to service in the Rubber City, a Cleveland paper pointed to the trial of bus transportation as conclusive evidence that if buses failed in "Tire Town," where the majority of citizens favored their use at the start, there was very little hope of them succeeding in any town where conditions not so favorable for a proving ground exist.

A leading bus magazine said: . . . "The service of buses and street cars must be co-ordinated with each other. One management in charge, to use each facility in its place. This is the 'Rubber City's' latest message to the transportation world."

A Persistent, Organized Effort Needed

There is no question but that the public's understanding and appreciation of the utility industry is improving. But molding public opinion is a slow job at best. It never can be accomplished with the feverish excitement that razes mountains in a few days, but rather with persistent and patient everyday effort, regular and methodical. This is what constitutes the faculty and genius for organization.

Think of the combined power and influence of the manufacturers who make materials used by the utilities and are, therefore, dependent upon this industry for their existence. There are armies of factory workers who should be shown that it is to their own selfish interest to boost for the industry. There are thousands of salesmen who, in their travels, have excellent opportunities to accomplish good. There are all the stockholders—many of them influential citizens—who can add their weight to the movement. There are concerns from whom we buy our raw materials, who have seldom realized that they have a dollars and cents interest in the welfare of the industry.

Recognizing that this great source of influence was lying practically unused, the American Electric Railway Association decided a little more than two years ago to make use of it.

A special committee on co-operation of manufacturers was organized and has been able to accomplish quite a good deal, despite the handicap of having the writer as its chairman. No doubt the committee at first felt like expressing to its chairman the sentiment of Jonah when he said to the whale, "If you'd kept your mouth shut, this never would have happened."

At first our committee found it difficult to get some manufacturers to warm up to the plan. But we were not discouraged; we remembered that tombstones at long range seem cold and cheerless, but when you get close to them you usually find that they have something good to say for the people they are holding down.

We felt that our cause was a worthy one and that the manufacturers would support it, when the plan was made clear to them. We realized that the electric railway industry had been subjected to a long, hard struggle, but felt confident that its efforts to live and prosper would be rewarded and that it certainly was entitled to receive active co-operation from the manufacturers.

Of course we struck pessimists. One manufacturer told me dolefully he didn't think the electric railways could survive much longer. I said to him, cheer up, here's a point which I believe even you can understand.

An Arkansas farmer had struggled for a long time with a sick horse. His neighbor, who had lost a horse rather suddenly, said to him, "What's the use of going to all that trouble, you'll never save that horse." To which the farmer replied, "It stands to reason that the horse that has a long, lingering illness is more apt to live than the one that gets took with a sudden sickness that kills it quick."

To-day our committee has the active co-operation of something like 250 manufacturers in the work.

By combining the strength of operators and manufacturers, and all others connected with the industry, into a powerful unit, thoroughly organized and skillfully directed, it would be quite possible to place the political demagogue and his partner, the prevaricating press, in just about the predicament of the colored soldier who was asked what he would do if he was guarding a hundred feet of trench all alone and saw a hundred of the enemy swiftly advancing toward him. He scratched his head a moment and then answered, "Boss, ah think ah'd go back an' spread de news."

The news would soon be spread that the utility industry was poor picking for pilferers if every one of us whose welfare is linked with the welfare of the industry would only make his identity unmistakably known.

Steels for Special Trackwork*

By James H. Budd
Traveling Engineer Bethlehem Steel Company

THE buyer of special trackwork has the problem of choosing between plain cast-carbon steel, manganese steel and the various special alloy steels. Each has its own individual properties.

The introduction and development of the welder as a repair tool has reached such proportions that it has become an important factor in trackwork maintenance. Cast carbon steel can be most easily repaired by welding, but has the shortest first life. Cast manganese is the most difficult to repair by welding, but undoubtedly has the longest first life. The cast alloy grade is between the other two, but is still in the experimental stage.

In choosing between these grades of steel one should be governed not only by the ease or difficulty of repairing by welding, but also by the first cost and the cost of installation and reinstallation. I question if the "weldability" should be the governing factor.

From the manufacturing standpoint, manganese steel is a tried and proved product. It is made in quantities, and therefore produced with economy. It has the valuable characteristic that it can be cold straightened satisfactorily. This shop operation is a good test of the quality of the casting, as a piece of improper analysis or faulty heat treatment will not pass this bending test.

It satisfactorily resists the wear and pounding of the car wheel in paved track, with the accompanying grinding, gritty conditions. It is easily fabricated, and is a tough and rugged product when finished. It is used not only for trackwork but also for commercial castings, which helps to keep the foundry producing units in continuous and economical operation.

Considerable progress has been made of late in the art of welding manganese steel. It would seem quite within the realm of possibility that sooner or later a satisfactory and economical method will be found. Some good welds are being made today, but nobody seems to be able to tell why a certain weld is good and the next one bad. It must be largely a lack of knowledge of proper technique on the part of the welder, as manganese steel has shown a remarkable uniformity of quality extending over a long period of years.

And right here I would like to suggest that handsome returns would be yielded by the proper solution of this welding problem. The American Electric Railway Association or any body of street railway properties could well afford to set aside a good sum of money for research work in this direction. It also is a subject that should very properly be handled and directed by the street railway engineer rather than by the manufacturer of managanese steel. Many millions of dollars are invested in manganese steel trackwork, the life of which could be prolonged by welding. It would be money well spent if a proper welding method could be found.

*Abstract of a paper presented before the Southwestern Public Service Association, New Orleans, April 22-25, 1924.

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Ordinary cast carbon steel is easy to weld, and while not having as long a first life as managanese, it can be welded to give a fairly long service life. For years good serviceable trackwork was made from steel of this grade, before the advent of manganese. It is also a standard grade of steel produced for a large variety of purposes and therefore on tap, so to speak, for track castings. It requires a reasonably careful annealing treatment, but no other.

Some interesting pioneer experimental work has been done with chrome-nickel alloy steel, as it seems to offer the greatest possibilities among alloy steels. The results of actual service tests are awaited with interest. However, it is a relatively new and untried steel for track castings and is now in an experimental stage both from the standpoint of the railway and that of the manufacturer. It is more expensive to make and fabricate than either manganese or carbon steel. It is an entirely special grade, not being used in commercial foundries for any other products. Consequently every heat of this steel produced is special, which makes it expensive. Once made, it must be treated with far more care than either manganese or carbon steel, requiring a double heat treatment. Once treated, it is a springy, tough, resilient steel that resists cold straightening to bring it to proper line and surface. If it is heated locally for fabricating reasons, the previous carefull treatment is jeopardized. This sensitiveness to heat and the presence of alloys further increases the difficulties of welding.

The manufacture of rolled chrome-nickel steel does not present such difficulties, as this steel is cast in standard ingots which are later rolled into blooms and are cropped sufficiently to remove all defects; the resulting product is a sound homogeneous steel. It is, of course, always preferable to use rolled products in all cases where practicable.

For this reason, the Bethlehem Steel Company has developed a type of crossing that has worked out quite satisfactorily for crossing angles of 45 to 90 deg. The design has not yet been perfected for smaller angles and frogs. To produce this crossing, a special girder guard rail is rolled of chrome nickel steel with a full head. These rails are assembled in the shape of a crossing and are then ironbound together in one solid piece. This is the standard form of iron binding and cast welding. Flangeways of the proper depth and width are then machined in this full head rail. As a last operation, the bottoms of the flangeways are hardened.

In regard to the relative merits of the three grades of steel under discussion, it would seem that manganese steel, all things considered, is best adapted to meet the exacting requirements of electric railway special trackwork. Cast alloy steel is still in the experimental stage and results of service tests should be awaited before plunging deeper with this product. Cast carbon steel or rolled alloy steel can be used where "weldability" is of greater importance than long first life.

The Bus and the Railway and the Outlook*

By W. B. Tuttle
President San Antonio Public Service Company

IN THE present stage of bus development the best statistics obtainable indicate that where there is a very heavy volume of traffic to be handled cars operated on tracks are more effective in transportation and are more economical than motor buses, in spite of the fact that heavy street construction charges and street maintenance expense and taxes on track installation are assessed against the cost of transportation on rails, while it is not customary for motor buses to bear an equivalent roadway expense.

There are, however, several fields where it seems that motor bus transportation may be desirable. Some of these are as follows:

1.—Shuttle lines on extensions into developing communities, where there is as yet not sufficient population to warrant a heavy capital expenditure in tracks.

2.—To give transportation where there is some legal or physical reason why it is not feasible to construct a car line.

3.—To give more direct routings in sections where the development of the city changed traffic conditions, and where existing car lines cannot be rerouted because of prohibitive cost, or because of franchise or legal restrictions.

4.—To provide additional transportation, particularly in peak hours where track or street capacity is already filled and where there is the necessity of additional transportation facilities.

5—To provide a supplemental and preferred service which will attract patrons who are not now availing themselves of street railway transportation.

Taking up the first field of operation, we are immediately confronted with the condition that in all probability if there is not enough business in a new territory to support a street car line with one-man car operation, there is probably not enough business to support a bus line. This would seem immediately to preclude bus operation, but such is not necessarily the fact.

Regular public transportation is a necessity, and it is the duty of the public transportation company to provide it under reasonable conditions. This being true, the public and the authorities must recognize the fact that, for the good of the whole community, unprofitable operations in certain localities must be carried on, and that these operations must necessarily be supported by profitable operations in other localities. This principle has been tacitly recognized for many years in street railway operations. The last half mile of almost any car line is unprofitable. Under such conditions, it may be proper to put on bus transportation in thinly settled sections of any community, even though this service is not self-supporting.

One of the problems in feeder bus line operations is that of good roads. In the early days, when street railway construction and operation costs were only a fraction of what they are now, the street railways pioneered into undeveloped portions of the cities they served, and good roads followed them at a much later date. This is not possible with buses, as one of the essentials for successful operation is a first-class paved roadway.

In the second field of operation, there may be conditions where restrictions imposed by some governing body, or by provisions in the deed of conveyance of some public park or place, prevents the issuing of permits for track construction, or where such hazards and burdens are placed on the investment that track construction cannot be undertaken; or there may be physical reasons, such as the character of bridges, which would prevent the construction of a car line. It may be that public transportation can only be given by bus line operation.

The third field for bus transportation is apt to arise in any growing city, and it is brought about largely by the failure on the part of almost every city to adopt a comprehensive city plan of development.

As cities expanded, the earlier street car lines were built where traffic existed or could be expected, and as the development of property was controlled mainly by the land owner and real estate man, little attention was paid to the effect of the routes of traffic then established on the future growth of the city. The result in many cases was indirect and tortuous street railway routes. Under such conditions, a large portion of the public may greatly desire more direct and quicker transportation, and yet it is possible that the street railway lines cannot be changed on account of the development of business establishments along the existing routes, or on account of the pressure of public opinion, or the effect of franchise and legal restrictions. Bus service may be the only solution of the transportation problems under such conditions.

The fourth field for bus operation is possible; particularly in some of our older cities, where the streets in the central business district are narrow. As a usual thing, a large portion of the traveling public desires to go into or near this district, and the operation of street cars through the center of such a district is a convenience and a necessity for the majority of the people, and yet, with the tremendous increase in the use of motor vehicles, street congestion may become so acute that it is impossible to operate a sufficient number of street cars through the district during the rush hours to accommodate all those who wish to travel.

Under such a condition, the establishment of bus routes, which avoid the most congested sections, may be necessary as an auxiliary and substitute for additional street railway service. Such bus routes will be patronized by those who do not have to go into the most

*Abstract of paper presented before Southwestern Public Service Association Convention at New Orleans, April 22-25.

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congested section, and by those who prefer a short walk from the bus line rather than the delays of traffic. Such a condition may warrant the establishment of bus lines, either throughout the entire day or during the rush hours.

The fifth field for bus operation is due to psychological rather than economic causes. The experience of the bus lines in a number of cities would seem to indicate that there is a considerable portion of the public who prefer to ride on buses rather than on street cars, even at a higher rate of fare. This mental attitude has probably come about largely on account of the tremendous development of the automobile riding habit in the last ten years. In many cases people will try to crowd into an automobile at considerable physical discomfort rather than to ride on a street car where there is plenty of room. This attitude toward public transportation may be a temporary thing, akin to the craze for roller skating or automobiling which have swept the country in the past, but it certainly exists today, and must be given consideration.

Where the installation of motor bus service is contemplated, careful consideration must be given to the operating cost and the rate of fare that will be charged. Comparisons are sometimes drawn with motor bus fare in Europe, particularly in the city of London, which are misleading. Motor bus service in London is probably more highly developed than anywhere else in the world, the buses there carrying approximately three and one-half million passengers each day. The rate of fare is dependent on the length of haul. On account of the mixing of business centers with residential districts in London, there is a very large portion of short-haul riding, and one bus may fill and empty several times on a given trip. The short-haul fare is correspondingly low.

Conditions in the United States are very different, as in most cities a large part of the traffic is through service from the business center to residential suburbs, with a flat fare for the entire distance or any part of it. Under these conditions, the short-haul rides cost more in some cases than they do in London, but the long hauls are often made for a much less fare.

Public transportation is a necessity, and the experience in many cities has shown that public transportation can be properly supplied only when all of it is handled by one responsible company which will co-ordinate and regulate all the service. There are portions of every community which need public transportation service, and yet where this service cannot at the time be profitably conducted. It therefore cannot be conducted at all, unless the whole service is carried by one agency and the profitable sections are made to support the unprofitable sections. The public and the community in general will surely suffer if reasonable transportation facilities are not provided, and therefore public interest demands the operation of all local street transportation facilities by one strong agency. Moreover, every public transportation company must have the maximum possible volume of business if the costs of transportation to the public are to be kept at a minimum. The operation of bus service, which will attract a class of passengers which would not otherwise be obtained, may be desirable to meet this condition.

Bus operation in the United States is still in the experimental stage, but there is a feeling on the part of the public that it is a desirable and a coming form of public transportation. There are many cases where it may be a valuable auxiliary to street railway service. There are some cases where it may be necessary to replace street railway service with it.

American Association News

Engineering Manual in New Form

THE new edition of the Manual of the Engineering Association, soon to be ready for distribution, contains many new features. Perhaps the one which will appeal most is the change from a loose-leaf publication 3½ in. thick to a 1,000-page book less than 1½ in. thick. The new Manual will be bound in cloth, uniform with the annual proceedings. Other important changes are a new system of grouping the sections dealing with each general subject and of numbering individual sections; elimination of nearly all folded sheets; substitution for the historical data in each individual section of a brief statement indicating the years of adoption and revisions.

The change to the bound form was decided on after a careful study of the requirements. A principal complant against the loose-leaf Manual was the difficulty of inserting new and revised sections and in removing superseded sections.

A new edition of the Manual will be published every third year. In the intervening years supplements will be issued containing all revisions and additions. The various committees have reviewed carefully all sections so that they represent the best and most modern practice. This review was completed in 1923, and the new Manual contains all the changes approved at the 1923 convention.

The Manual is divided into eight main parts, as shown in an accompanying table. In the new system of designating the sections, the letter corresponding to the proper one of the eight divisions is followed by the serial number. Standards in each class are numbered from 1 to 99; recommendations from 100 to 199; miscellaneous methods and practices from 200 to 299. In each of the general groups the sections are numbered in order of their adoption. Following the section letter and number is another number indicating the year of adoption or latest revision. As an illustration, the standard design of axles is specification E3—23. The "E" indicates the equipment section; the figure "3" that this was the third standard adopted in its class, the "23" after the dash that it was adopted or last revised in 1923.

Each general section of the new Manual is a complete unit with table of contents and title page. The Manual committee has been authorized to have printed and bound in paper a supply of these sections. The practice of maintaining a supply of individual Manual sections will be discontinued.

The following prices have been authorized for the new Manual, cloth bound, and for the general sections, paper bound:

ENGINEERING MANUAL—CLOTH BOUND

To member companies	$5.00
To individual members	5.00
To non-members	7.50
Rebate allowed for the return of an old Manual with binder, for each new Manual purchased	1.50

GENERAL SECTIONS—PAPER BOUND

Section		Member Companies and Individual Members	Non-Members
B	Buildings and structures	$0.75 each	$1.00 each
D	Power transmission and distribution	1.00	1.25
E	Equipment	.75	1.00
G	Power generation and conversion	.50	.75
PS	Purchases and stores	.50	.75
S	Signaling	.50	.75
W	Way matters	1.00	1.25
WP	Wood preservation	.75	1.00

It is especially desirable that the old edition be removed from circulation in order to avoid confusion and error. To accelerate its withdrawal a rebate will be allowed for the return of copies with the binders when purchasing an equal number of the new edition.

Compilation of the new edition has been carried on under the direction of G. C. Hecker, special engineer, under the supervision of the Engineering Manual committee consisting of R. C. Cram, chairman; C. R. Harte and Daniel Durie. The committee members have devoted a great deal of time to the revision and have contributed many new drawings to eliminate the folded pages.

Association Appoints Delegates to Chamber of Commerce Meeting

THE American Electric Railway Association has appointed the usual number of ten delegates and equal number of alternates to attend the annual meeting of the Chamber of Commerce of the United States to be held in Cleveland May 6-8. The names of the representatives follow, the first in each group being the national councillor: Delegates: J. N. Shannahan, F. R. Coates, C. E. Morgan, W. H. Sawyer, R. P. Stevens, L. S. Storrs, E. F. Wickwire, J. J. Stanley, Harry Reid, James P. Barnes. Alternates: J. H. Hanna, H. W. Blake, Thomas Fitzgerald, Cornell S. Hawley, H. J. Kenfield, T. O. Kennedy, Paul E. Wilson, Norman McD. Crawford, Dudley Farrand, L. H. Palmer.

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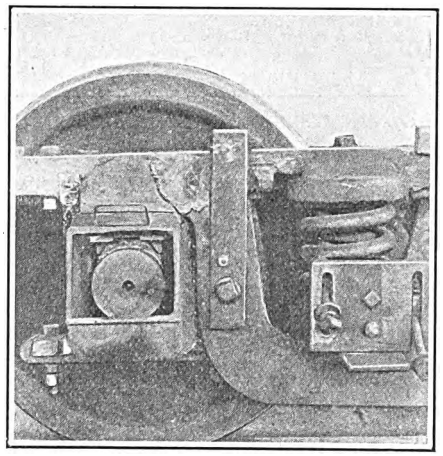
Maintenance of Equipment

Safety Strap for Equalizer

SOME trouble has been experienced from equalizer bars breaking at the bends adjacent to the journal boxes by the Philadelphia & Western Railway, Norristown, Pa. In order to insure that an accident would not result from breakage of these bars while in service, a safety strap has been added as shown in the accompanying illustration. This strap fits over the top of the truck frame and extends down on the sides of the two equalizer bars. The straps, which are 3 in. by 2 in., are bolted through the equalizer bars so as to hold them in position. This also acts to take some weight off the equalizer bars. A spacer of 1-in. pipe is used between the two equalizer bars, the bolt passing through this. With his construction bars have been found cracked, but still in proper position.



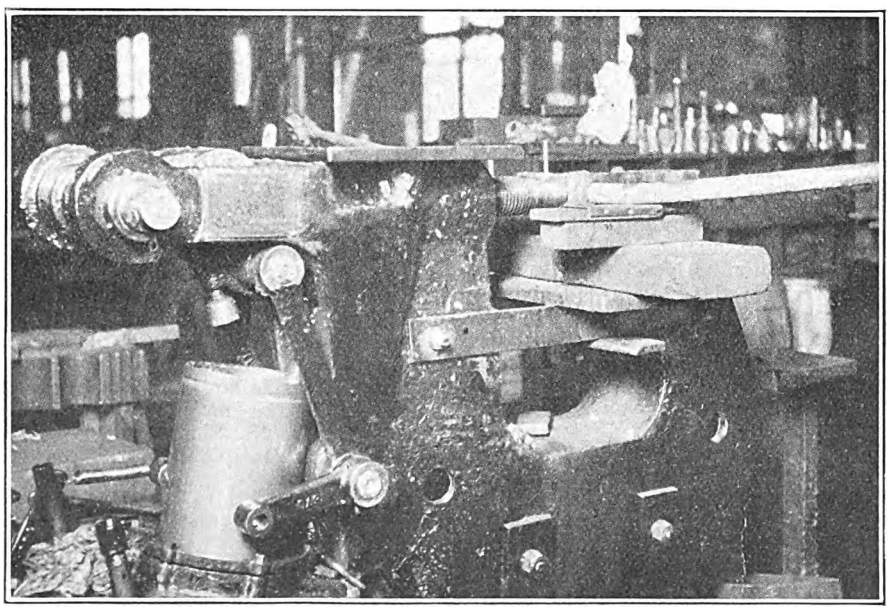
Accident from Cracked Equalizer Bar Prevented by Safety Strap

Riveting Machine Straightens Trolley Poles

AN UNUSUAL, yet practical, use is made of an air-operated "Hanna" horizontal riveting machine in the shop of the Pittsburgh Railways for straightening trolley poles. The pole is held in position by a simple fixture, while pressure is applied to the bend through dies attached to the jaws of the riveter.

The fixture is made up of a 6-in. x 2-in. wood member, approximately 2 ft. long, with cleats nailed to one side near each end. These serve to hold the bent pole in position during straightening. The dies on the jaws of the machine are shaped to fit the trolley pole. A single bearing is provided on one jaw while the attachment on the other jaw has two points of contact approximately 18 in. apart.

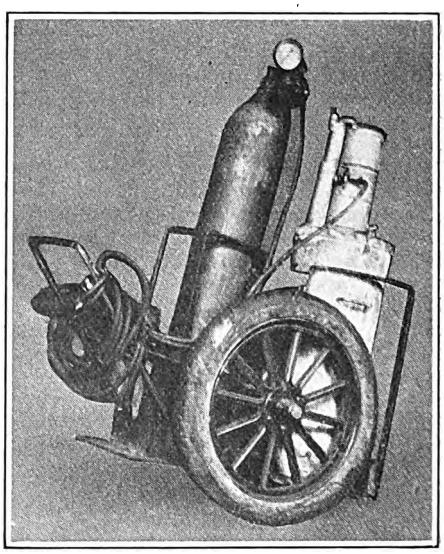
The pole is placed on the fixture with the bend at the single contact die and pressure is applied until the bend is removed and the pole brought into line.



Horizontal Riveting Machine, Equipped with Fixture for Straightening Trolley Poles

Welding Outfit on Pneumatic Tires

A RUBBER-TIRED carriage is used in the shops of the Indiana Service Corporation, Fort Wayne, to transport a portable welding outfit from place to place. The outfit includes an acetylene generator as well as tank and hose. The practice of carrying an acetylene generator for supplying gas requires a smoother riding carriage than is necessary with rechargeable acetylene tanks.



Pneumatically Tired Carriage Is Used in the Fort Wayne Shops of the Indiana Service Corporation for Transporting Welding Outfit

Two Ford wheels with tires are mounted on an axle 24 in. long with ends tapered and threaded to take the customary Ford automobile ball bearings. An underslung platform is hung from and extends on each side of the axle. This is made of one piece of $\frac{3}{8}$-in. steel carried over the axle. Uprights of steel 1 in. x $\frac{1}{4}$ in. are provided on each platform to hold the tanks, which are fastened in position by hooks between the uprights. A round iron handle fastened to one platform and braced to the axle serves as a means for propelling the carriage about the shop.

As this outfit is used in the carhouse as well as the repair shops, the rubber tires facilitate the movement over tracks and rough floors.

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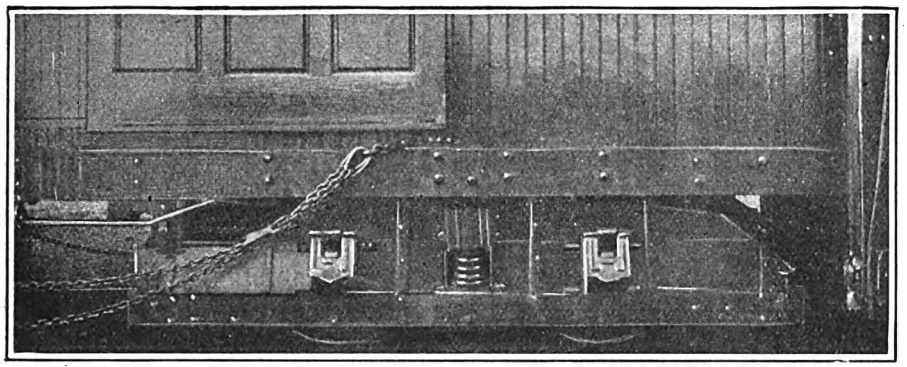


Blocked-In Truck on Snow Plow of Union Street Railway

Blocked-In Trucks Save Motor Maintenance

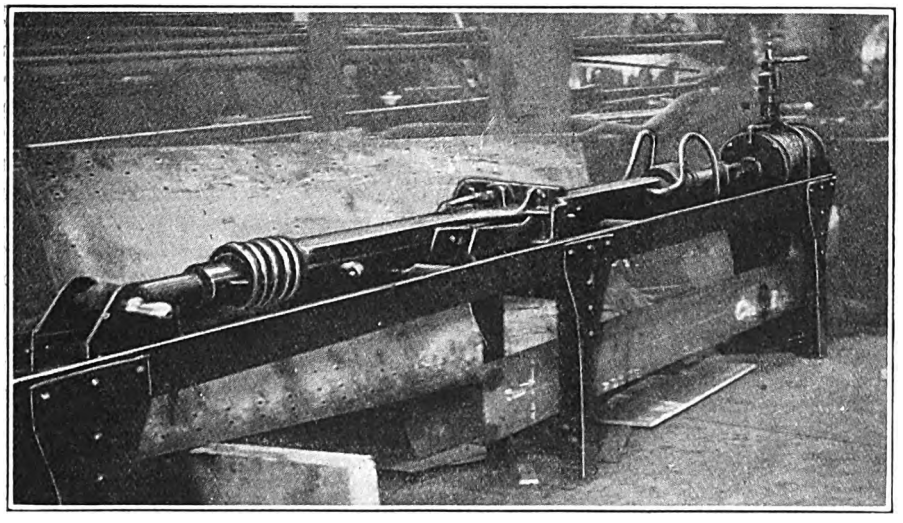
IT IS common practice in New England where the street railways encounter severe winter snow conditions to block in with wood the truck frames of snow plows and sweepers. The accompanying illustration shows a plow of the Union Street Railway, New Bedford, the trucks of which have been thus blocked in. The protection afforded has been useful in reducing damage to motors, but of course it makes more difficult the work of inspection and repairs when these are necessary.

Testing Automatic Couplers

AN APPARATUS has been worked out in the shops of the Cleveland Railway for testing new and repaired Tomlinson automatic air and car couplers. The test consists of making a coupling between the coupler under test and a master coupler, subjecting the two to a pull of 12,300 lb. and endeavoring to "break" the coupling by pulling the release levers. It is aimed to duplicate service conditions as far as possible.

The device is constructed of heavy angle irons of sufficient length to accommodate the two couplers and a brake cylinder. The cylinder is mounted at one end of the frame work and has the necessary piping and engineer's valve for admitting air to either side of the piston. The master coupler is permanently fastened to the piston rod and is further supported by a cross member of the frame, near the head. At the other end of the apparatus the coupler to be tested is fastened to two lugs by means of a removable pin. A cross member supports the coupler near the head.

With the couplers lined up, air is admitted to the head side of the brake cylinder, forcing the drawbars together and effecting a coupling. The air is then released and admitted to the other side of the piston, producing a pull between the couplers. If they disengage under this pull, which is approximately 12,300 lb., or if it is possible to uncouple by pulling the release lever while the couplers are under load, the coupler is not fit for service and is further repaired.



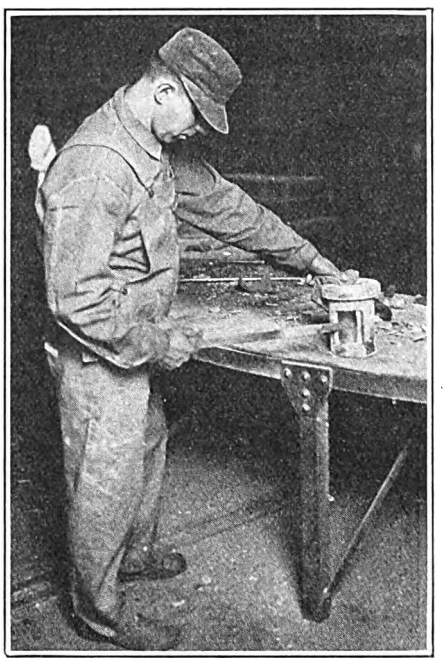
Apparatus in Cleveland Shops Tests Couplers Under Service Conditions

While the couplers are engaged, air is admitted to the coupler air line as a test on the air line gaskets on the face of the coupler.

This apparatus has helped to eliminate failures of couplers while in service. As many as 80 couplers are tested during a month.

Removing Excess Babbitt with Hot Iron

WHEN bearings are babbitted the molds frequently allow burrs and an excess of babbitt at certain points, particularly around the window of the bearing. If this is chipped off with a chisel there is danger of loosening the babbitt. A method of removing excess babbitt from bearing shells by melting it off with a hot iron is practiced in the shops of the Brooklyn-Manhattan Transit System. This method saves considerable time over that required for chipping or scraping off the excess metal and there is no danger of loosening the lining from the shell.



Opening Up a Window with a Hot Iron in Babbitting Department of Brooklyn-Manhattan Transit System

Shoe Fuse Box Mounted on Car Body

A WOODEN shoe fuse box with transite lining is used by the Philadelphia & Western Railway, Norristown, Pa. In the original installation this box was mounted on top of the shoe beam. Vibration from the trucks caused considerable trouble. The angle straps used to

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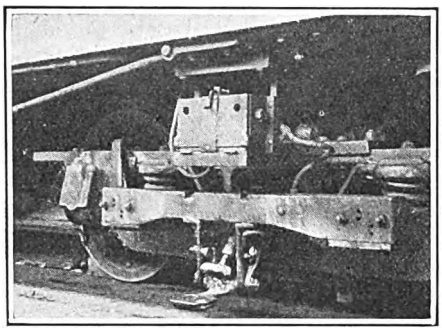
support the box would break, the boxes themselves would shake apart, terminals would work loose, fuses would break and burning at connections would result. In order to remedy this trouble the company is now mounting its shoe fuse boxes



Shoe Fuse Box Supported from the Car Body by Straps

directly on the car body. They are supported by two ¼-in. x 3-in. strap hangers, so as to bring them down to a convenient location for attaching the flexible leads running to the shoe beams. An accompanying illustration shows a shoe fuse box with the latest mounting. Care is taken to locate the box so that the swinging of the truck on curves will not interfere with the box and leads are brought out of sufficient length to take care of any turning. This method of mounting has effectively solved the difficulties previously experienced.

New Equipment Available

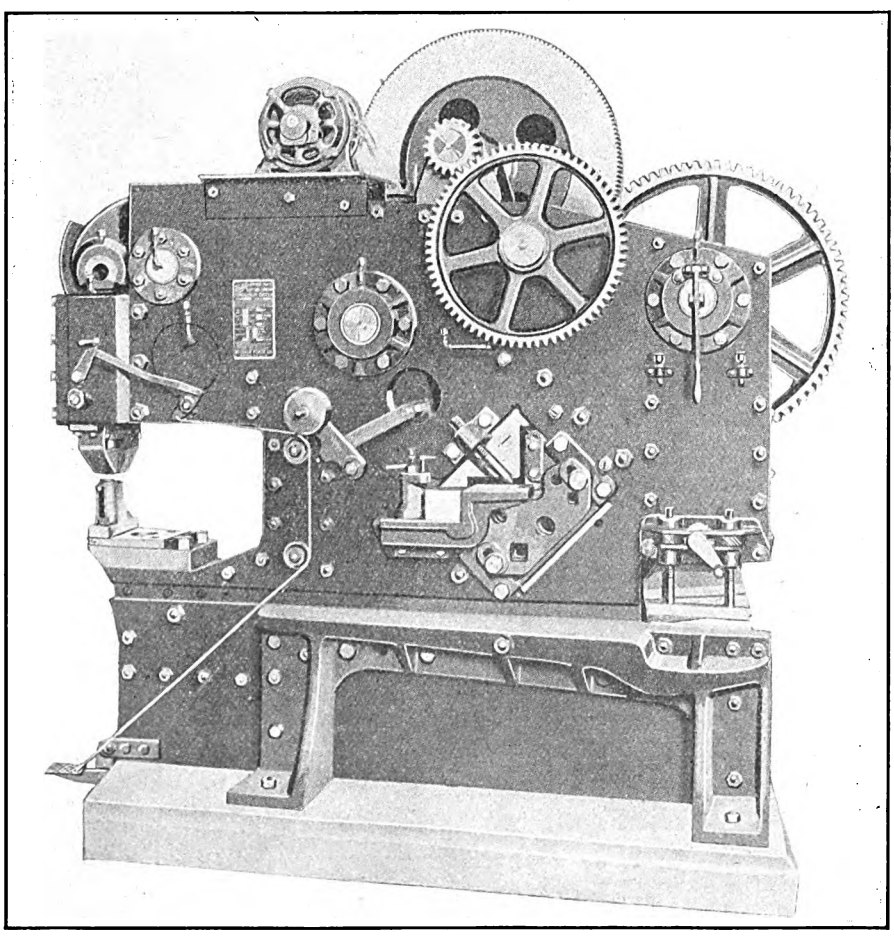
New Slitting Shear, Punch and Bar Cutter

A SERIES of new combined slitting shear, punch and bar cutters with diagonal bar cutter plunger has been brought out by the Buffalo Forge Company, Buffalo, N. Y. The two smaller sizes of the series have but one plunger for both the bar cutter and slitting shear. In the larger machines there is a separate plunger for each of these operations.

Among the changes made is an improved mitering arrangement, new type main gears, a heavier side bracket and a shift in position of the gear type shear clutch. With the old style mitering attachment it was necessary to move the stripper screw for each different angle of square cutting. With the new design the stripper screw is universal and requires no adjustment. Due to the diagonal bar cutter arrangement of the new machines, angles can be mitered or beveled on a horizontal plane. The new type gears are of steel and are smaller. The side bracket used for supporting the plates when a slitting operation is under way has the bracket and the two supporting legs cast in one piece. These machines are made with an extra high throat for handling material and the holes can be punched without turning the section over.

When it is desired to punch in the flange of channels or H columns it is only necessary to remove two bolts at the base of the die block, lift off the high die holder and replace the short punch holder with the long one. The punch is then ready for any standard beam, channel, girder or "H" section. Either block and punch is suitable for punching flats. The punch is provided with a gag, making it semi-floating. The bar cutter is engaged by shifting the ram by means of a counterweight lever. Stops for shearing angles, squares or 45-deg. miter are fixed, making it unnecessary to mark the angles.

The punching capacity of the new series ranges from 1 in. x ½ in. for the smallest machine to 1¾ x 1½ in. for the largest; slitting plates capacity ranges from ½ in. to 1½ in. Other capacities, such as that for squares, rounds, angles, etc., have a corresponding range.



Improved Punch, Shear and Cutter for Bars and Sheet Metal

Shop Compressor Governor

A NEW pressure governor, for use in maintaining pressure in shop air and water systems, has been designed by the General Electric Company, Schenectady, N. Y. In operation, the governor element is set for a maximum and minimum range of pressure. An auxiliary relay is energized to open the control circuit of the panel when maximum pressure is reached and to close it at the minimum pressure. The electrical connections are arranged so that the governor contacts do not carry current or break contact.

The electrical mechanism is of strong construction. Contact tips are silver plated to give low resistance contact and to eliminate burning and sticking. The device is inclosed in a cast-iron box with a glass window through which the indicating dial is visible. The complete unit is designed for wall mounting. It is about 10 in. square and 4 in. deep.

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The News of the Industry

Five Arbitrators Will Decide Cleveland Wages

An arbitration board of five members instead of three, will act in the dispute between the Cleveland Railway, Cleveland, Ohio, and its platform employees in the demand of the local union for increased wages and new working conditions. The present agreement between the men and the company calls for arbitration by a board of three members, but because the board of that size a year ago failed to give the men all they thought they were entitled to the union asked that the board this year consist of five members. This request has been granted by John J. Stanley, president of the company, who stated that he had no objection to an additional arbiter being named by each side.

The company has named as its arbitrators Attorney Charles Higley and Thomas P. Schmidt, a company director, while the union has selected United States District Attorney A. E. Bernsteen and Max Hayes, editor of the *Citizen*, a Cleveland labor publication. These four arbitrators have five days in which to pick the fifth member. If they fail, the company itself and the union will seek to agree upon a fifth member of the board, and if they also fail, after five days, the appointment of the fifth member will be made by the local Federal judge.

The Cleveland conductors and motormen will demand 85 cents an hour for the first three months' service, 87 cents an hour for the next nine months and 90 cents an hour after the first year. Their present wage scale is 55, 57, and 60 cents. They are also asking many changes in their working conditions, including an eight-hour day and two weeks vacation with pay.

Strike Averted in Pittsburgh

Eleventh hour efforts by Mayor Magee to avert a car strike in Pittsburgh, Pa., were successful on May 1 following an announcement by John L. Nelson, business agent of the carmen, to the effect that the threatened walkout would be deferred in order to meet with representatives of the Pittsburgh Railways for further parleys. At two different meetings on April 30 A. W. Thompson, president of the Philadelphia Company, parent company of the railways company, insisted that no increase could be granted. The men are now receiving 67 cents an hour, maximum pay, and are asking 75 and 77 cents for the first and second years of the contract. The contract expired on May 1.

In a full-page spread in the Pittsburgh *Post* of April 30 the company, in response to many questions asked relative to the contract of the city of Pittsburgh, the Pittsburgh Railways and the Philadelphia Company, reprints the agreement drawn up on Dec. 20, 1921. One article of this agreement includes the formation of a traction conference board under the new agreement with the city to sit in judgment on quesitons affecting railway operation. This board has never functioned and might now provide a means of immediate settlement. For the information of the car riders and others interested the company has told its story in voluminous "ads" in recent newspaper editions.

Perjury Admitted by Witness in Buffalo Dynamiting Case

State Senator Robert C. Lacey, Buffalo, former president of the Central Labor Council, has entered a plea of guilty before Federal Judge John R. Hazel in the United States Court for the Western District of New York, to a charge of perjury in connection with the dynamiting of a Buffalo-Niagara Falls high-speed interurban train in August, 1922. He was fined $500 and sentenced to the Erie County Jail for one day. Through his conviction, Lacey loses his citizenship and automatically is expelled from the New York State Senate.

Lacey was one of twelve men indicted by the Federal Grand Jury on various charges growing out of the dynamiting of the interurban train during the strike. The light sentence imposed upon him was due to the plea made by United States District Attorney William J. Donovan, who informed the court that Lacey has made a full and complete confession of the part he played in the alleged conspiracy and that he had been a big help to the government in obtaining evidence against other labor leaders and striking employees of the railway.

It was announced that the trial of other defendants, including John M. Parker, president of the Buffalo local of the Amalgamated; Clarence F. Conroy, business agent of the Buffalo local, and Vincent Tuero, financial secretary, will be moved at once. It is expected Lacey will be used by the government as a witness against them. The court was informed that it was through the confession of Lacey that Alvin Heineman of Lockport was produced as a witness to testify regarding the theft of the dynamite from a powder magazine in that city. Some of the dynamite was carried in Lacey's automobile.

The perjury charge against Lacey grew out of his first appearance before the Grand Jury at the investigation into the dynamiting outrage. In his explanation of the evidence against Lacey, Colonel Donovan, the government prosecutor, said to the court:

> Lacey falsely swore in answer to a question that he was not at the home of several strikers already indicted in this case; that he did not know them; that he did not know there were certain bundles in the house, and that he did not aid or assist in transporting the bundles.

Jitneys Defeated in Youngstown

At the election held on April 29 in Youngstown, Ohio, the so-called "jitney referendum ordinance" initiated by the jitney operators was defeated by more than 870 votes out of a total of 15,000 votes cast. The jitneys had practically been eliminated as competitors of the Pennsylvania-Ohio Electric Company by recent action of the City Council prohibiting them from entering or loading in the business district around the Public Square. The referendum ordinance was initiated by the jitney men to enable them to enter the forbidden district where they could divert some of the business from the railway.

The principal questions involved, as brought out in the pre-election arguments for and against the ordinance, were whether or not the city authorities should continue to control the traffic on the streets and also whether or not the jitneys should be allowed to take away a portion of the revenues of the railway, which would ultimately result in an increase in fares by the terms of the service-at-cost franchise under which the railway operates.

Transit Legislation for New York City Signed

Governor Smith of New York, on the morning of May 2, signed the act passed by the last Legislature creating a new Board of Transportation of three members for New York City under which the Mayor will have authority to undertake the planning and construction of new rapid transit railroads.

Springfield Jitney Men Refused Extension

As a result of the Transportation Board of Springfield, Mass., refusing to grant an extension of time to jitney operators all licenses for jitney operation expired on May 1. The men had sought an extension to allow officials to check up on the 25,000 signatures on petitions which had been filed for the continuance of bus service. The Transportation Board decided that the referendum was not a fair expression and would not consider the results. The Mayor had determined that bus operation would cease on May 1, thereby giving the transportation monopoly to the Springfield Street Railway. However, he told the bus men's counsel that their request for reconsideration of this decision would be granted provided the request be backed by one-half of the voters. An aggressive campaign was then started by the jitney men to obtain signatures of one-half of the registered voters.

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State Aid Sought

Virginia Railway & Power Company Seeks Settlement of Franchise Controversy in Richmond

Richmond's franchise fight has suddenly taken on life again after five years of pendulamic animation. Shortly after Easter the Virginia Railway & Power Company, following its policy publicly announced in its annual report, petitioned the State Corporation Commission for a valuation of its Richmond railway property.

News of the filing of the petition, coming as it did on the heels of the announcement of Ordway Puller, chairman of the committee on streets of the Council, that some action would be taken within sixty days on the company's petition for a blanket franchise, brought a diversity of public opinion.

Councilmen immediately petitioned for a meeting of that body, at which time the city will answer this step of the company.

COMPANY'S CASE RECITED

After reciting the situation, sketching its history briefly, the company petitions the commission to investigate and find:

> What is the reasonable and fair present value for rate-making purposes of the property of your petitioner used in the railway division in the city of Richmond; that is to say, the electric railway system of the city of Richmond, and as a part of said system those lines which are extensions of city lines into the counties of Chesterfield and Henrico, and on such basis fix such rates, tolls and charges for the service to be rendered as shall be just and reasonable.

It will be remembered that the Corporation Commission recently relieved the company of the necessity of paving the center of High Street in Portsmouth, as required in its franchises, and fixed a 7-cent fare in Norfolk on the basis of the city's own valuation figures of the company's property.

The Virginia Railway & Power Company is operating in Richmond on a 6-cent fare granted under an ordinance adopted by Council relieving it of the necessity of continuing operation on a 5-cent fare basis and other similar obligations, including cheap labor tickets during rush hours.

COMPANY'S APPEAL IGNORED

The company's petition for a blanket franchise was renewed several years ago. The first petition of the kind was presented to Council about 12 years ago. It has been sleeping peacefully in committee ever since.

Councilmen expressed amazement at the company's stand following the filing of the petition. Chairman Puller authorized the following statement:

> After agreeing in previous franchises to city control of rates, the company is now apparently unwilling to abide by its contract and wants to take away this control, as well as control of extensions and improvements and pavement obligations, and go on using the streets and enjoying the privileges of the city as before. I cannot understand why the company wants us to prepare a new franchise and at the moment we are ready to discuss it begin to undermine the very principles upon which the franchise will be based.
>
> I believe the committee will stand by the report of the John A. Beeler organization, which valued the power company's properties at $7,374,975, as compared with the $13,619,719 valuation set by Stone & Webster, the power company's experts.
>
> It is absurd for the Virginia Railway & Power Company to expect the Corporation Commission to make a valuation of its own unless it rules definitely that the state has the power to fix the rates, and the city valuation is as good a one as the power company's unless the commission does make such a ruling. If the commission makes such a rule after the power company gets a new franchise the franchise will not be worth anything.

The company explained its action in a full-page advertisement in which the greater part of the company's petition was reproduced and the history of the franchise from the date it was filed in 1920 to the present time was reproduced. The Beeler report was reviewed and it was pointed out that the city for months has taken no action on this paper.

Supplementing this advertisement, E. Randolph Williams, vice-president and general counsel, issued the following statement:

> It would be best for the city as well as the company if the State Corporation Commission assumes the authority to fix fare rates within the corporate limits of Richmond because it will take this all important question out of politics. In every city in the country where traction companies have been able to operate successfully the rate-making power has been given to the state.

The Corporation Commission has taken the petition under advisement.

COMPANY'S ACTION MISUNDERSTOOD

Mr. Williams took occasion to assure the Councilman on April 28 that the company's actions had been misunderstood, and that all it intends to do is place the controversy in the hands of unbiased persons. Some solution of its difficulties must be obtained, he said, for the good of the people of Richmond more than the good of the stockholders. Should the commission's decision be unacceptable to the city, he said the city could go to the Supreme Court with it.

City Attorney James E. Cannon told the Council that he has prepared a tentative draft of a franchise and has it ready to present to the committee, but that until the commission has acted it is useless to take up the matter. He said it looked as though the company is going over the head of the city in its action in disregard of its franchise and he asked that the paper be tabled indefinitely. This was done.

In some quarters it is accepted that action of the company in going to the commission at this particular time assures the passage of an ordinance now before the body giving the Richmond Rapid Transit Corporation, operating a bus line, the right to return to Broad Street, the main thoroughfare of the city, from which it was ousted more than a year ago.

The Richmond Rapid Transit Corporation has assured the merchants on the streets where it operates at present that the company will not discontinue present service, but will add buses and operate two lines, one on Broad and the other on Grace Street.

W. F. Jenkins, associated with Richmond's first electric railway developments, has indicated that he and associates will be bidders for the Broad Street franchise, the principal grant under which the Virginia Railway & Power Company is operating. This franchise expires next year. Mr. Jenkins signified his intention to bid in a letter sent to the City Council on April 27.

Hearings Held on Springfield and Worcester Wages

At the arbitration hearings in the case of the Springfield and the Worcester Consolidated Street Railways, employees of which are seeking an increase in wages and an eight-hour day, arguments were made on April 25 by Attorney James H. Vahey for the men and Attorney Bentley W. Warren for the company, before Lewis C. Parker, neutral arbitrator. Briefs were to be submitted on May 2, it was stated, and the first conference of the board is expected to be within a few days. In all the board is called upon to decide thirty-three points. With a nine-hour day and a spread of twelve hours in force, the men seek an eight-hour day within an eleven-hour spread.

In his closing remarks Mr. Warren said that if the employees accept the present hours the companies are willing to cut the bonuses and continue the present wage rate of 58 cents an hour, but if the nine-in-eleven day be adopted the wage rate should be reduced to 53½ cents in Springfield and 52½ cents in Worcester. An alternative would be to cut out all bonuses, which for a nine-in-eleven day, he said, would bring wages below 50 cents an hour unless the Worcester and Springfield publics are to be burdened more than other communities.

Attorney Vahey argued for a wage scale as high as or higher than that in force previous to the Storrow award of 1922, and also for a reduction of hours. Taking of evidence occupied about fifteen days and covered a wide field, including comparative wage scales, cost of living statistics, budgets, costs of operation, and so on.

Prof. Albert S. Richey, Worcester, for the companies, testified that wages on these lines were higher than the average. Howard R. Whitney, vice-president, testified that the grand total of the payroll is $1,832,789, for the two companies, and an increase of even 1 cent an hour would cost the Springfield company $31,523 a year and the Worcester company, $37,374.

Rerouting and Trackless Trolley Project Under Way in Toledo

The City Council at Toledo approved three more of Commissioner Cann's proposals incident to a general rerouting of traction lines in Toledo. The most important is the establishment of a trackless trolley line on Bancroft Street from Ottawa Park to Cherry Street, at a cost of $74,500. This service is planned to have seven trolley buses in operation at maximum and give five and one-half minute service. The Michigan Avenue line was abandoned and the Erie Street line rerouted. Through the changes in the Bancroft line the south portion of its belt will be linked with the northern part of the Short Belt to form a new line which will serve both sections and enable considerable service to be eliminated. No action has been taken on the elimination of the Indiana line, but it is expected that it will soon be cut away from the present system. Its elimination is estimated to save $58,000 a year

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and the elimination of the Michigan line will make a saving of about $8,800 annually. It is believed that the sale of $101,000 of preferred stock for the double-tracking of Sylvania Avenue will be undertaken soon in order to provide the funds for the work ready to go forward now.

Commerce Body Against Buses

The Chamber of Commerce of Boone, Iowa, has adopted a resolution recommending that business men not lend encouragement to the Union Bus Service, which plans to run between Boone and Des Moines, via Luther. The chamber recites that adequate transportation service is maintained between Boone and Des Moines by the Fort Dodge, Des Moines & Southern Railway, an electric line, which runs a two-hour service, and by the Northwestern and the Milwaukee steam lines.

Railway Proclaims Dependability of Its Bus Service

In a statement addressed to its patrons the Connecticut Company, New Haven, calls particular attention to the dependability of its bus service during the past winter. The company says:

"During the past winter from Dec. 1, 1923, to March 31, 1924, the buses of this company operated a total of 37,700 hours with a loss in time of only ninety-two hours due to mechanical troubles or bad road conditions.

"This demonstrated reliability of our bus service is of great importance to the traveling public."

Traffic Conference in New York in May

The mayors of 411 cities and towns in New Jersey, New York and Connecticut within a radius of 50 miles of New York City and the presidents of 950 civic organizations have been invited to participate in a conference on the traffic problems of this area which is to be held at the Town Hall in New York City beginning at 10:30 a.m. on May 20.

The call for the conference points out that every city in the region of New York is facing the difficult task of handling not only its own constantly increasing local traffic but also that which flows daily to and from the larger cities in the region, particularly that which originates in or is bound toward New York City. The situation, says the invitation to mayors, calls for immediate relief of present congestion and for wise planning to prevent worse conditions in the future. It is already a question whether the congestion of traffic outside of Manhattan is not greater than that in Manhattan.

The conference will consider not only the congestion of traffic, but the traffic accident situation, traffic costs, convenience of travel within the region of New York (or lack of it), the adequacy of existing bridges, tunnels, streets and highways, the probable future need for wider, more numerous and differently located traffic arteries, and the whole relation of traffic problems to the contemplated regional plan of New York and its environs.

Congestion Reduced

New Traffic Regulations in Buffalo Speed Up Traffic—No Parking in Downtown Area

Two new traffic ideas put into effect in Buffalo, N. Y., have reduced congestion in the downtown retail shopping zone and have speeded up the movement of street cars and other vehicles in four parallel streets in the business section of the city. One of the new traffic ideas is the enactment of a no-parking ordinance affecting practically the entire down town business area. Recommendations for the enactment of this ordinance were made in a report submitted to the municipal authorities by the traffic committee of the Chamber of Commerce. The second traffic idea is the installation of an automatic electric signal system along Main Street from Swan to Tupper Street, a distance of almost 1 mile.

Measure Very Helpful

The no-parking ordinance was enacted and put into successful operation despite the objections raised by Main Street merchants and property owners, who argued that the plan would drive business from Main Street department stores and office buildings to community trade centers in outlying parts of the city where motorists and others could park their cars without fear of arrest. Under the no-parking ordinance, automobiles cannot be parked along Main Street or any parallel or intersecting thoroughfare within two blocks east or west and the north and south limits extend for about one-half mile, taking in the entire downtown business zone of the city. Certain areas have been designated by the municipal authorities as parking spaces and the erection of a large number of new garages provides adequate parking space for motorists who bring their cars into the retail shopping zone of the city.

Under the old traffic ordinances, parking on Main Street was prohibited but motorists used parallel and intersecting streets for all day parking without restriction. This tended to delay the movement of street cars and often interfered with the operation of fire and other emergency vehicles.

Signals to Be Installed Similar To Those in Detroit

The new automatic electric signal system installed along Main Street is similar to that in use in Detroit. Its operation has speeded up the movement of street cars and other vehicles. The speed limit of 15 m.p.h. in the congested district of the city has been lifted and motorists can now travel from 20 to 25 m.p.h. through the signaled zone.

The plan provides for red, yellow and green electric lights at every street intersection. Red lights indicate traffic must stop, yellow indicates a change is to be made in the lights and green lights indicate traffic can move. The green or clear signal allows traffic to move one minute along Main Street while one-half minute is given for traffic to cross Main Street. A gong is made to sound whenever the signals change. Left-hand turns are prohibited in Main Street. Mayor F. X. Schwab already has recommended to the City Council that the same type of signal system be used on Delaware Avenue, a parallel street which has become a motorists' boulevard with a serious traffic problem.

Prole Rebate System to Be Tried in Long Beach

The Prole system of rebates for fares went into effect in Long Beach on April 28 on the lines of the B. & H. Transportation Company. Each purchaser of a 5-cent fare receives a transfer bearing two 2-cent coupons, redeemable as cash at the rate of one coupon to each 25 cents of cash purchase by the merchants listed on the back of the transfer and any other merchants who choose to redeem them. The Prole system has been approved by the Railroad Commission. Arrangements have been made for a ninety-day trial period. The rebate fare system, founded by W. A. Prole, is known as the Prole Transfer System and has been patented as such. The plan provides for the giving of transfers from 9 a.m. to 4.30 p. m. and from 6.30 p. m. to midnight every day except Saturday and Sunday. According to Mr. Prole, the system will reduce the congestion during the early morning hours and evening rush hours and will tend to increase patronage during slack hours.

One-Man Cars Restored in Toledo

One-man cars were again put in service on the Bancroft line in Toledo by the Community Traction Company, on Sunday, April 27.

"The purpose of putting on the one-man cars is to reduce operating expenses," declared President B. C. Adams, in making his announcement. "We want the lowest possible fare in Toledo and that means we must have the lowest possible operating cost. On this line alone, one-man cars will mean a saving of $25,000 a year in expense."

Ten cars of the 600-type have been converted for one-man operation. They are entered at rear and passengers pay as they leave by the front door. There are no rear doors.

The present agreement with the union covers one-man operation by providing additional pay of 5 cents an hour for the operators.

The City Council at Toledo banned the one-man cars from this and two other routes in October, 1922, but it has since developed that the resolution was not a complete prohibition against the present use of the equipment.

Under Section 14 of the Milner ordinance the company also has rights in the way of changing service in the interest of economy and of resisting efforts of the Council to change service requirements when they would cause added expense. Disagreements are subject to arbitration. Although Council at a recent meeting ordered legislation prepared to oust the one-man cars from the Bancroft line, it is doubtful if this legislation will be enacted.

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Will Develop Business

Michigan Railroad Joins with Bus and Truck to Increase Freight and Passenger Facilities

By joining forces with a bus and truck company for transportation in a 26-mile gap between Owosso and Flint, Mich., the Michigan Railroad will save hundreds of miles of freight carriage and will develop a passenger service not now enjoyed by the company. This statement was recently made by F. W. Brown, Grand Rapids, transportation superintendent. Formerly all freight for Flint and points north had to pass by way of Detroit. Negotiations now are practically completed and as soon as schedules can be made and other details arranged the freight and passenger service over this route will begin.

The bus service in question now operates between Lansing and Flint, but officials of this firm have said they will be glad to shorten their lines in order to enjoy the increased service the railway would make possible. The railway, according to Mr. Brown, plans to sell through passenger tickets across this gap as well as quote freight rates to Flint by way of Owosso from any point on the road. This is done now, but the cars must pass on two sides of a triangle with approximately 50-mile legs, while now they will go direct.

DE LUXE BUSES WILL MEET CARS

The truck company agrees to have buses of the Pullman type meet cars at Owosso and at Flint. The railway will run four limiteds each way daily and will offer competition for the only other means of transportation between Lansing and Flint, the Grand Trunk Railway. The bus line will not compete as it agrees to co-operate with the railroad. Officials express themselves as being extremely glad to take up the more frequent short hauls instead of the more than twice as long haul now made. Prices for both passenger and freight rates will be competitive from all points, Mr Brown said.

At present a huge freight traffic daily passes between Lansing and Flint and Jackson and Flint. Flint is a city in which thousands of automobiles are turned out each week and parts in great quantity are sent by way of interurban both from Jackson and from Lansing. The Jackson freight was taken the 100-mile trip by way of Detroit, while the Lansing freight for the most part went to competitive lines, since the railway had no connections direct. Now by means of the truck service these automobile parts can be transported cheaply and speedily to their destination. Mr. Brown now is considering methods of transporting the freight. Containers have been considered favorably, but perhaps more favor has gone to collapsible racks which can be folded into a small space when there is no return cargo to require their use, as will be the case with a certain amount of the traffic.

Mr. Brown has been working intensively along truck - bus - interurban schemes for some months and also has under consideration a plan whereby trucks in various cities could work under contract, as will the Owosso-Flint line, and would deliver direct to and from the railroad cars and various industrial plants. This plan is nearing the workable stage.

Oakland's One-Man Cars Reassigned

One-man cars have been taken off Telegraph Avenue in Oakland, Cal. This removes all the one-man cars from Oakland with the exception of those on short feeder lines. The feeder lines, however, never figured in the controversy that has raged since last October.

W. R. Alberger, general manager of the Key System Transit, says the cars will be used on Ashby Avenue and Dwight Way in Berkeley. He explained that the company has only a limited number of these cars and that they are all needed in Berkeley, where they are being put on six months' trial beginning May 1.

Mayor Davie has sought to construe this action by the company into a personal victory for him. It will be recalled that last October an ordinance was passed against the use of one-man cars in Oakland, but that the city never exercised the police power under this measure. The Mayor now points out that forcible action on the part of the the city against the one-man cars would have been welcomed by the company, as it would have enabled it, in his opinion, to put the matter in the courts, resulting in years of litigation. He says that to his mind the action of the company "indicates that the Key System officials realize that they can no longer defy public opinion and the duly constituted authorities of the city of Oakland."

The company ignored the order forbidding operation of this type of cars, having been advised by the State Railroad Commission that the cars had its approval. No attention was paid by the company to threats to use force. Then the Mayor, backed by Commissioner Moorehead, put the city officially into the transportation business as a competitor to the Key System by acquiring a bus. This vehicle was run at a 5-cent fare as compared with 6 cents charged on the street cars. It was shifted to various routes as the weeks went by. Efforts made to secure other buses were defeated by vote of the City Council. The Rosalie, as the bus was known, ran four months and then was taken off because the City Auditor ruled that the city coach had been illegally acquired. He refused to pay the bill covering the cost of the bus.

The scene of one-man car activity now shifts to Berkeley. That city has voted to put the cars on probation for six months. This was agreed to some time ago, but there has been considerable delay, owing to the fact that the company, by the terms of the agreement with the city, was compelled to install a number of automatic street safety devices. This work has now been completed and it was expected the cars would run on May 1.

Pending the outcome of the Berkeley experiment the company is acquiring no new cars of the one-man type. There are not more than fifty of these, although there are some of the newer one-man, two-man type.

Detroit Refuses to Deal with Union

The demands of the employees of the Detroit Department of Street Railways for an average wage increase of 14 per cent have been presented to Ross Schram, assistant general manager, and referred by him to the Street Railway Commission. The commission has taken the stand that it will deal only with committees representative of the trolley workers, elected in its own carhouses. The proposition of the commission provides that a committee selected by all employees meet with the commission and its statisticians and auditors to formulate an adequate wage scale and proper working conditions.

Union officials express the belief that an agreement can be reached without friction, but that the men are prepared to resort to arbitration. The commission called 106 platform men, selected on a seniority basis, to confer with its members and the assistant general manager. It was cited that the demands for the increase in wages and for modified working conditions were presented on stationery of the Amalgamated Association, but that the city could not deal with a union. The wage increases asked would amount to about $80,000 annually, approximately the present net income of the railway.

Union officials say that the procedure they are following was agreed upon by the commission on Feb. 7, 1923, and that if the commission holds out for any other form of procedure it is violating that agreement.

The D.S.R. has decided that if an employee permits the deduction from his wages of the same amount as the union he will be insured for $2,000 in case of death and $15 a week after the first week in case of sickness or accident. A blanket policy covering all platform men who have been in the employ of the department six months has been put into effect.

Abandonment and Consolidation Authorized in Mobile

The Alabama Public Service Commission, on April 19, authorized the Mobile Light & Railroad Company to take up its tracks and to abandon service on certain streets, to lay tracks and furnish service on certain other streets and to rearrange and consolidate its service. The commission held that when it is shown a railway fails to earn a fair return on its investment, and such failure is not its fault, the utility should be allowed to rearrange and consolidate its service, if such changes give promise of resulting in substantial reduction of operating expenses, without serious impairment of its public service.

Zone Fares Increased

The Board of Public Utility Commissioners of New Jersey has granted permission to H. H. Parmlee, as receiver of the North Jersey Rapid Transit Company, operating in Bergen County, to charge a 10-cent fare in each zone. There will be a 6-cent fare for school children and a 7-cent fare where tickets are bought in books. The company went into receivership in April, 1912.

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News Notes

Buses Will Be Regulated.—The bus problem at Newcastle, Ind., at last has received recognition on the part of the City Council in the introduction of an ordinance recently providing for the regulation of buses. The city is given the right to fix schedules and routes through the board of safety, the action to be ratified by the City Council. Buses on given routes will be limited in numbers and signs will be used to show the streets traveled. A penalty of a fine of $100 is provided for violation of any of the provisions of the ordinance.

Planning to Restore Jitneys. — An ordinance aimed to restore jitney service in Port Arthur, Tex., was read for the first time before the City Council by City Attorney Wistner recently. Some time ago the Mayor introduced and passed a resolution which would have the effect of opening all the streets of the city for the operation of jitney lines. This action was the outcome of negotiations with the management of the Port Arthur Traction Company in an effort to obtain further railway extensions. The situation in Port Arthur has attracted considerable attention from owners of jitney equipment in Port Arthur itself and also from outside sources. It is said that a number of Houston jitney men are planning to enter the service in Port Arthur when it is restored.

Will Arbitrate Wages.—Employees of the Wheeling Traction Company, Wheeling, W. Va., are seeking an increase in wages of 2 cents an hour. The company offered an increase of 2 cents, but this was rejected. The present wage scale is from 49 cents to 57 cents maximum. Arbitration will likely settle the controversy.

Stages Will Serve Short Hauls.—The Southern Pacific Company, operating in Oregon, has recently announced that three of its short-haul lines will be served in the future by automobile stages, to replace the present railway service. The lines affected are the Salem-Black Rock branch, 25 miles long; the Whiteson-Willamina branch, 20 miles long, and the Woodburn-Silberton line, 10 miles. The company will not own the stages, but will handle the passenger business on the same schedules as at present through traffic agreement with the existing stage lines.

Buys Bus Lines.—The Northern Ohio Traction & Light Company, Akron, Ohio has purchased two independent bus lines—the Northeast and Gregory—in Akron. There are three buses in each line and both operate into the Northeast and Goodyear Heights section of the city. The Northeast has been in operation several years, the other only a few months. The newly acquired lines will be operated as a part of the traction company's city system. These, with the buses recently purchased, and the ones in operation give the company a fleet of sixty city buses in Akron.

Company Wants Cut—Men Seek Advance.—The employees of the Stark Electric Railroad, Alliance, Ohio, have rejected the company's suggestion of a 10-cent cut in wages effective with the signing of the new scale on May 1. The men want an increase of 9 cents an hour and a continuation of the present working agreement.

Will Operate Buses in Germantown Soon.—The Philadelphia Rapid Transit Company, Philadelphia, Pa., will be ready to operate a bus line in Germantown ten days after the City Council passes an ordinance granting a franchise for the proposed line, according to the statement made by the company to W. D. B. Ainey, chairman of the Public Service Commission. J. A. Queeney, president of the Philadelphia Rural Transit Company, a subsidiary of the railway company, testified before the commission that in the event of a temporary certificate being granted the company would operate a fleet of buses which would provide ample facilities for that section of the city. The fare would be 10 cents with an exchange system from the buses to the cars, operated in Germantown by the Philadelphia Rapid Transit Company, by the payment of an additional 3 cents.

Full One-Man Operation on Suburban Line. — The Morris County Traction Company, Morristown, N. J., is now entirely operated with one-man cars (converted), no safety appliances being used at this time. The company's main line operates through ten zones and identification checks are issued to passengers. This has worked out well and no delays of any kind have been experienced. Schedules operated are the same as those with two men. Operation is through thickly settled suburbs. An average speed of 12.9 m.p.h. is obtained. On the Dover-Hopatcong line there are two railroad crossings at grade. The derails at these points have been electrified, Cheatham electric deraling device being used. The installations at these points have been approved by the Board of Public Utility Commissioners.

Fare Will Be Lowered.—Railway fare on the pier line, running from the Public Square to the East Ninth Street docks, in Cleveland, will be reduced from 6 cents to 2½ cents, according to a recent announcement of John J. Stanley, president of the Cleveland Railway.

Time Extended on Fare Change.—The Key System Transit Company, Oakland, Cal., has been granted an extension of time by the Railroad Commission until May 4, 1924, in which to remove the discrimination in interurban fares and service now existing against the city of Piedmont, as heretofore ordered by the commission. The matter has been referred to previously in these columns.

Fares Increased.—The Androscoggin & Kennebec Railway, Lewiston, Me., recently received permission from the Public Utilities Commission to file a new schedule of passenger rates in which the cash fare for a single zone ride will be 10 cents instead of the present 9-cent charge. Students' tickets in books of 100 coupons will be sold for $5.

Fares in Hornell Approved. — The Public Service Commission has approved the application of the Hornell Traction Company, Hornell, N. Y., to try reduced fares for a period of ninety days. Instead of the 8-cent fare which has been in effect, a 7-cent fare will be charged in Zone 1 (within the city of Hornell and from Hornell to Glenwood Park) or between any two points within Zone 2 (all stops between Glenwood Park and Canisteo). Metal tickets will be sold at the rate of twenty for $1 and ten tickets for 50 cents. A twenty-ticket book will be sold for $1.40, good in either direction between Canisteo and Crittendon. An account of Hornell's fare difficulties was published in the ELECTRIC RAILWAY JOURNAL, issue of April 26.

Tramway Men Petition.—Employees of the Montreal Tramways, Montreal, Can., are seeking the return of the 1920-21 conditions which were terminated in July 1921 when a 12½ per cent reduction in wages was put into effect. The present demand therefore is for an increase of 12½ per cent on the existing rates of pay. The men's representatives have been instructed to interview the company with a view to obtaining a definite reply on the wage schedule proposals and also on the pension scheme. Four thousand tramway employees are effected by the outcome of the wage matter. It is believed that the company favors the proposition of the men that an employee shall be eligible for a pension after twenty years service or upwards.

Hears Abandonment Petition.—The petition of the Chautauqua Traction Company, Jamestown, N .Y., to abandon its line between Mayville and Westfield had its final airing before the Public Service Commission on April 25. Briefs are to be filed in two weeks by attorneys for the company and the village of Mayville, which opposes the proposed abandonment. The company showed that there has been very little business in passenger service between Mayville and Westfield in many years. Testimony was introduced by the Company to show that it was feasible to utilize other transporting means for the patrons of the line.

Wants Relief from Superior. — An ultimatum has been delivered to the City Council of Superior, Wis., by the Duluth Street Railway threatening the establishment of one-man car service through an appeal to the commission unless the city immediately takes the proper steps to pass two proposed ordinances covering the halting of street cars at railroad crossings and charging bus companies a license fee for operating in Superior. Such relief was promised the railway by the Council on Sept. 15, 1923, in return for the company's agreement on fare rates providing a 10-cent straight cash fare and five tickets for 30 cents, thus maintaining the old 6-cent fare. The company states in its communication to the Council that during the past several months it has continued to do so as long as the city fails to grant the necessary relief. The annual report of the Superior division of the Duluth Street Railway for 1923 shows the company suffered a net deficit of $10,396.

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Foreign News

London Traffic Bill Introduced

Plan Would Create Committee with Control Over All Local Carriers and Traffic

The London traffic bill, introduced in Parliament by the British government, provides for control over an area covering a radius of 25 miles from Charing Cross. It is intended that the Minister of Transport, acting through an advisory committee, will have power to prohibit all wasteful competition, and to make regulations on a wide variety of subjects. These regulations will have to be submitted to Parliament.

Two points which may be referred to the advisory committee have special interest as bearing on bus competition with tramways and railways. One is the co-ordination of all or any of the various forms of transport services, and co-operation between the persons operating the same or different forms of transport services with a view to combined operation in the best interests of the public. The other is to decide on the comparative desirability of different forms of transport services in various circumstances, either generally or in any specific case.

BUS PROHIBITION IN MINISTER'S HANDS

Bus licensing authorities are to have power to define the routes taken by buses, to require that a bus shall not ply for hire unless it maintains a regular service, and to specify the number of buses to be used on any given route. The Minister may prohibit or restrict bus traffic in streets where he considers such a course justified by width of the street, traffic density, or the existence of alternative facilities. Expenses incurred under the bill are to be met out of the road fund. There will be no charge on the ratepayers or the taxpayers.

The bill is rather complicated and provides among other things for restrictions on powers to break up street surfaces. The government believe that its operation will help buses, tramways and underground railways to pay their way.

The introduction of the bill in Parliament was hastened by the troubles incident to the London tramway men's strike. The court of inquiry which the government had set up reported that the claim for increase of wages was not seriously questioned. The crisis had arisen through the London tramway undertakings being unable to earn sufficient to meet this claim. This had been brought about by the severe competition of buses in the absence of any co-ordinating control, by the heavy expenditure on renewals and upkeep of permanent way at present high costs, and by the discharge of the statutory obligations for the maintenance of the surface of the highway.

All parties expressed the view, with which the court concurred, that without some co-ordinating control of passenger traffic there was little if any prospect of improvement in the condition of the industry. An undertaking by the government to press forward legislation placing the passenger traffic of the metropolitan area under some co-ordinating control afforded, in the court's view, a basis, and the only one at present suggested, for reopening negotiations between the parties.

The London traffic bill, based on this report, was debated in the House of Commons on March 28, when the second reading was carried by 211 votes against 112. The opposition came from the Liberal party, though some of the Labor men also opposed. The ground of objection was that the bill would set up a bureaucratic control and would favor a monopoly of the "combine" of the underground railway, bus and tramway companies. This objection was based on the composition of the committee, the appointment of which the bill proposes, to advise the Minister of Transport. This committee would consist of a chairman, twelve ordinary members representing local authorities, government departments and the police, and six additional members, two of them representatives of labor and four of commercial transport interests. Only on subjects directly concerning them are the six additional members to be called into council.

The London County Council and other local authorities in the metropolitan area, as well as the Labor interests, are conducting an agitation in favor of making the advisory committee entirely a municipal and state body. On the other hand, bus and commercial motor interests oppose the scheme on the ground that it gives too much power to the municipal interests.

Bordeaux Trams and Buses to Extend

The report of the Compagnie Française des Tramways Electriques et Omnibus de Bordeaux for 1923, published recently, takes account for the first time of the agreement with the city by which the fares of the urban sections were increased 25 per cent. Of the sums so received two-fifths is to be applied to the reduction of the deficit accrued during former years and three-fifths for new track and rolling stock equipment.

During 1923 there were issued 10,000 bonds of 500 francs each bearing 6 per cent interest. This netted 4,750,000 francs, which was also in a large measure expended in re-equipment, including the building of a substation. There was expended for new rolling stock a sum of approximately 1,300,000 francs.

In addition large suburban extensions were undertaken, including electrifying the lines from Bordeaux to Pessac and Allouette and from Bordeaux to Léognan. A new line is in course of construction from Bordeaux to Bouscat and a new car shop has been constructed at Pont-de-la-Maye. The departmental, or county, government, has advanced for these suburban lines a sum of 5,000,000 francs.

This is considered one of the most important extensions of urban and suburban electric car services undertaken by any French municipality since the war.

Cork-Screw Railway for Paris

Another idea has been put forward for handling short-haul passenger traffic in Paris. This time it is proposed to propel a series of close-coupled cars by an underhung screw, or worm. This is similar to a project which, it is announced, is to be operated in London during the summer at the Wembley Exhibition. The idea seems to have pleased the fancy of the French and estimates have been made that from the crowded centers of the Place de l'Opera to the Place de la Concorde, to the Palais Royal and to the Port Saint Denis 16,000 passengers per hour could be handled by eighty cars as a maximum, the distance to be covered in each trip being not more than 2,000 m. (6,600 ft.). This gives 200 passengers to the car per hour.

Handling London Traffic During the Strike

The recent strike of tramway and bus employees in London, which terminated on April 1, crippled the transportation facilities to the extent of shutting down all regular local service except the tubes and the suburban branches of the main line railways. Some indication of what the strike meant to the underground companies, is revealed in the following figures: The week's passengers including tramway and bus lines, dropped from 35,000,000 to 8,000,000, but the railways carried 4,000,000 passengers, exclusive of season ticket holders, over a normal week. On Wednesday, the heaviest day on the tubes, nearly 1,250,000 passengers were carried.

Owing to the circumstances prevailing, the underground companies were unable to put a single extra train into service; neither were they able to make any increase in the staff. The automatic ticket machines were of considerable assistance in easing the booking office situation. The bank of machines at Victoria station issued 25,000 tickets daily as against 7,000 tickets on a normal day. On the first day of the strike, half a ton of coppers was collected from this station alone.

The chief difficulty, apart from the handling of the crowds, was the high proportion of short distance riders who were new to the underground railways and added to the difficulties of the staff by asking questions rather than paying heed to the direction notices.

The new trains on the District Railway and Piccadilly tube showed the three wide center doors to be of paramount importance in handling dense crowds. The trains frequently had loads of 1,000 passengers apiece.

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Financial and Corporate

Another Suit in Connection with St. Louis Reorganization Affairs

A plan of reorganization for the United Railways, St. Louis, by which the St. Louis Transit Company 5 per cent bonds would be foreclosed and the United Railways general 4s would be validated and continued until their maturity ten years hence, has been suggested in a suit which Samuel W. Adler, New York, has filed in the United States District Court at St. Louis. Mr. Adler holds approximately $135,000 of the St. Louis Transit Company 5s, of which the total issue now outstanding amounts to $10,000,000. He was the plaintiff to the suit under which the present receivership of the United Railways was decreed.

In his new suit Mr. Adler asks that the several trustees under the mortgages be enjoined temporarily from prosecuting foreclosure suits until final decree shall be entered, determining the respective priorities and equities of the securities of the United Railways properties. He asks further that the St. Louis Union Trust Company as trustee under the $30,300,000 issue of general 4s be "temporarily restrained from claiming or asserting that the bonds have matured."

The theory of the Adler suit is said to be that when the court determines the priority of the various liens against the United Railway properties they will rank as follows: First, the $4,200,000 of receiver's certificates; second, the underlying bonds; third, the general 4s, the St. Louis Transit 5s and then the other outstanding securities.

If the court should issue the orders requested in the suit the receiver's certificates and the underlying bonds would be paid off and the general mortgage 4s, now in default because of nonpayment of interest, would be reinstated and extended for ten years as a first mortgage. The Transit 5s would then remain as the basis for the reorganization of the system, and the obligations of reorganization would devolve upon the holders of the Transit 5s.

Charleston-Isle of Palms to Be Sold on May 7

Judge Henry A. M. Smith recently handed down a decree ordering the final sale of the property of the Charleston-Isle of Palms Traction Company, Charleston, S. C., at public auction on May 7. Recently P. R. Rivers, Charleston, was appointed receiver of the company by order of Judge Smith in Federal court upon petition of the Baltimore Trust Company, trustee, under the indenture securing $250,000 of 5 per cent bonds. The Sheriff of Charleston County on Feb. 21 seized the ferryboats and cars of the company under attachment proceedings. He was ordered to show cause why he should not be restrained from proceeding to advertise and sell that portion of the property which he seized. Arthur M. Huger, United States Commissioner, was named by Judge Smith in the order appointing a receiver as a special master in this matter. The property will be offered for sale by Mr. Huger.

If efforts should fail to sell the property as a whole the master will be prepared to offer it in three parcels; the first will be composed of the wharves and slips located in Charleston, office furniture, materials and supplies; parcel 2 will be comprised of the tracks of the Charleston-Isle of Palms Traction Company as they now lie, and parcel 3 will include the cables, lighting and power systems, poles and overhead wiring.

Interpretation of Amended New York Law Causes Confusion

The Fearon bill, signed by Governor Smith of New York, amending the penal law and making it misconduct in office for an officer or director of a stock corporation to declare a dividend except from surplus instead of "surplus profits arising from the business," as formerly in the law, has caused discussion as to application.

The State Tax Commission held the opinion that the language of the law is simply changed and that no added meaning is had, as surplus always consists of profits. Other authoriities, however, declare that the changed wording permits the inclusion in surplus of unearned income such as enhanced value above the purchase price of realty, without the actual physical conversion of such property into cash so as to show a money profit, the contention being that the striking out of the words "profits arising from the business of a corporation" leaves the word "surplus" undefined, which of course would include unearned income.

Section 664 of the penal law relates to misconduct of officers and directors of stock corporations, and specifies what directors thereof may not do in the handling of the funds of such a corporation. The amendments would seem to affect particularly utility and insurance corporations.

Net Income and Traffic in Detroit Fall Off Slightly

The Department of Street Railways, City of Detroit, during March, 1924, reports a total revenue from transportation of $1,988,878. In March a year ago this revenue was $1,755,955. The total operating revenue, which included the above-mentioned figures, was $2,031,930 and $1,851,535 for March, 1924 and 1923 respectively. Total operating expenses showed an increase from $1,339,794 in March, 1923, to $1,403,261 in March of the current year. The net revenue from railway operations was $628,669, against $511,741 in March a year ago. The net income varied very slightly. A year ago it was $98,025, and in March of the current year $97,180. In March this year 42,773,240 passengers were carried, compared with 43,227,300 in the corresponding month last year.

All Records Smashed in 1923

Electric Railways Carried More Passengers, Operated More Cars and More Car Miles, and Had the Greatest Gross Revenue in History of the Industry—Net Revenue Off Nine-tenths of 1 per Cent

REPORTS to the American Electric Railway Association from 400 electric railways representing more than 80 per cent of the whole industry show total passengers carried as 13,280,730,742 in 1923, compared with 12,822,423,121 in 1922, an increase of 3.6 per cent. Applying this increase to the total for the whole industry as reported by the United States Census Bureau in 1922 nearly 16,000,000,000 passengers were carried by the traction lines in 1923.

The total revenues reported by the 400 reporting companies was $781,186,841 in 1923 and $762,805,840 in 1922, an increase of 2.5 per cent. Operating expenses increased 3.6 per cent, from $558,547,354 in 1922 to $578,763,453 in 1923. In consequence of the greater increase in the expenses compared with the revenues the operating ratio rose from 73.2 per cent to 74.1 per cent, an indication that operating conditions were not so favorable in 1923 as they had been in 1922.

Edmund J. Murphy, chief statistician of the association, writing in *Aera* for May, says the principal causes of these unfavorable conditions were the slightly lower rate of fare prevailing in 1923 and the higher cost of operation, brought about chiefly by increased labor costs and in lesser degree by increased commodity prices. According to Mr. Murphy there is also evidence that slightly more service was given in proportion to the traffic than in 1922. This also operated to increase the operating ratio. The net revenue, in consequence, fell off. In 1922 it was $204,258,486, while in 1923 it dropped to $202,423,389, a decrease of 0.9 per cent.

In the accompanying tables data are given for 288 companies. The other 112 companies could not be included because in some cases they could not segregate their railway taxes and fixed charges from their light and power business and in other cases their fiscal year does not coincide with the calendar year on which the tables are based. This smaller group operates 25,219 miles of single track and represents approximately 60 per cent of the whole industry.

The operations of this group follow the same general trend as the larger group. The number of revenue passengers increased 3½ per cent, transfer passengers increased 2.45 per cent and total passengers, including free passen-

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Statistics Compiled by American Electric Railway Association

TABLE I—COMBINED INCOME STATEMENT OF 288 RAILWAYS

	1923	1922	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Railway operating revenues	$549,825,275	$538,756,193	$11,069,082	2.05
Railway operating expense	412,455,676	397,729,646	14,726,030	3.70
Net operating revenue	$137,369,599	$141,026,547	(D) 3,656,948	(D) 2.59
Net revenue: Auxiliary operations	23,924,788	21,196,178	2,728,610	12.87
Taxes	36,210,928	35,428,696	782,232	2.21
Operating income	$125,083,459	$126,794,028	(D) 1,710,569	(D) 1.35
Non-operating income	13,295,850	12,327,856	967,994	7.85
Gross income	a$138,448,406	b$139,136,987	(D) 688,581	(D) 0.50
Deductions from gross income	99,711,148	99,724,713	(D) 13,565	(D) 0.01
Net income	$38,737,258	$39,412,274	(D) 675,016	(D) 1.71
Operating ratio (per cent)	75.0	73.8	1.2	1.62
Ratio: Net income to operating revenue	7.04	7.31	(D) 0.27	(D) 3.69
Miles of single track				

a Includes $69,097 equalization income. b Includes $15,103 equalization income.

TABLE II—COMBINED INCOME STATEMENT (ON A CAR-MILE BASIS) OF 288 RAILWAYS

	1923 (Cents Per Car Mile)	1922 (Cents Per Car Mile)	Per Cent Increase or (D) Decrease
Railway operating revenues	44.8	45.3	(D) 1.0
Railway operating expense	33.6	33.4	0.7
Net operating revenue	11.2	11.9	(D) 6.0
Net revenue: Auxiliary operations	1.9	1.8	8.5
Taxes	2.9	3.0	(D) 1.5
Operating income	10.2	10.7	(D) 4.5
Non-operating income	1.1	1.0	10.0
Gross income	11.3	11.7	(D) 3.5
Deductions from gross income	8.1	8.4	(D) 3.5
Net income	3.2	3.3	(D) 3.0

TABLE III—OPERATING EXPENSES (BY PRIMARY ACCOUNTS) OF 288 RAILWAYS

	1923	1922	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Way and structures	$62,668,050	$59,626,816	$3,041,234	5.10
Equipment	49,843,090	48,289,672	1,643,418	3.36
Power	61,756,842	60,424,384	1,332,758	2.21
Conducting transportation	173,640,168	167,410,301	6,229,867	3.72
Traffic	1,844,695	1,760,058	84,637	4.81
General and miscellaneous	57,390,451	54,843,356	2,547,095	4.64
Transportation for investment—credit	—242,292	—244,507	(D) 2,215	(D) 0.96
Total operating expenses	a$412,455,676	b $397,729,646	$14,726,030	3.70

a Includes $5,554,672 of undistributed expense.
b Includes $5,619,566 of undistributed expense.

TABLE IV—SIGNIFICANT RATIOS DERIVED FROM ACCOUNTS OF 288 RAILWAYS

	1923	1922	Per Cent Increase
Railway operating revenue	$549,825,275	$538,756,193	2.05
Per mile of single track	$21,801	$21,371	2.01
Passenger revenue	$514,010,138	$504,491,839	1.88
Per revenue passenger	[1]7.1c	[1]7.2c	(D) 1.39
Per total passenger	[1]5.7c	5.7c	
Per mile of single track	$20,381	$20,011	1.84
Per passenger car-mile	43.9c	44.0c	(D) 0.23
Per car operated	[2]$15,785	[2]$16,013	(D) 1.43
Per revenue car-hour	[3]$3.99	[3]$4.07	(D) 1.97
Revenue passengers	[4]7,022,740,707	[4]6,797,627,822	3.31
Per mile of single track	[4]289,795	[4]280,898	3.16
Per passenger car-mile	[4]6.1	[4]6.1	
Per car operated	[5]222,592	[5]223,425	(D) 0.38
Per revenue car-mile	[6]57	[6]58	(D) 1.73
Total passengers	[4]8,719,157,241	[4]8,463,910,829	3.01
Per mile of single track	[4]359,799	[4]349,754	2.87
Per passenger car-mile	[4]7.6	[4]7.6	
Ratio: Transfer passenger to revenue passenger (per cent)	21.0%	21.0%	
Car miles	1,226,016,151	1,188,487,632	3.15
Per mile of single track	48,613	47,144	3.11
Per car operated	[2]37,159	[2]37,329	(D) 0.46
Per revenue car-hour	[7]9.30	[7]9.38	(D) 0.86
Car hours	[8]115,531,437	[8]111,051,112	4.02
Per car operated	[9]3,986	[9]3,970	0.40

[1] 281 companies. [5] 238 companies. [8] 250 companies. [2] 242 companies. [6] 247 companies. [9] 223 companies. [3] 254 copmanies. [7] 255 companies. (D) Decrease. [4] 280 companies.

TABLE V—OPERATING EXPENSES (PER CAR-MILE) OF 288 RAILWAYS

	1923	1922	Per Cent Increase or (D) Decrease
Way and structures	5.1	5.0	2.00
Equipment	4.1	4.1	
Power	5.0	5.1	(D) 1.96
Conducting transportation	14.2	14.1	0.71
Traffic	0.1	0.1	
General and miscellaneous	4.7	4.6	2.17
Transportation for investment—credit			
Total operating expenses	a33.7	b33.5	0.59

a Includes 0.5 cent of undistributed expense.
b Includes 0.5 cent of undistributed expense.

TABLE VI—OPERATING STATISTICS OF 288 RAILWAYS

	1923	1922	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Passenger car miles	1,178,000,332	1,144,459,363	33,540,969	2.93
Total revenue car miles	1,226,016,251	1,188,487,632	37,528,619	3.16
Revenue passengers[1]	7,022,750,707	6,797,627,822	225,122,885	3.31
Transfer passengers[2]	1,472,714,921	1,437,524,285	35,190,636	2.45
Total passengers	8,719,157,241	8,463,910,829	255,246,412	3.01
Passenger revenue	$514,010,138	$504,491,839	$9,518,299	1.89
Revenue car hours[3]	115,531,437	111,051,112	4,680,325	4.03
Miles of single track	25,219.5	25,209.6	9.9	0.04
Cars operated[4], a	29,136	28,160	976	3.46

a Average maximum number of cars in service daily. [1] Reported by 280 companies. [2] Reported by 183 companies. [3] Reported by 254 companies. [4] Reported by 242 companies.

TABLE VII—COMBINED INCOME STATEMENT OF 114 COMPANIES OPERATING CITY LINES EXCLUSIVELY

	1923	1922	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Railway operating revenue	$364,781,419	$358,173,520	$6,607,899	1.84
Railway operating expense	267,978,621	259,282,083	8,696,538	3.35
Net operating revenue	$96,802,798	$98,891,437	(D) 2,088,639	(D) 2.11
Net revenue: Auxiliary operations	8,423,053	7,995,944	427,109	5.34
Taxes	24,451,773	24,012,492	439,281	1.83
Operating income	$80,774,078	$82,874,889	(D) 2,100,811	(D) 2.54
Non-operating income	4,213,444	3,952,831	260,613	6.59
Gross income	a$85,056,619	b$86,842,823	(D) 1,786,204	(D) 2.06
Deductions from gross income	62,217,683	62,152,667	65,016	0.10
Net income	$22,838,936	$24,690,156	(D) 1,851,220	(D) 7.50
Operating ratio (per cent)	73.5	72.4	1.1	1.51
Ratio: Net income to operating revenue	6.26	6.89	(D) 0.63	(D) 9.15

a Includes $69,097 equalization income. b Includes $15,103 equalization income.

TABLE VIII—OPERATING EXPENSES (BY PRIMARY ACCOUNTS) OF 114 COMPANIES OPERATING CITY LINES EXCLUSIVELY

	1923	1922	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Way and structures	$37,198,595	$35,618,168	$1,580,427	4.44
Equipment	32,303,575	31,768,689	534,886	1.68
Power	37,826,699	36,861,368	965,631	2.62
Conducting transportation	119,426,909	115,692,065	3,734,844	3.23
Traffic	595,883	662,011	(D) 66,128	(D) 9.98
General and miscellaneous	35,670,790	33,615,743	2,055,047	6.11
Transportation for investment—Cr.	—154,531	—135,623	18,908	13.94
Total operating expense	a$267,978,621	b $259,282,088	8,696,538	3.35

a Includes $5,110,701 undistributed expense. b Includes $5,199,662 undistributed expense.

TABLE IX—OPERATING STATISTICS OF 114 COMPANIES OPERATING CITY LINES EXCLUSIVELY

	1923	1922	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Passenger car-miles	806,326,674	783,193,404	23,133,270	2.95
Total revenue car-miles	811,955,756	787,192,929	24,762,827	3.14
Revenue passengers[1]	5,411,344,990	5,232,073,596	179,271,394	3.42
Transfer passengers[2]	1,212,308,988	1,185,779,989	26,528,999	2.23
Total passengers[1]	6,830,404,389	6,626,922,391	203,481,998	3.07
Passenger revenue	$355,465,052	$349,445,992	$6,019,060	1.72
Revenue car-hours[3]	79,808,224	76,507,341	3,300,883	4.31
Miles of single track	10,693.7	10,652.5	41.2	0.38
Cars operated [4]a	20,504	19,751	753	3.81

a Average maximum number of cars in service daily. [1] Reported by 110 companies. [2] Reported by 79 companies. [3] Reported by 109 companies. [4] Reported by 102 companies.

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TABLE X—INCOME STATEMENT OF 117 COMPANIES OPERATING INTERURBAN LINES EXCLUSIVELY

	1923	1922	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Railway operating revenues	$88,476,229	$86,694,517	$1,781,712	2.05
Railway operating expenses	69,423,129	65,887,261	3,535,868	5.37
Net operating revenue	$19,053,100	$20,807,256	(D) 1,754,156	(D) 8.43
Net revenue: Auxiliary operations	5,990,401	4,770,180	1,220,221	25.58
Taxes	5,480,086	5,485,143	(D) 5,057	(D) 0.09
Operating income	$19,563,415	$20,092,293	(D) 528,878	(D) 2.63
Non-operating income	1,859,156	1,637,703	221,453	13.52
Gross income	$21,422,571	$21,729,996	(D) 307,425	(D) 1.41
Deductions from gross income	15,581,821	15,504,302	77,519	0.50
Net income	$5,840,750	$6,225,694	(D) 384,944	(D) 6.18
Operating ratio (per cent)	78.5	76.0	2.5	3.28
Ratio: Net income to operating revenue	6.60	7.18	(D) 0.58	(D) 8.08

TABLE XI—OPERATING EXPENSES (BY PRIMARY ACCOUNTS) OF 117 COMPANIES OPERATING INTERURBAN LINES EXCLUSIVELY

	1923	1922	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Way and structures	$12,504,460	$11,551,472	$952,988	8.22
Equipment	8,287,690	7,690,180	687,510	8.95
Power	11,871,280	11,766,269	105,011	0.89
Conducting transportation	24,657,575	23,121,068	1,536,507	6.64
Traffic	862,346	782,719	79,627	10.18
General and miscellaneous	11,138,137	10,905,925	232,212	2.13
Transportation for investment—Credit	—47,842	—74,390	(D) 26,548	(D) 35.70
Total operating expense	*a* $69,423,129	*b* $65,887,261	3,535,868	5.37

a Includes $149,463 undistributed expense. *b* Includes $144,018 undistributed expense.

TABLE XII—OPERATING STATISTICS OF 117 COMPANIES OPERATING INTERURBAN LINES EXCLUSIVELY

	1923	1922	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Passenger car-miles	172,805,765	168,294,873	4,510,892	2.68
Total revenue car-miles	194,617,639	187,882,163	6,735,476	3.58
Revenue passengers[1]	569,918,785	561,179,897	8,738,888	1.56
Transfer passengers[2]	73,229,866	71,719,079	1,510,787	2.11
Total passengers[1]	647,986,569	639,097,068	8,889,501	1.39
Passenger revenue	$69,094,473	$67,266,869	$1,827,604	2.72
Revenue car-hours[3]	13,161,796	12,658,500	503,296	3.97
Miles of single track	8,179.2	8,187.3	(D) 8.1	(D) 0.10
Cars operated[4] *a*	3,020	2,895	125	4.31

a Average maximum number of cars in service daily. [1] Reported by 114 companies. [2] Reported by 49 companies. [3] Reported by 93 companies. [4] Reported by 87 companies.

TABLE XIII—INCOME STATEMENT OF 57 COMPANIES OPERATING COMBINED CITY AND INTERURBAN LINES

	1923	1922	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Railway operating revenue	$96,567,627	$93,888,156	$2,679,471	2.85
Railway operating expense	75,053,926	72,560,302	2,493,624	3.44
Net operating revenue	$21,513,701	$21,327,854	185,847	0.87
Net revenue: Auxiliary operations	9,511,334	8,430,054	1,081,280	12.82
Taxes	6,279,069	5,931,061	348,008	5.86
Operating income	$24,745,966	$23,826,846	919,120	3.86
Non operating income	7,223,250	6,737,322	485,928	7.21
Gross income	$31,969,216	$30,564,168	1,405,048	4.59
Deductions from gross income	21,911,644	22,067,744	(D) 156,100	(D) 0.71
Net income	$10,057,572	$8,496,424	$1,561,148	18.37
Operating ratio (per cent)	77.7	77.3	0.4	0.51
Ratio: Net income to operating revenue	10.42	9.05	1.37	15.13

TABLE XIV—OPERATING EXPENSES (BY PRIMARY ACCOUNTS) OF 57 COMPANIES OPERATING COMBINED CITY AND INTERURBAN LINES,

	1923	1922	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Way and structures	$12,964,995	$12,457,176	$507,819	4.18
Equipment	9,251,825	8,830,803	421,022	4.77
Power	12,058,863	11,796,747	262,116	2.22
Conducting transportation	29,555,684	28,597,168	958,516	3.35
Traffic	386,466	315,328	71,138	2.25
General and miscellaneous	10,581,524	10,321,688	259,836	2.52
Transportation for investment—Credit	39,919	34,494	5,425	15.75
Total operating exp.	*a* $75,053,926	*b* $72,560,302	$2,493,624	3.44

a Includes $294,508 undistributed expense. *b* Includes $275,886 undistributed expense.

TABLE XV—OPERATING STATISTICS OF 57 COMPANIES OPERATING COMBINED CITY AND INTERURBAN LINES

	1923	1922	Increase or (D) Decrease	Per Cent Increase or (D) Decrease
Passenger car-miles	198,867,893	192,971,086	5,896,807	3.03
Total revenue car-miles	219,442,756	213,412,540	6,030,216	2.85
Revenue passengers[1]	1,041,476,932	1,004,374,329	37,102,603	3.69
Transfer passengers[2]	187,176,067	180,025,217	7,150,850	3.97
Total passengers[1]	1,240,766,283	1,197,891,370	42,874,913	3.58
Passenger revenue	$89,450,613	$87,778,978	$1,671,635	1.90
Revenue car-hours[3]	22,561,417	21,885,271	676,146	3.09
Miles of single track	6,346.6	6,369.8	(D) 23.2	(D) 0.36
Cars operated[4] *a*	5,612	5,514	98	1.78

a Average maximum number of cars in service daily. [1] Reported by 56 companies. [2] Reported by 55 companies. [3] Reported by 52 companies. [4] Reported by 53 companies.

gers, increased 3 per cent. In actual numbers these increases mean that there were 255,246,412 more passengers carried by these 288 companies in 1923 than there were in 1922. The average maximum number of cars in daily service was 29,136 in 1923, compared with 28,160 in 1922, an increase of 3.46 per cent.

With these additional cars the companies operated 33,540,969 additional car-miles and 4,480,325 additional car-hours, this increase in service being somewhat greater than the increase in traffic.

As has already been said, fares were lower in 1923 than in 1922. In the table of derived ratios, the average fare per revenue passenger is shown. It was 7.2 cents in 1922 and 7.1 cents in 1923, a decline of nearly one and one-half per cent.

On account of this decrease in the rate of fares, the revenues of the companies did not increase in proportion to the increase in the volume of traffic nor in proportion to the increased service given.

The operating revenues did increase, however, some 2 per cent. The actual increase in revenue amounted to $11,069,082, being $549,825,275 in 1923 as against $538,756,193 in 1922.

Expenses, on the other hand, increased slightly more than the increased traffic and increased service would account for. This was due principally to the increased wages paid in 1923 and, in a lesser degree, perhaps to increase the cost of materials.

In summing up Mr. Murphy says three factors influenced operations: (1) An increase in the cost of providing service; (2) an actual increase in the amount of service produced, and (3) a lower unit price for the service sold. The actual decline in net revenue was $3,656,948, or 2.59 per cent. The operating ratio rose from 73.8 per cent to 75.0 per cent.

Mr. Murphy says that viewing the industry as a whole the year was not without certain favorable features. True it is somewhat discouraging after enjoying the biggest year on record to find that net profits have been reduced. But sight should not be lost of the fact that it was the biggest year in volume of business on record, in spite of the inroads made by the private automobile and the organized bus lines. The traffic is there waiting for the traction lines to handle it. The real problem is how to handle it at a greater profit. In 1923 lower fares and higher expenses reduced the profit but already there is evidence that the force of these two conflicting movements has been spent. The rise in costs has tended to put a quietus on the demand for lower fares, and the slackening of business activity has tended to stop the rise of prices. Whether the traction companies can hold their traffic gains under such conditions remain to be seen in 1924.

As regards the companies operating city lines exclusively the results scored by them follow very closely the trend of the national group covering all types of companies. The operating ratio of the city companies is several points lower than the average of all companies. The city ratio rose from 72.4 per cent in 1922 to 73.5 per cent in 1923, a proportionately smaller increase than that of the general group. On the other hand the proportion of operating revenues remaining as net income after the payment of all charges is less in the case of the city group than in the case of the general group. This apparent inconsistency is explained by the fact that the city companies received only about one-third of the total revenues from auxiliary operations and non-operating income, whereas they pay about two-thirds of the total taxes and fixed charges.

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TABLE XVI—INCOME STATEMENT OF 114 CITY COMPANIES, 117 INTERURBAN COMPANIES AND 57 COMPANIES OPERATING COMBINED CITY AND INTERURBAN LINES (ON A CAR-MILE BASIS).

	City Lines			Interurban Lines			City and Interurban Lines		
	1923	1922	Per Cent Increase or (D) Decrease	1923	1922	Per Cent Increase or (D) Decrease	1923	1922	Per Cent Increase or (D) Decrease
Railway operating revenue	45.0	45.5	(D) 1.0	45.4	46.4	(D) 2.0	43.9	43.9	.....
Railway operating expense	33.0	32.9	0.2	35.6	35.4	0.6	34.2	34.0	0.6
Net operating revenue	12.0	12.6	(D) 4.5	9.8	11.0	(D) 8.9	9.8	10.0	(D) 2.0
Net revenue: Auxiliary operations	1.0	1.0	.....	3.1	2.5	22.4	4.3	3.9	10.3
Taxes	3.0	3.0	.....	2.8	2.8	.....	2.9	2.8	3.6
Operating income	10.0	10.6	(D) 5.5	10.1	10.7	(D) 5.50	11.3	11.2	0.9
Non-operating income	0.5	0.5	.....	1.0	0.9	11.0	3.3	3.3	3.1
Gross income	10.5	11.1	(D) 5.5	11.1	11.6	(D) 4.0	14.6	14.3	2.1
Deductions from gross income	7.7	7.9	(D) 2.8	8.0	8.3	(D) 3.5	10.0	10.3	(D) 2.9
Net income	2.8	3.2	(D) 12.5	3.1	3.3	(D) 6.00	4.6	4.0	15.0

TABLE XVII—OPERATING EXPENSES OF 114 CITY COMPANIES, 117 INTERURBAN COMPANIES AND 57 COMPANIES OPERATING COMBINED CITY AND INTERURBAN LINES (ON A CAR-MILE BASIS)

	City Lines			Interurban Lines			City and Interurban Lines		
	1923	1922	Per Cent Increase	1923	1922	Per Cent Increase	1923	1922	Per Cent Increase
Way and structures	4.6	4.5	2.22	6.2	6.2	.....	5.9	5.7	1.76
Equipment	4.0	4.0	....	4.3	4.1	4.65	4.2	4.1	2.44
Power	4.7	4.7	....	6.1	6.3	(D) 3.17	5.5	5.5	.....
Conducting transportation	14.7	14.7	....	12.7	12.3	3.25	13.5	13.4	7.48
Traffic	0.1	0.1	....	0.4	0.4	.....	0.2	0.1	100.0
General and miscellaneous	4.4	4.3	2.33	5.7	5.8	(D) 1.72	4.8	4.8	.....
Transportation for investment—Credit	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total operating expenses	a33.1	b33.0	0.33	35.4	35.1	0.85	34.1	33.6	1.49

a Includes 0.6 cent undistributed expense. b Includes 0.7 cent undistributed expense.

interurban companies were not quite so good. As compared with city lines their traffic increased only about 2.5 per cent, compared to 3 per cent for the city lines. On the other hand the average rate of fare was slightly higher in 1923 than in 1922, with the result that their railway revenues increased 2.05 per cent compared with 1.84 per cent for the city lines. The operating ratio of the interurbans rose from 76.0 per cent to 78.5 per cent, while the ratio of net income to operating revenue dropped from 7.18 per cent to 6.60 per cent.

A third group of companies numbers 57 and consists of those operating combined city and interurban lines as part of one system. Mr. Murphy says it might fairly be expected that these companies would form a hybrid group, exhibiting certain of the characteristics of both of the other groups and forming a mean between them. In so far as the averages and ratios of this group are concerned this expectation is justified. It falls naturally midway between the other groups. But strangely enough it is the only group which increased its net income in 1923. The operating ratio of this group rose from 77.3 per cent in 1922 to 77.7 per cent in 1923. On the other hand the ratio of net income to operating revenue rose from 9.05 per cent in 1922 to 10.42 per cent in 1923.

Further analysis of the figures has been made by dividing each group into companies having annual revenues of more than $1,000,000, companies having revenues of $250,000 to $1,000,000 and companies having revenues of less than $250,000 a year. In Mr. Murphy's study these tables were numbered from XIX to XXVII. They have been omitted from the present summary.

The forty-seven city companies having revenues of more than $1,000,000 a year, have the lowest operating ratio. In 1923 the operating ratio increased from 72.1 per cent to 73.2 per cent, and there was a decrease of 9.06 per cent in the net income. In the case of the medium-sized companies having revenues of from $250,000 to $1,000,000, the operating ratio dropped from 76.3 per cent to 75.4 per cent and there was an increase of 24.03 per cent in the net income in 1923. The small companies having annual revenues of less than $250,000, on the other hand, suffered a loss of 53.6 per cent in net income and their operating ratio rose from 84.3 per cent to 86.5 per cent. In other words, the large city companies are in the strongest position as measured by their operating ratio, but lost some ground in 1923.

Among the interurbans the companies with revenues of more than $1,000,000 a year made the best showing. They increased their net income, but their operating ratio rose from 74.4 per cent to 76.6 per cent. The medium-sized companies suffered a loss of 44.7 per cent in net income while their operating ratio rose from 78.7 per cent to 81.2 per cent. The small interurbans are operating at a deficit, which increased from $125,888 in 1922 ot $293,927 in 1923. The operating ratio rose from 80.0 per cent to 84.0 per cent. In the interurban group, therefore, it is the largest companies that are making out best.

Among the companies operating combined city and interurban properties the large companies again are making the best showing. Their operating ratio rose slightly, from 75.6 per cent to 76.2 per cent, but in 1923 they increased their net income 12.64 per cent. The medium-sized companies, on the other hand, are operating at a deficit, which, however, was decreased from $570,319 to $105,627, a decrease of 81.48 per cent. Their operating ratio fell from 84.5 per cent to 83.6 per cent. The operating ratio of the small companies rose from 85.6 per cent in 1922 to 90.0 per cent in 1923. They operated at a deficit of $290,514 in 1922, and this was increased to $377,523 in 1923.

TABLE XVIII—SIGNIFICANT RATIOS DERIVED FROM THE STATEMENTS OF EARNINGS OF THE COMPANIES

	114 City Companies			117 Interurban Companies			57 Companies Operating Combined City and Interurban Lines		
	1923	1922	Per Cent Increase	1923	1922	Per Cent Increase	1923	1922	Per Cent Increase
Railway operating revenue	$364,781,419	$358,173,520	1.84	$88,476,229	$86,694,517	2.05	$96,567,627	$93,888,156	2.85
Per mile of single track	34,111	33,623	1.45	10,817	10,588	2.16	15,215	14,739	3.22
Passenger revenue	355,465,052	349,445,992	1.72	$69,094,473	$67,266,869	2.71	$89,450,613	$87,778,987	1.90
Per revenue passenger	[1]6.5c	[1]6.6c	(D) 1.52	[4]11.7c	[4]11.6c	0.86	[7]7.6c	[7]7.7c	(D) 2.07
Per total passenger	[1]5.1c	[1]5.2c	(D) 1.93	[4]10.3c	[4]10.2c	0.98	[7]6.4c	[7]6.5c	(D) 1.54
Per mile of single track	$33,240	$32,804	1.32	$8,447	$8,216	2.81	$14,094	$13,780	2.27
Per passenger car-mile	44.0c	44.6c	(D) 1.35	39.9c	39.9c	.....	44.9c	45.4c	(D) 1.11
Per car operated	[2]$15,928	[2]$16,249	(D) 1.98	[5]$16,401	[5]$16,477	(D) 0.47	[8]$14,932	[8]$14,922	0.06
Per revenue car hour	[3]$4.02	[3]$4.12	(D) 2.43	[6]3.97	[6]4.00	(D) 0.75	[9]3.86	[9]3.90	(D) 1.03
Revenue passengers	15,411,344,990	15,232,073,596	3.42	[12]569,918,785	[12]561,179,897	1.55	71,041,476,932	71,004,374,329	3.69
Per mile of single track	[1]511,615	[1]496,877	2.96	[12]71,381	[12]70,248	1.61	[7]183,606	[7]176,789	3.85
Per passenger car-mile	[1]6.7	[1]6.7	.....	[12]3.3	[12]3.4	(D) 2.95	[7]5.7	[7]5.7	.....
Per car operated	[10]239,841	[10]241,381	(D) 0.64	[13]157,037	[13]161,359	(D) 2.68	[9]191,340	[9]187,722	1.92
Per revenue car hour	[11]61	[11]62	(D) 1.62	[14]40	[14]41	(D) 2.44	[15]50	[15]50	.....
Total passengers	[16]6,830,404,389	[16]6,626,922,391	3.07	[12]647,986,569	[12]639,097,068	1.39	71,240,766,283	71,197,891,370	3.57
Per mile of single track	[1]645,780	[1]629,343	2.61	[12]81,159	[12]80,002	1.44	[7]218,740	[7]210,851	3.74
Per passenger car-mile	18.5	18.5	.....	[12]3.8	[12]3.8	.....	[7]6.9	[7]6.9	.....
Ratio: Transfer passengers to revenue passengers (per cent)	22.4%	22.6%	(D) 0.89	12.8%	12.7%	(D) 0.78	17.9%	17.9%	.....
Revenue car-miles	811,955,756	787,192,929	3.14	194,616,639	187,882,163	3.58	219,442,756	213,412,540	2.82
Per mile of single track	75,928	73,897	2.74	23,794	22,948	3.68	34,576	33,503	3.20
Per car operated	[2]36,063	[2]36,337	(D) 0.76	[5]45,268	[5]45,776	(D) 1.11	[8]36,797	36,446	0.96
Per car hour	[3]8.9	[3]9.0	(D) 1.12	[16]10.9	[16]11.0	(D) 0.91	99.4	99.4	.....
Car hours	[3]79,808,224	[3]76,507,341	4.31	[6]13,161,796	[6]12,658,500	3.97	[9]22,561,417	[9]21,885,271	3.08
Per car operated	[17]3,997	[17]3,995	0.65	[18]4,088	[18]4,060	.068	[19]3,898	[19]3,844	1.40

[1] 110 companies. [2] 102 companies. [3] 109 companies. [4] 115 companies. [5] 87 companies. [6] 93 companies. [7] 56 companies. [8] 53 companies. [9] 53 companies. [10] 100 companies. [11] 106 companies. [12] 114 companies. [13] 86 companies. [14] 90 companies. [15] 51 companies. [16] 94 companies. [17] 98 companies. [18] 77 companies. [19] 48 companies.

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Winnipeg Railway to Change Its Name.—In commenting on the affairs of the Winnipeg Electric Railway, Winnipeg, Man., the Canadian *Financial Post* said recently that eventually the Winnipeg Electric Railway is likely to be a much greater power company than traction company and that evidence of this is to be found in the decision of the company to change its name to the Winnipeg Electric Company.

Country Club Line Abandoned.—The Pittsburg County Railway, McAlester, Okla., has been given permission by the Corporation Commission to abandon its line, extending from the southern boundary of McAlester to the Country Club.

Net Loss $174,398.—The San José Railroads, operating in San José, reports to the California Railroad Commission for the year 1923 that its operating revenue was $419,749 and operating expenses $345,374, giving a net operating revenue of $74,375. Interest, rent, taxes and other deductions totaled $250,983. The net corporate loss for the year was $174,398. The accumulated deficit at the end of the year was $1,304,147.

Gold Bond Issue Authorized.—The Indiana Public Service Commission has authorized the Gary Street Railway, Gary, Ind., to issue $643,000 of 5 per cent gold bonds and $140,000 of common stock to be sold at 75 per cent of par value. The money to be obtained from the sale of securities is to be used in making additions and betterments to the property.

Eastern Massachusetts Dividends Declared. — The Eastern Massachusetts Street Railway, Boston, has declared a dividend of five-sixth of 1 per cent on the adjustment stock, payable on May 15 to holders of record of April 30. This dividend covers the two months' period from Feb. 1 to April 1. Under the readjustment plan, which became effective on Jan. 4, 1922, the adjustment stock was non-cumulative until Feb. 1, 1924. During 1923 the adjustment stock received 5 per cent.

$2,616,208 Surplus for Brooklyn Company for Nine Months.—For the nine months ended March 31, the first nine months operation under the reorganization plan, the Brooklyn-Manhattan Transit Corporation, the successor to the Brooklyn Rapid Transit Company, reported a surplus of $2,616,208 after charges. This is the equivalent of $1.40 a share on the 766,530 shares of common stock after allowing for the sinking fund on the new rapid transit security 6s and dividends at the rate of $6 a year on the preferred stock, aggregating $1,451,478 for the nine months. The surplus is also equivalent to twice the dividend requirements after deducting charges for the sinking fund. The plan adopted last year provided that the annual sinking fund payments of 2-3 per cent on the $92,697,207 new 6 per cent bonds were to begin on Jan. 1, 1927, unless dividends were declared on either the preferred or common stocks prior to that date. An initial dividend of 1½ per cent having been declared on the preferred payable on May 1, sinking fund payments must begin not later than that date.

Legal Notes

MASSACHUSETTS — *Operator of Street Car Not Required to Sound Warning and Slacken Speed on Approaching Intersection.*

While the duty rests on the operator of a street car at all times and in all places to manage his car with a high degree of care, he is not required by law to give warning signals or slacken speed of his car and keep it under control, provided when he nears an intersecting street he will not be proceeding at an unreasonable rate of speed. [Froio vs. Eastern Massachusetts St. Ry., 142 Northeast Rep., 255.]

MICHIGAN — *Equity May Change the Provisions of a Trust Mortgage, Even Though These Changes Bind Absent Beneficiaries of Mortgage.*

This case arose over the forced sale by the Detroit United Railway to the city of Detroit for $19,850,000 of the Detroit city lines, appraised at $43,000,000. The protection of the Chancery Court was invoked by representatives of holders of the $25,000,000 bond issue of the Detroit United Railway, covering the entire property. A provision of the trust mortgage said that the company might sell materials, supplies, rolling stock, etc., and all real estate, buildings and fixtures no longer useful or necessary to the business, but this was held not to cover the sale of the entire city system forming part of the security of the bonds issued. Such a condition, however, can be considered by equity, which has power not only to construe the instrument creating the trust, but change it to carry out the settlor's intention. It has power sometimes even to instruct the parties concerned to act in opposition to the provision, if necessary to preserve the trust property and protect the beneficiaries' right. Its judgments not only apply to all parties represented in the case but to parties not individually represented, as it is obviously impossible to gather and have present in court 1,200 street railway bondholders scattered throughout the world. [City of Detroit vs. Detroit United Railway et al., 197 N. W. Rep., 697.]

MISSOURI—*Authority for Operating Defective Car Was Sufficient.*

A motorman of two months' experience ran into the car ahead while on a slight grade and was injured. When he took the car out in the morning, he discovered the air brakes were not in good condition, but was told by the dispatcher that the car in question was the only one available and to take it at least as far as the next carhouse. At the time of the accident he tried to stop the car with the air and then by the hand brake, but applied the latter too late. The court held that his action was not negligent, and that while the company had a rule that when a car is not in order, the motorman must refuse to take it out of the carhouse, the authority of the dispatcher overrode this rule. The company, therefore, was held liable. [Lauderdale vs. Kansas City Railways, 250 S.W. Rep., 736.]

MONTANA—*Trial Court May Remit Excessive Verdict as Condition to Denying New Trial Without Infringing on Right to Jury Trial.*

Where the court is warranted in finding that the damages awarded are excessive, it may order the excess remitted as a condition to denying defendant's motion for a new trial without violating the right to trial by jury. The objection that the damages awarded are excessive may be raised because the evidence is conflicting or because it is insufficient to sustain the verdict. [Bull vs. Butte Electric Railway, 223 Pacific Rep. 514.]

NEW YORK—*Non-Availability of Less Dangerous Apparatus Is No Defense Where It is Not Essential to Operation.*

The plaintiff's finger was injured in the mechanism of a turnstile at the Fourteenth Street subway station. The defense claimed that there was no proof of negligence in the construction or maintenance of the turnstile machine, but the court held that non-availability of a less dangerous machine is no excuse for installing dangerous equipment not essential to the operation of the railroad. [Chakofsky vs. Interborough R. T. Co., 203 N. Y. Sup., 357.]

NEW YORK—*Injury to Employee After Day's Work Held Compensable.*

Where it was the duty of a trolley car conductor to report and turn in the day's receipts before 9 o'clock the next morning, and a conductor, instead of going directly to the office at the end of his run, went home to make out his report, and on his way to the office about an hour later fell and was injured, the accident rose "out of and in the course of his employment" within the meaning of those words in the workman's compensation law. [Wilber vs. Fonda J. & G. R.R., 203 New York Sup., 336.]

TEXAS—*Duty of Company to Warn Employees of Independent Contractor When They Are Working in a Dangerous Position.*

An independent contractor agreed with an electric railway and several steam roads to build a causeway and to indemnify them for all damages connected with the prosecution of this work. An employee of this contractor, received a shock when the boom of the derrick he was operating came in contact with an uninsulated feed wire of the electric railway company. The company was not guilty of negligence in maintaining the wires in the condition they were in, but was held to be negligent in not giving the employees of the contractor sufficient warning of the danger if the boom came in contact with these wires. [Galveston-Houston Electric Railway et al v. Reinle, 258 Southwest Rep., 803.]

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Personal Items

Coffin Honored by Franklin Institute

Charles A. Coffin, former president of the General Electric Company, was awarded a certificate of honorary membership in the Franklin Institute on April 16 at Philadelphia. This honor, conferred by one of the foremost scientific societies in the world, was in recognition of Mr. Coffin's many achievements and contributions to the electrical industry. The presentation was made in the assembly hall of the Institute in Philadelphia. The membership certificate was presented by C. F. Eglin, president of the Institute. Mr. Coffin is the twenty-eighth person so honored by membership in the Institute.

E. W. Allen, formerly engineer and assistant manager of the Central district of the General Electric Company, with headquarters in Chicago, has been appointed manager of the engineering department of that company, with offices at Schenectady. Mr. Allen was born in Buchanan, Va., on Nov. 8, 1880. He was graduated from the Virginia Polytechnic Institute in 1900 with a B. S. degree in electrical engineering. He entered the employ of the General Electric Company in January, 1901, in the test department in Schenectady. On Dec. 1, 1902, he was assigned to the lighting engineering department, where he remained until Sept. 30, 1911, when he was appointed engineer of the Chicago district. On Sept. 1, 1913, he was made assistant district manager in addition to his duties as district engineer. Early in 1917 he entered the military service and served two years. He returned to the company in April, 1919. A. F. Riggs has been named district engineer to succeed Mr. Allen.

Herbert J. Flagg has resigned as chief engineer of the State Department of Public Works at Olympia, Wash., effective May 1, to become connected with the Grays Harbor Railway & Light Company, Aberdeen, which is controlled by the Federal Light & Traction Company.

C. C. Levis, manager of the Eastern offices of H. M. Byllesby & Company, has been elected a vice-president of the company. With the exception of two years when he served in the United States Army, he has been connected with the above organization since 1914. It was in January, 1922, that he was placed in charge of all the Eastern offices. Prior to that he had been appointed manager of the New York office. He has been identified with the electrical industry for practically seventeen years, first becoming associated with the General Electric Company and its allied interests in England. In this connection he served seven years, taking a two-year course in the works of the British Thomson-Houston Company, Ltd., and later handled the business of that company in the Far East.

E. E. Howard has recently become head of the investment department of the Interstate Public Service Company, Indianapolis, Ind. With a bond selling experience of thirty years he is well qualified to handle the banking and sales campaigns of the company.

W. E. Wood, manager of the Houston Electric Company and the Galveston-Houston Electric Railway, since May, 1920, has been elected chairman of the railway section of the Southwestern Public Service Association. He was formerly general manager of the Galveston Electric Company. All of these properties are under Stone & Webster direction. Mr. Wood has been connected with the Stone & Webster organization since his graduation from the Georgia Institute of Technology in 1907. He spent the year following his graduation in the home office of Stone & Webster, in Boston, Mass., and was then transferred to the Jacksonville Traction Company, where he worked in several departments as a student. In 1912 he was made superintendent of the Jacksonville system, continuing to serve in that capacity until 1916, when he was transferred to Houston as general superintendent of the system there. He was subsequently appointed manager of the El Paso Electric Company and still later manager of the Galveston Electric Company.

William M. Black, since 1919 chief engineer of the Maine Public Utilities Commission, has resigned to become electrical engineer of the Pennsylvania Public Service Commission. He will take up his new duties about May 19. On the Maine commission he has been active in valuation, service and safety engineering. Following his graduation in 1909 in civil engineering at the University of Maine, he became cost clerk for Frank B. Gilbreth, efficiency engineer, and later engaged in structural work with the Hudson Structural Steel Company, Hinckle Iron Works, Milliken Brothers, American Bridge Company, Gunwald Aus and Post & McChord. He was employed at one time on subway construction in New York City as steel foreman, engineering foreman, assistant to resident engineer for Jacobs & Davies, and bridge engineer, 1918-1919.

Sylvester D. Smith, superintendent of the elevated lines of the Interborough Rapid Transit Company, New York, was tendered a surprise dinner recently to celebrate his golden anniversary with the company. Fifty years ago Mr. Smith went to work as a conductor on the Ninth avenue "L," the first of New York's lines above the ground, and then known as the New York & Yonkers Patented Elevated Railway. Thirty-three years ago he was made superintendent, and 319 men, representing every branch of the service, greeted him in the Schnorer Club of the Bronx. Old engineers of the elevated came from all parts of New York to sup with the superintendent, and officers of the road came from the executive offices at 165 Broadway, the construction and motive power departments. Frank Hedley, president of the company, presided at the banquet and crowned his superintendent with a golden fez and dubbed him "King of the Interborough." From the men under him, Mr. Smith received a round robin in which his name, Sylvester D., was transposed to "Square Deal" Smith.

John B. Tinnon, identified with the Chicago & Joliet Electric Railway, Joliet, Ill., for approximately twelve years resigned his position as engineer maintenance of way on May 1 to become connected with the Metal & Thermit Corporation of New York in charge of its rail welding department. It was in April, 1908, that Mr. Tinnon entered the employ of the Chicago City Railway as instrument man under W. F. Graves, engineer of construction. Later he was given charge of track welding and various other duties, and in the early part of the year 1910 was made assistant engineer. In this capacity he had charge of the installation of the special work in the downtown district and from 1910 to September, 1912, he had charge of about half of the track construction and maintenance on the City Railway lines under Mr. Graves. Then it was that he went to Joliet as engineer maintenance of way, and was there until May 1 of this year except between August, 1918, and February, 1919, when he was in the Ordnance Department, U. S. A. For the past six years he has really been serving in the capacity of chief engineer. Mr. Tinnon was educated at the Vanderbilt University in Nashville, Tenn. His early connections included service with the Louisville & Nashville Railroad, B. F. Sturtevant & Company, Chicago, and Roberts & Schaefer Company, Chicago.

Obituary

H. M. Byllesby

The utility field suffered the loss of one of its outstanding figures in the death on May 1 of H. M. Byllesby, president of the Byllesby Engineering & Management Corporation, Chicago, pioneer engineer and promoter of electrical, gas and railway utilities. Colonel Byllesby began his professional career in the employ of the Corliss Engineer Works of Robert Wetherill & Company, Chester, Pa., and the Edison Electric Light Company. From 1885 through 1890 Mr. Byllesby was first vice-president and general manager of the Westinghouse Electric & Manufacturing Company, Pittsburgh, and also managing director of the Westinghouse Electric Company of London. At one time he was vice-president of the Washington Light & Traction Company, Washington, D. C. In 1902 he organized in Chicago the firm of H. M. Byllesby & Company, engineers, to operate and manage public utility undertakings. At the time of his death he was an officer and director of many utility companies, among them the Fort Smith Light & Traction Company, Ottumwa Railway & Light Company and the Wisconsin-Minnesota

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Light & Power Company. During the war Mr. Byllesby served as purchasing agent for Great Britain and Scandinavian countries with the American Expeditionary Forces, with headquarters in London. In this activity the English Distinguished Service Order was conferred upon him. Mr. Byllesby was born in Pittsburgh. He was educated in the schools there and at the Lehigh University.

John High, sales manager of the railroad and mill board departments of the Pantasote Company, died on April 24 in Chicago. He was on a business trip when he was stricken and was removed to the Durand Hospital, where he died two days after entering that institution. Jack High, as he was known to railroad men all over the country, entered the service of the Pantasote Company at the time of its formation in 1897 and organized the railroad department of that company. In 1910 the railroad and mill board departments were combined and he was made sales manager. Before becoming connected with the Pantasote Company Mr. High was engaged in railroad work on the Pacific Coast. He was born in Chicago fifty-five years ago. He is survived by his wife and a son, John, Jr. Mr. High lived at Riverdale-on-Hudson.

Colin Alexander Morrison, superintendent of division five of the Los Angeles Railway died on April 18, following an illness of several weeks. He was 62 years old. Mr. Morrison was born at Mount Elgin, Ontario, Canada. In 1886 he began driving a horse car in Minneapolis. A few years later he moved west and in 1892 went to work on the cars in Portland, Ore. For three years he served as motorman and conductor and then went to California for his health. From 1895 to 1902 he worked for the San Francisco & San Mateo Railway Company. On June 1, 1902, he started as mechanical inspector for the Los Angeles Traction Company, which centered at the old division four property recently torn down. In 1910 the Los Angeles Railway absorbed this property.

Interurban at Grand Rapids Delivers Coal

The Michigan Railroad has completed at Grand Rapids, Mich., a 2,500-ft. siding from its main line to the coal pocket of the Consumers Power Company and is delivering coal at the rate of 1,500 cars a year. The railroad expects eventually to haul twice that amount of coal. The Consumers Power Company is the latest of five firms now supplied direct by interurban freight. The railroad also recently made connections with the New York Central Railroad and, using its feeders to the Père Marquette Railroad, which have existed for some time, the interurban can transport and receive freight to or from any railroad coming into Grand Rapids. Additions have been made to the team and warehouse tracks in the past few weeks. Two additional team tracks and two house tracks have been installed, providing berthing space for forty-eight cars.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

$500,000 for Improvements in Knoxville

The Knoxville Power & Light Company, Knoxville, Tenn., has planned an expenditure of $500,000 for improvements during 1924. In addition to its power and light improvements, $285,000 will be spent on other betterments for the purpose of giving additional service. Out of this sum $125,000 will be spent at the car shops for extensions and improvements in building, $160,000 for rebuilding tracks, overhead and putting in additional sidings on street car lines.

In addition to the fourteen new cars which were purchased last fall, twenty-eight of the present cars are being remodeled and equipped as duplicates of the new cars at a cost of about $60,000. All of these cars will have the safety appliances that are now on the new equipment.

$8,000,000 to Be Spent in Twin Cities in Five Years

The Twin Cities Rapid Transit Company, Minneapolis, Minn., has a five-year program to spend $8,000,000, of which $5,000,000 is to be spent in extensions and other permanent improvements and $3,000,000 for new type "noiseless" trolley cars, completion of the remodeling of the standard trolley cars into front exit type, and construction of one-man cars for use in Stillwater, Minn., a suburban extension of the Stillwater interurban from St. Paul. Fifty of these "noiseless" cars are to be built in a year and the front exits are being installed on the rear door cars at the rate of seventy-five a year. The Stillwater new cars are to be in operation by fall.

$250,000 Improvements in East Liverpool

The Steubenville, East Liverpool & Beaver Valley Traction Company, East Liverpool, Ohio, through General Manager Smith, recently announced a program of development and increased power and roadbed facilities on the Beaver-Steubenville division, involving an expenditure of $250,000, during this spring and coming summer. New substations costing approximately $175,000 make up the largest item in the program.

In co-operation with the City Council of Toronto and the State Highway Department, the company plans laying a new double track on North Fourth street in the down-river town and pave according to state requirements. This work, which will start about May 1, is part of the improvement of the Ohio River highway from Toronto to Empire. The company cost is put at $35,000.

ELECTRIC RAILWAY MATERIAL PRICES—MAY 1, 1924

Metals—New York

Copper, electrolytic, cents per lb.	13.30
Lead, cents per lb.	7.95
Nickel, cents per lb.	26.00
Zinc, cents per lb.	6.25
Tin, Straits, cents per lb.	47 875
Aluminum, 98 to 99 per cent, cents per lb.	27.50
Babbitt metal, warehouse, cents per lb.:	
Fair grade	60.00
Commercial	28.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$4.45
Somerset mine run, Boston	2.25
Pittsburgh mine run, Pittsburgh	1.875
Franklin, Ill., screenings, Chicago	2 175
Central, Ill., screenings, Chicago	1.90
Kansas screenings, Kansas City	2.50

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$43.00
Standard open hearth rails, gross ton	43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	2 95
Tie plates (flat type), cents per lb.	2.55
Angle bars, cents per lb.	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.125
Steel bars, cents per lb.	2.25
Ties, white oak, Chicago, 6 in.x8 in.x8½ ft.	$1.70

Hardware—Pittsburgh

Wire nails, base per keg	3.00
Sheet iron (28 gage), cents per lb.	3.60
Sheet iron, galvanized (28 gage), cents per lb.	4 85
Galvanized barbed wire, cents per lb.	3.80
Galvanized wire, ordinary, cents per lb.	2.75

Waste—New York

Waste, wool, cents per lb.	15
Waste, cotton (100 lb. bale), cents per lb.:	
White	12–18
Colored	9–14

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), per gal.	$0.93
White lead (100 lb. keg), cents per lb.	12.25
Turpentine (bbl. lots), per gal.	$0.91
Car window glass, (single strength), first three brackets, A quality, discount*	84.0%
Car window glass, (single strength), first three brackets, B quality, discount*	86.0%
Car window glass, (double strength) all sizes, A quality, discount*	85.0%
Putty, 100 lb. tins, cents per lb.	4–6

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb.	15.625
Rubber-covered wire, No. 14, per 1,000 ft.	$6 50
Weatherproof wire base, cents per lb.	17 50

Paving Materials

Paving stone, granite, 4x8x4, f.o.b. Chicago, dressed, per sq.yd.	$3 60
Common, per sq.yd.	2.95
Wood block paving 3½, 16 treatment, N. Y., per sq.yd.	2.56
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots	53–54
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.85
Cement, Chicago consumers' net prices, without bags	2.20
Gravel, ¾-in., cu.yd., f. o b. N. Y.	1.75
Sand, cu.yd., N. Y.	1.25

Old Metals—New York and Chicago

Heavy copper, cents per lb.	10.50
Light copper, cents per lb.	9.25
Heavy brass, cents per lb.	6.50
Zinc, old scrap, cents per lb.	4.00
Yellow brass, cents per lb. (heavy)	6.25
Lead, cents per lb (heavy)	6.50
Steel car axles, Chicago, net ton	$16.25
Cast iron car wheels, Chicago, gross ton	16.25
Rails (short), Chicago, gross ton	17.25
Rails, (relaying), Chicago, gross ton	26.50
Machine turnings, Chicago, gross ton	7.25

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In Steubenville the company will spend $10,000, in cooperation with the city and the Wheeling Traction Company, in the new "loop" plan of routing.

American Car Buys Pacific Stock

The American Car & Foundry Company, Pittsburgh, has acquired a substantial stock interest in the Pacific Car & Foundry Company. The acquisition of this interest, it was pointed out, will give the American company a valuable connection on the Pacific coast.

Rolling Stock

Wisconsin Valley Electric Company, Wausau, Wis., recently purchased four cars from the American Car Company of St. Louis. The specifications of these cars follows:

Type of car	Light-weight, double-truck, one-man city and suburban
Total weight	32,000 lb.
Bolster centers, approximate	23 ft.
Length over all	43 ft. 6 in.
Truck wheel base	5 ft. 1 in.
Width over all	8 ft. 2 in.
Height, rail to trolley base	10 ft. 6 in.
Body	Semi-steel
Finish	Enamel
Interior trim	Oak
Headlining	Agasote
Roof	Arch
Air brakes	G. E. straight air with Sutherland safety device
Signal buzzer	Consolidated
Car trimming	Bronze, statuary finish
Control	K-35
Curtain material	Pantasote
Destination signs	Hunter
Wheel guards	H. B. or root
Hand brake	Brill
Heat equipment	Consolidated, truss plank
Headlight	O. B. Type SDT Gold Ray reflector
Motors	Four Westinghouse 510
Registers	Ohmer
Sanders	O. B.
Seats	Rattan, full spring, upholstered
Step treads	Feralum
Thermostat	Consolidated
Trolley catcher	O. B.
Trolley base	O. B., Form 1
Trolley wheels	More Jones V. K.
Trucks	Brill 77-E-1
Ventilators	Brill
Wheels	Cast, 26-in.

Wisconsin Railway, Light & Power Company, Milwaukee, Wis., will spend approximately $160,000 for the purchase of new equipment.

Pacific Electric Railway, Los Angeles, Cal., has placed an order with the Fageol Motors Company for twenty double-deck buses at a value of $12,250 each. The order is for immediate delivery.

Track and Line

Jamestown, Westfield & Northwestern Railway, Jamestown, N. Y., has announced through William H. Pickard, traffic manager, that it will begin at once the erection of a new scenic railway, to cost $50.000, at its Midway Park, Chautauqua Lake.

New York, N. Y.—The New York Transit Commission recently made the award for the construction of the first section of the new Brooklyn crosstown subway to the Oakdale Contracting Company, whose bid of $3,948,830 was the lowest received. The new subway will link Brooklyn and Queens without the present necessity of passing under the East River and through Manhattan Borough.

Key Route Transit Company, Oakland, Cal., plans the extension of its line 1,000 ft., to the entrance of Lakeshore Manor. This will mean that the residents of this section will have the advantages of rapid transit into Oakland and San Francisco.

Duluth Street Railway, Duluth, Minn., proposes to spend $450,000 during 1924 to improve its service. For extensions into new territories, $85,000 will be spent, $302,000 for track and power plant improvements and $63,000 for the purchase of railway equipment.

Public Service Railway, Newark, N. J., will lay a new asphalt pavement on Liberty Street, Trenton, N. J., for a distance of nearly a mile. The pavement will cost about $80,000. The company will also remove one of the rails on that thoroughfare, using one in the center of the street for the cars on the Newark-Elizabeth division.

Puget Sound Power & Light Company, Bellingham, Wash., will shortly begin improvements on South Elk Street, at a cost of $50,000. Work includes laying of 150 tons of 93-lb. steel rails and paving between the rails. The company has also started work on a proposed new steel bridge to span Chuckanut Creek at Hibridge.

Wisconsin Railway, Light & Power Company, La Crosse, Wis., is completing the installation of new steel rails and wire from Jackson Street south on Sixteenth Street to Farnam Street. Following the completion of this work an extension will be made from Eleventh and Market Street south on Eleventh to Farnam Street.

United Railways, St. Louis, Mo., has been urged to extend the Lee Avenue division westward from Lee and Taylor Avenues to Lucas and Hunt Road in St. Louis County. The proposed extension would be 3 miles.

Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., proposes to expend a total of approximately $4,000,000 in 1924 divided as follows: $2,200,000 for extensions, $1,035,000 for improvements and $700,000 for new equipment. It also has under way plans to build an extension in Chicago from Howard Street to Niles Center.

Lake Superior District Power Company, Ashland, Wis., has plans under way for the expenditure of $1,065,000 to improve its electric light and power city and transmission systems, interurban and railway systems. The expenditure will be divided up into $50,000 for extensions, $315,000 for improvements and $700,000 for new rolling stock, power plant, gas plant and other equipment.

Trade Notes

G. A. Richardson, manager of the technical publicity department of the Bethlehem Steel Company, Bethlehem, Pa., gave a talk recently before the Philadelphia section of the American Society of Mechanical Engineers on the new Bethlehem two-cycle Diesel type oil engine.

Wilson Welder & Metals Company, New York, N. Y., has announced the increased demand for welding machines and welding wire had necessitated increasing the manufacturing facilities. The company will move its plant and general offices on May 1 to the Wilson Building, Hoboken Factory Terminal, Hoboken, N. J.

L. A. Marshall, for a number of years service manager of the Industrial Works, Bay City, Mich., is now connected with its Chicago office, 1051 McCormick Building, as sales engineer.

Perey Manufacturing Company, Inc., New York, N. Y., manufacturers of turnstiles, has moved its offices from 30 Church Street to 101 Park Avenue.

Kuhlman Electric Company, Bay City, Mich., manufacturer of power, power distribution and street lighting transformers, has opened a sales office at 300 Madison Avenue, in charge of D. F. Potter, Jr., New York manager. After completing the General Electric test course at the Lynn, Pittsfield and Schenectady plants, Mr. Potter entered the employ of the Robertson-Cataract Electric Company of Buffalo as sales manager. A year ago he became sales engineer for the Kuhlman Electric Company in Buffalo.

New Advertising Literature

Allen-Bradley Company, Milwaukee, Wis., has issued four bulletins on alternating current motor starters. One describes the automatic resistance starter, another the semi-automatic resistance starter, a third is called across-the-line starting switch and a fourth resistance starters.

Electric Power Equipment Corporation, Philadelphia, Pa., has issued Bulletin 601 on Bennett Lightning Arresters. The pamphlet contains forty pages with illustrations and includes general information on the details of construction of these arresters, engineering data and instructions for installation.

Rail Welding & Bonding Company, Cleveland, Ohio, has issued bulletins Nos. 106 and 107. Bulletin 106 gives operating instructions on the preparation, welding and grinding of the Una rail joint and bulletin 107 decribes Una joint rod, grade 200.

Heine Boiler Company, St. Louis, Mo., has issued a thirty-page booklet on the Heine cross-drum boilers. The bulletin, No. 53, describes the general design, details of construction, circulation and furnace arrangement of the cross-drum boilers. Information on cleaning boilers is also included.

Philip Carey Company, Cincinnati, Ohio, has issued a seventy-page pamphlet on elastite expansion joint. The book has some valuable information for engineers, architects, contractors and others engaged in the promotion, design and construction of pavements, roads and other forms of engineering construction.

Metals Coating Company of America, Philadelphia, Pa., has issued a pamphlet describing the Metalayer, Schoop Process, of applying metals by means of a spray gun.

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New York, May 10, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 63
Number 19

The National Chamber of Commerce and the Electric Railway

THE electric railways have always held that their business is so closely allied to the general prosperity of the community they serve that an injury to one is an injury to the other. Hence, if they can secure a sympathetic hearing from the business men of their community so that they can state their case fully and clearly, they are sure of a fair deal.

This position, which is undoubtedly correct, is the reason for the interest which the electric railway industry should take in the annual meeting of the Chamber of Commerce of the United States held at Cleveland this week. It also explains why the American Electric Railway Association was represented officially at that meeting by some fifteen delegates even though there was no question directly relating to electric railways on the program this year.

In the national chamber and in its constituent bodies, the local chambers of commerce and boards of trade, the business interests throughout the county have an agency of growing importance for constructive action, and it is a healthy sign that business men are taking this broader interest. It means more business and less politics in our national and state governments, more intelligence and less waste in our laws.

Probably no kind of industry in the community has more to gain from the entry of a larger number of business men into governmental affairs than the utility industry. The utilities have profited greatly, as has the public also, from commission rule. But the commissions need public support for their decisions, and this the business men in the community can give when they know the facts.

The electric railway industry benefited greatly from the study which the National Chamber of Commerce gave to the electric railway situation two years ago, as represented by its referendum No. 33. The vote on this occasion showed clearly that the business men in the country believe the electric railway is a prosperity builder, that the regulation of it should be promptly responsive to changing conditions, that it should not be subject to unfair competition, that it should be relieved of all burdens unrelated to service, and that the service should be given by a private company rather than a municipality.

The reports made by the committees on transportation of the national chamber last year were also of value to the electric railway industry, as they emphasized the importance of co-ordinating all means of transport and the need for simplifying the taxes of the steam and electric carriers. The fact that the general principles in both of these matters are but dimly understood by the public shows how much the national chamber has done and can do by further study along these lines.

The best way in which the individual railway man can help in this movement is by taking an active part in the work of his own chamber, helping its members to understand the railway's problems and encouraging them to support further study on these problems by the national chamber.

An outstanding address at the Cleveland meeting was that by Herbert Hoover in which he stated his belief that the vast tide of governmental regulation of commerce and industry can be stopped by the systematic and voluntary action of industry itself through the agency of trade associations.

Pittsburgh's Way of Handling a Wage Proposal

A PROPERTY convalescing from a receivership is *prima facie* not strong enough to stand the shock of a sudden and large increase in operating expenses. This is the case with the Pittsburgh Railways, which is confronted by demands for increases in wages and amelioration in other conditions that would wipe out an estimated balance based upon a continuance of last year's good industrial conditions. It is interesting to note the manner in which the management is facing the situation.

Ordinarily a request for more wages is pitched to considerably higher figures than the men really expect to get, and the usual result is a compromise to some schedule that was really expected. In such negotiations the spirit of bargaining was as much to be looked for as in an Oriental bazaar. So it was a decided shock to the representatives of the men when the management frankly told them that while working conditions were subject to negotiation, any increase in the rate per hour was out of the question. No compromise could be offered.

When the leaders realized that the management said what it meant and meant what it said, they sought refuge in a strike vote. Nothing is easier. The men voted "Strike" whether they wanted one or not, in the apparent hope that the management would crumble before the fateful midnight hour of May 1. On the night of May 1, however, the leaders suddenly appreciated that they had started something not easy to finish. There was a hurry call for the intercession of Mayor Magee and a statement to the public that ample warning would be given should the men be ordered to quit.

This moral victory for the railway was obtained by going to the public through newspaper and mail publicity with more facts and figures than has usually been the case in wage discussions. The management made no threats whatsoever about replacing men who

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might go out. On the contrary, it gave the employees full credit for loyal service, but regretted that its income did not permit an increase in wages out of hand. The following plain facts plainly reiterated were too strong to be overcome:

First, all Pittsburgh knows that the railway has just come out of receivership and that receivers are not associated with prosperous concerns.

Second, almost every one appreciates that the fares are already beyond the elastic limit. The public is eagerly seeking a reduction in fares, as proved by the substantial increase in the sales of the liberalized (Sundays only) 10-cent crosstown transfer.

Third, the public now realizes that the average Pittsburgh platform man earns more per annum than the Pittsburgh laborer, semi-skilled workman, store clerk or office employee.

Fourth, President Thompson's discussions of post-receivership plans for improved service and equipment gave the public so good an idea of the company's intentions and resources that there is a strong feeling against anything that would delay these betterments.

Fifth, the publication of the company's budget for 1924 explained how little margin there was to meet payment of deferred debts and interest on new money.

Sixth, the daily advertisements and articles in the newspapers were supplemented by thousands of letters to business men to give them a more personal appreciation of their interest in the wage argument.

Seventh, the management's policy of acquainting scores of other electric railway men with the facts, through copies of its publicity, to the end that its willingness to give all the facts in its possession would be reciprocated by any counsel that seemed to fit the case, was helpful.

As this issue goes to press, it is impossible to say what the outcome of Mayor Magee's emergency investigation will be, but if newspaper accounts and letters to the company are satisfactory criteria, it is clear that the management's stand has won the public confidence to an unusual degree. Wages in Pittsburgh are not out of line and there is no occasion now for an increase.

New York's Latest Transit Plan Involves Many Complications

A NEW transit plan for Greater New York, tentatively proposed by Daniel L. Turner and reviewed briefly elsewhere in this issue, is a suggestion primarily for relieving Grand Central and Pennsylvania stations in Manhattan and the Hudson River of the burden of handling commuter traffic, which now amounts to 20 per cent of all the steam railroad passenger traffic of the country. That something of the sort must be done soon is apparent, as the capacities of the two stations and the railroad ferries have practically been reached. As to the physical plan proposed in this instance there is much to be said. It might form a satisfactory solution of the situation, but no attempt is made at this time to show that it is the best solution. It is put out mostly to start discussion, its likelihood of execution as it stands being limited for three main reasons.

In the first place, three states and so many local communities (100 or more) are involved that it would be virtually impossible to bring about an agreement on a plan which tends to subordinate the wishes of the suburbanites to the needs of Manhattan Borough. Nor would these interests consent to the assessment upon them of a portion of the cost. Secondly, the railroads would not be reticent about declining to contribute to the cost of subway construction in the city—if they could be brought into agreement on the physical plan. Thirdly, the project is handicapped by the proposal to cut two new north and south vehicle arteries through Manhattan as a preliminary to subway construction.

Common Sense May Be Better than Law in Settlement of Claims

HOW it was possible to reduce the amount of claims settlements against a street railway company to the almost incredibly low figure of one-tenth of 1 per cent of the gross revenue was told by W. T. Bie, one of the speakers at the recent Milwaukee meeting of the Wisconsin Public Utilities Association. The theme of the story, which is published in this issue, is that he made the claimants feel that the company was not merely a corporation, but a group of men of the same sort as those who had been injured. This is a worth-while accomplishment.

Far too often the claim department—or legal department, as it more correctly is called in the cases in mind—uses the time of many employees in preparing legal proof that the claimant is in the wrong, so that if the case is taken into court, an unbreakable chain of evidence can be built up that will exonerate the company. When this is the attitude, the legal department is likely to work in an impersonal, cold-blooded way.

Of course there are essential differences of method, depending on the size of the community and the character of the inhabitants. Green Bay, for instance, where the results mentioned were obtained, is small and the population is largely American born. In a very large city, with a mixed population, there may be more value in the legalistic method of handling claims. In fact, in a few cities of this class good results have been reported by establishing the reputation in the courts that the company will not submit to extortion.

But in general, especially in the smaller centers, the companies that have tried the legalistic method over a period of years have found that it begets distrust on the part of claimants. As a result the first reaction of the injured man is to hire the best lawyer he can afford in order to combat the known high-class talent of the company. Minor injuries and damages that might be settled out of court for a few dollars become the subject of expensive litigation, and the amount paid out by the company in the award is likely to be far greater than it might be otherwise, to say nothing of the lawyers' fees and court costs.

Why should the settlement of damage claims in the average city be put in the hands of lawyers, anyway? It is a straight man-to-man proposition to determine the facts and to compensate the claimant fairly in case the company is at fault. Or if the company is clearly not liable, the plain facts will tend to show that without need for a lawyer.

The field for the legal profession comes in case the claimant is unreasonable in his demands. Even then, Mr. Bie shows that on his road better results can be obtained with a jury by keeping the lawyer in the background and leaving the argument of the case to the motorman or some other representative of the company directly concerned in the accident than by having the legal talent of the company arrayed against the claimant's attorney.

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Issues in Massachusetts Wage Arbitration

Springfield, Worcester and Associated Companies Present Significant Evidence that Many Cost-of-Living Theories Are Fallacious—Reduced Spread of Working Hours and Changes in Conditions Held to Be Camouflaged Methods of Securing Higher Wages for Platform Men

FUNDAMENTAL wage issues are involved in the pending arbitration of the Worcester Consolidated Street Railway, the Springfield Street Railway, and allied lines under the same management* in the Milford-Attleboro district of Massachusetts. These issues have been raised by the employees' requests relative to hours of labor, compensation and working conditions, as presented to a board composed of Lewis C. Parker, Westfield, chairman; James H. Vahey, Boston, for local divisions of the Amalgamated Association, and Bentley W. Warren, Boston, counsel for the railways. The number of employees concerned is 2,217; a long series of hearings at which 233 exhibits were presented has been concluded, and a finding is expected in the near future.

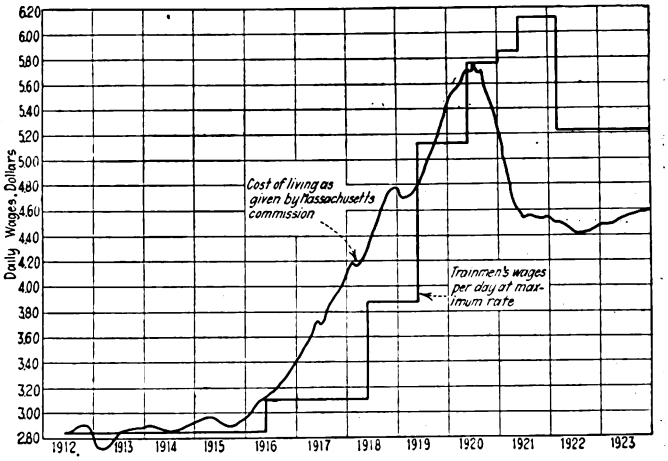
Acute interest in the proceedings has been manifested in traction circles on account of the demand of the union that the 11-hour spread specified by State law be rigorously adhered to and that the basic day for blue uniform men be made 8 hours instead of the 9 permitted by statute. The men also demanded a 5-minute allowance for turning one-man cars at the ends of lines, provision of change carriers on one-man cars, increased allowances for evening express car service, extra assistance in handling United States mail bags, and the classification of freight handlers on platforms as messengers. They also asked that all car movements in shops and yards be made by the transportation forces. In all there were between 20 and 30 such items. Most of these demands, when analyzed, prove to be unreasonable, and are mere pretexts for more pay. They have not, therefore, been considered in the present article.

MASSACHUSETTS "9 IN 11" LAW UNIQUE

Involved in the question of the number of hours which blue uniform men shall work ordinarily, whether approximately 8 hours with an excess not exceeding 30 minutes in the case of 30 per cent of the scheduled runs, or 9 hours strictly limited and without any such excess, is the matter of spread or outside limit of such a day's work. Even more important than the number of hours of work to be fixed by the board is the number of hours to be included in this spread. The Massachusetts law (Chapter 833, Acts of 1913) is unique in that it fixes nine hours of work in a total of eleven as the maximum that may be demanded by operating street railway companies, although it authorizes longer hours and increased spread if the men consent. The spread permitted on every Massachusetts electric road, except possibly the Boston & Worcester interurban, is 14 hours or more.

If the employees' request for 8 hours is refused by the board the men state that they desire the enforcement of the 9-in-11 hours statute. The companies maintain that limitation of the spread to 11 hours, particularly for extra men, should call for an hourly rate of pay substantially less than might otherwise seem reasonable to the arbitrators, and substantially less than that prevailing on other properties where a greater spread of hours is permitted.

At present the allied companies in the controversy guarantee every spare man a minimum of 7 hours pay. This is tied up with a 9-hour day and a 12-hour spread within which the 7 hours work may be laid out or required. Under the present agreement, by paying a certain bonus, the extra man may be called upon to serve the company in the thirteenth, fourteenth or even further number of hours. The employees have requested that this guaranteed minimum for spare men shall be made 8 hours, with an 11-hour spread. The companies declare that they would hardly have agreed to so large a guaranteed minimum as 7 hours if the spread were to be limited to 12.



Daily Wages of Springfield Trolleymen Compared with Cost of Living as Determined by Massachusetts Commission, 1912-1924 (1914 Taken as Base)

WAGE INCREASES FORCED UP FARES

From the summer of 1914 to the end of 1921, the rate of wages paid by all the companies involved in this arbitration had been increased about 140 per cent, from 28½ cents per hour to 68 cents per hour for blue uniform men, or, in Springfield, from $2.85 per day to $6.12 per day. The maximum increase in fare in Worcester and Springfield was of the order of 100 per cent. The rise in wages began in 1915, the first fare increases in Springfield and Worcester being deferred until 1918. As a consequence, all the companies fell seriously behind in revenue. The Worcester company, which for 25 years prior to the war had paid at least 5 per cent annual dividends, did not pay a single dollar in dividends during 1918-1921 upon its approximately $7,000,000 of capital stock, fully paid in under the drastic anti-stock-watering laws of Massachusetts. The Springfield company, which had paid at least 6 per cent annually during the same pre-war period, paid between 1917 and 1921 an aggregate of only 5 per cent upon its $4,654,700 paid-in capital stock. Measured by the lowest rates

*Milford, Attleboro & Woonsocket Street Railway, Interstate Consolidated Street Railway and Attleboro Branch Railroad.

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TABLE I—BUDGET FOR AVERAGE FAMILY

(Two adults and 1.4 dependent children)

Made up from minimum budget details prepared by Visiting Housekeepers' Association of Detroit, Sept. 1, 1923.

Food	Per Month	Per Month
Man	$14.70	
Woman	11.40	
Boy 11-14	11.40	
4/10 Girl 9-11	3.36	
Add 10 per cent to man	1.47	$42.33
Light		3.69
Fuel		
Cooking	2.63	
Heating	8.13	10.76
Clothing		
Man	9.33	
Woman	7.18	
Boy 12-14	6.02	
4/10 Girl 10-12	2.64	
Deduct 7 per cent	1.76	23.41
Rent		
5 rooms, unheated		45.00
Household Furnishings and Sundries		
Family of four	8.10	
Family of three	7.17	
Pro-rate for family of 3.4		7.54
Extras		
Family of four	6.34	
Family of three	5.67	
Pro-rate for family of 3.4		5.94
Total per month		$138.67
Total per year		$1,664.04

paid before the war the Worcester company was in arrears in dividends at the end of 1921 to the extent of $1,400,000 and the Springfield company, $1,163,675. The smaller companies failed to earn their fixed charges during much of the war period.

In February, 1922, an arbitration board headed by James J. Storrow of Boston, made a reduction of 10 cents or 14.7 per cent in blue uniform wages, establishing a rate of 58 cents per hour. The employees were then receiving 68 cents, an increase of 140 per cent over the pre-war rate. The cost of living had dropped from the peak at the time when the 68-cent rate had been agreed upon (203, based on the index figure of 100 for 1914) to 155 about March 1, 1922. The company had asked for an hourly rate of 50 cents. By voluntary agreement the 58-cent rate was continued for a second year, or until March 1, 1924.

During the two years 1922-1923 the Worcester company paid the current annual dividend upon its preferred stock of $5 per share and also paid two years of the four years accrued and unpaid dividends. On Jan. 1, 1924, it had paid nothing on its common stock for six years, and owed its stockholders a total of $1,647,360 in dividends. The Springfield company owed its stockholders in dividends $1,256,769 on this date.

LENGTH OF THE WORKING DAY ARBITRATED

The employees ignore the fact that only two years ago they submitted to arbitration the question of what constituted a reasonable and proper spread, and that the board in that case decided on 14 hours; or that practically every company in the state and its men have agreed upon a 14-hour spread. Not a representative of the employees was able to name a single electric railway in the United States, except the Boston & Worcester, which is attempting to conduct the street railway business under the limitations of an 11-hour spread.

The companies state that it is immaterial to them and to the public whether the workday base is 9 hours or 8, provided, first, that a reasonable latitude of say 30 minutes is allowed beyond the fixed number of hours to meet special requirements on particular lines, and second, that the hourly rate of pay remains the same whichever length of day may be fixed. To give 9 hours' pay for 8 hours' work would be an entirely different matter, and would cost the public at Worcester and Springfield $267,498 per year on a 58-cent basis, with no additional service rendered.

If the employees insist that the board shall be bound by the 11-hour statutory limitation, existing wages paid by other companies cease to be a *prima facie* standard for wage rates involved in this arbitration. Then it is necessary to determine the added cost to these companies in Massachusetts of the 11-hour spread. This is indicated in the following table, the figures for which were supplied by Prof. A. S. Richey of Worcester Polytechnic Institute, expert witness for the companies:

Added costs per man-hour, cents	Springfield	Worcester
9-in-11 hour day, with 7-hour guarantee	4.656	5.721
8-in-11 hour day, with 8-hour guarantee	7.018	9.644
Rate equivalent to 58-cent rate without spread limited, cents per hour		
9-in-11 hour day, with 7-hour guarantee	53.535	52.279
8-in-11 hour day, with 8-hour guarantee	50.982	48.356

The companies maintained that if the spread is reduced to 11 hours, the 7-hour guarantee should also be substantially reduced. If an 8-hour day is required, for instance, the guarantee should be nearer 6 hours.

HOW SHOULD A LIVING WAGE BE DETERMINED?

Although it was criticised by some employees, the companies maintain that the standard of living which Mr. Storrow aimed at in the 1922 award was attained. This is indicated in the chart reproduced herewith, which is one of the many exhibits introduced in the case. The employees have now lived two years under the wage conditions fixed by him, the second of which was by virtue of a voluntary extension of the award. Many of them own and operate automobiles. Every employee appearing as a witness on the subject of living cost occupied a house or apartment with not less than five rooms and bath. Whether a bathroom is a necessity in these days depends on one's point of view, the companies maintain.

As to the actual earnings of the men, the following figures were submitted by the company:

AVERAGE ANNUAL AMOUNTS PAID BLUE UNIFORM MEN

	Springfield	Worcester
All conductors	$1,784	$1,856
Spare conductors only	1,729	1,871
All motormen	1,835	1,933
Spare motormen only	1,836	1,999

The average on the two roads is far in excess of the $1,750 which W. Jett Lauck, in the Federal Electric Railways Commission inquiry, declared "would be incapable of application at the present time owing to the fact that the board would not wish suddenly to inject a monkey wrench into the industrial wheels of the country."

In the Middlesex & Boston Street Railway arbitration in January, 1924, Chairman C. H. Donahue awarded the men 55 cents per hour after finding a $1,500 annual wage one which would limit the average employee too closely to the minimum standard of living. This rate is 3 cents below what the Springfield and Worcester men have been receiving under the Storrow award.

Most professional and employee budgets, the company maintains, are of little real aid in establishing a just wage rate. They all involve one inherent fallacy in an arbitrary assumption that any wage for a man should support himself, his wife and three dependent children under 14 years of age. This assumption is contrary to all known data. The United States census gives the average family in this country as a man, his wife and

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1.4 such dependent children, and the wage should be fixed for such average family. A count taken at one of the hearings in this case of employees who happened to be present showed that the 35 married men averaged only 1.7 children. Including the 8 unmarried men brought the average number of children per man for the 43 in the count down to 1.37. Professor Richey showed that the present wages of blue uniform men at Springfield and Worcester were sufficient to meet, for an actual family of man, wife and 1.4 children, the requirements of each of the several budgets exhibited, except that of the Boston Elevated Railway, which was inflated by the living cost in a large city. The budget for Detroit conditions is included herewith as Table I.

Before 1921 the increased cost of living was a favorite and inevitable subject for testimony on behalf of employees. Since this cost began to fall it has occupied, in the company's words, "a position of much less honor among the employees in their preparation of arbitration cases." However, it continues the most important element in connection with changes in wage rates. Variations in the index figure follow, the dates taken being those in connection with the present wage case:

VARIATIONS IN COST OF LIVING INDEX, 1913-1924

Average, 1913	100
March 1, 1922 (Storrow award)	155.3
Jan. 1, 1923 (Storrow award extended voluntarily)	157.1
Feb. 1, 1924	159.7

Hence the most that these employees can claim logically is an increase of wages of 1.65 per cent, or slightly under 1 cent per hour compared with the beginning of 1923, or 1.6 cents above that fixed in the 1922 award. In both cases the company had the privilege of calling upon the spare men for work during a spread of 14 hours and longer if needed. The only difference was that under the 1923 arrangement they became entitled to their 7-hour guarantee after only 12 hours.

The company maintains that if this wage rate is giving them so much income that they insist on conditions affording them greater leisure and more idle time, it is evident that the men do not need and should not receive so high a wage rate for this diminished labor equivalent. Thus the men, by their insistence upon the statutory limitation, make it impossible for the board to consider the wage question from any standpoint of comparison used in the past between these parties or considered in other arbitrations.

Comparison with Wages Paid on Other Roads

Much testimony was introduced by the employees as to the wages actually paid various classes of public employees and as to the hoped-for increases in the wages of some of these, notably the letter carriers. There is one vital distinction which makes any comparison of pay useless as a guide for an arbitration board. The employees of the Boston Elevated Railway, for instance, are paid from public treasuries kept full by the taxpayers. The managements of privately owned street railways have no such recourse to the purses of the public, and the street railway patron can refuse to use the facilities furnished if fares are raised too much.

An exhibit in this case covering 314 electric railways of major importance in this country shows that only 35 companies paid over 58 cents per hour, the going rate in Worcester and Springfield. Of the remaining 279, five paid 58 cents and all the other 274 paid under 58 cents. So far as could be ascertained only 15 companies besides those involved in the proceedings paid a differential of over 5 cents per hour for one-man car operation. Of these 15, one paid 6 cents, one 6⅜ cents, seven paid 7 cents, one paid 7.3 cents, two paid 8 cents, one paid 8.6 cents and two paid 10 cents. Among 85 street railways, each operating over 100 miles of track, the average hourly rate, according to the American Electric Railway Association, was 54.93 cents. The weighted average wage of 16 companies operating in cities of over 200,000 and under 500,000 population is 54.75 cents per hour, and there is no limitation of the spread. Twenty-three companies, operating in cities between 100,000 and 200,000 population (about the size of Worcester and Springfield), have a weighted average wage of 52.8 cents per hour. In general the wage rate drops in proportion to the size of the city involved.

In six out of 13 arbitrations in the United States during 1923 the rate awarded was higher than 58 cents per hour. These cases were:

WAGES AWARDED IN SIX ARBITRATIONS

	Population	Rate, Cents
Cleveland	796,000	60
Chicago Surface Lines	3,000,000	73
Chicago Elevated	3,000,000	75
Detroit	1,000,000	70
Boston	750,000	70
Scranton, Pa.	137,000	63

In the cases of one Chicago company and Cleveland, the municipality has a direct financial interest in the property. The Detroit company is actually owned and operated by the city and the Boston Elevated is publicly operated. The Chicago Elevated is not a street railway.

The weighted average rate of all the operating companies in New England, including several which have been forced out of business by high wages, is 61¼ cents per hour. Omitting the companies involved in this case and also the state-controlled Boston Elevated, this weighted average becomes 57.79 cents per hour. The simple average hourly rate for all the companies is only 54.39 cents. Only five companies in New England are paying a one-man car operator a differential of over 5 cents per hour.

Recent arbitration boards have recognized the futility as well as the injustice of ignoring the financial condition of a street railway in wage problems. The companies point out that their "slow return to partial prosperity" may be fatally ended by the award of an overgenerous wage or by failure to reduce the existing rate, if the unreasonable attitude of the employees continues with respect to the spread of hours. The wages of the men should be fixed in the smaller associated companies at figures which the board believes will permit of possible continuance of operation.

Anti-Freezer Works Well

IN CONNECTION with a report of the convention of the Wisconsin Public Utilities Association, published in the JOURNAL for April 26, an account was given of the discussion by A. B. Wood, Westinghouse Air Brake Company, on the problem of freeze ups in air brake lines. Mr. Wood described the construction and operation of an anti-freezing device which the JOURNAL erroneously assumed was of one type of manufacture, while Mr. Wood actually was describing the "Anti-Freezer," which is handled by another company. It was reported by several railway men at the Wisconsin meeting to have eliminated difficulty from freeze ups.

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The Railways' Competition and What It Pays

Motor Vehicle Production and Registration Show Heavy Gains—Taxes in 1923 Claimed to Amount to Nearly Half a Billion

FIGURES compiled by the National Automobile Chamber of Commerce, some of which are reproduced in the tables herewith, show that with a total production of 4,086,997 motor vehicles in 1923, the industry had its greatest year and the number of competitors of the railways increased 53 per cent over the number in 1922. The wholesale value of the automobiles sold is placed at $1,693,808,282; of the trucks, $311,144,434, and of parts sold by motor vehicle factories, $247,443,541, making a total of $2,252,396,257. This is the revenue derived from a capital invested in the motor vehicle manufacturing business of $1,571,722,411, which indicates a capital turnover of about 150 per cent. Total sales, as above, amount to $2,804,952,716 if the wholesale value of tires and all replacement parts is added in.

TABLE I—MOTOR VEHICLE TAXES COLLECTED IN 1923

	FEDERAL	
1.	Passenger cars	$106,280,234.24
2.	Commercial vehicles	10,908,777.31
3.	Parts, tires and accessories	38,610,844.42
		$155,799,855.97
4.	Vehicles for hire	1,907,399.55
		$157,707,255.52
	STATE	
1.	Registration fees, including drivers' licenses	$188,947,862.97
2.	Gasoline taxes	36,813,939.61
3.	Personal property taxes	75,000,000.00
		$300,761,802.58
	MUNICIPAL	
	Municipal taxes on motor vehicles	$13,079,209.57*
	Total motor vehicle taxes	$471,548,267.67

Apparently to answer a common comment that the huge investment of money in automobiles by the general public is taking money away from reservations for the rainy day, the National Automobile Chamber of Commerce presents curves showing the upward trend of savings in comparison with the growth of motor transportation, the curves showing the same general trend. The statement is made that investment by the public in motor vehicles has been accompanied during the past ten years by continual upward trend in various forms of savings. Assets of building and loan associations have tripled, life insurance in force is more than two and a half times as great, savings bank deposits are nearly double, and total individual bank deposits are at present more than twice what they were in 1913.

Another interesting part of the figures compiled by the Automobile Chamber is the amount of money collected during 1923 in motor vehicle taxes. This is claimed to amount to a grand total of $471,548,000, exclusive of property taxes on garages or local taxes levied on the retail business of selling automobiles. The federal and state figures are compiled by the United States Bureau of Public Roads, the municipal figures by the Automobile Chamber itself from reports made by city treasurers. The figures are given in Table I.

A few rather interesting deductions can be made from the chamber's figures. If an average value of $500 is placed on the 15,092,177 cars registered in 1923, there is represented a total property value of about seven and one-half billion dollars. The investment in the electric railway industry is six billion. The total taxes collected of $471,548,000 then represents an assessment of about 6¼ per cent on this value of motor vehicles.

In the ten years shown in the table, a total of 18,654,700 motor vehicles have been manufactured. As the total registration in 1923 was 15,092,177, this indicates the scrapping of 3,562,523 vehicles, or approximately 20 per cent of the total in ten years. In 1922 the total registration was 12,238,375. During 1923, 4,086,497 automobiles and trucks were sold, but the registration only increased 2,853,802. Thus there was a shrinkage of 1,233,195 vehicles or about 10 per cent in one year, indicating an average life of ten years. The true average life is probably nearer five to seven years, as will be developed with further statistics as this industry ages.

Red Lights Losing Significance

A PECULIAR result of the universal use of red taillamps on automobiles is that the message carried by them is "turn to the left" rather than "danger." This was the conclusion of A. H. Rudd, chief signal engineer of the Pennsylvania Railroad System, in an address before the New York Railroad Club. He said in part:

"During the time we had our safety-first campaign last year, 222 of our gates were run through. I don't know how many trains were run into. I do know that in one instance a train was stopped on a crossing on the Northern Pacific, and while standing there a Ford ran into the left-hand side. While they were cleaning up the wreck, a Buick ran into the right-hand side.

"Of the 222 gates 'busted,' 60 per cent of them were in the daytime. Of the other 40 per cent, 95 per cent were broken to the left of the red light on the gates. Now, what is the answer? That the red light on an automobile means turn to the left instead of stop, and that is what these drivers did."

TABLE II—PRODUCTION AND REGISTRATION OF MOTOR VEHICLES IN LAST 10 YEARS

Year	Passenger Cars Produced — Number	Passenger Cars Produced — Wholesale Value	Motor Trucks Produced — Number	Motor Trucks Produced — Wholesale Value	Total Motor Vehicle Production and Registration — Production	Per Cent Over Preceding Year	Motor Vehicles Registration	Per Cent Over Preceding Year
1914	543,679	413,859,379	25,375	45,098,464	569,054	17.5	1,711,339	36
1915	818,618	565,978,950	74,000	125,800,000	892,618	56.7	2,445,666	43
1916	1,493,617	797,469,353	90,000	157,500,000	1,583,617	77	3,512,996	43.6
1917	1,740,792	1,053,505,781	128,157	220,982,668	1,868,949	18	4,983,340	42
1918	926,388	801,937,925	227,250	434,168,992	1,153,638	—38	6,146,617	23
1919	1,657,652	1,461,785,925	316,364	423,326,621	1,974,016	—7	7,565,446	23
1920	1,883,158	1,809,170,963	322,039	423,756,715	2,205,197	11.5	9,231,941	22
1921	1,514,000	1,093,918,000	147,550	166,082,000	1,661,550	—24.6	10,463,295	13
1922	2,406,396	1,567,003,041	252,668	222,635,324	2,659,064	60	12,238,375	17
1923	3,694,237	1,693,808,282	392,760	311,144,434	†4,086,997	.53	15,092,177	23

† Includes as in preceding years, motor vehicles of United States design made in Canada.

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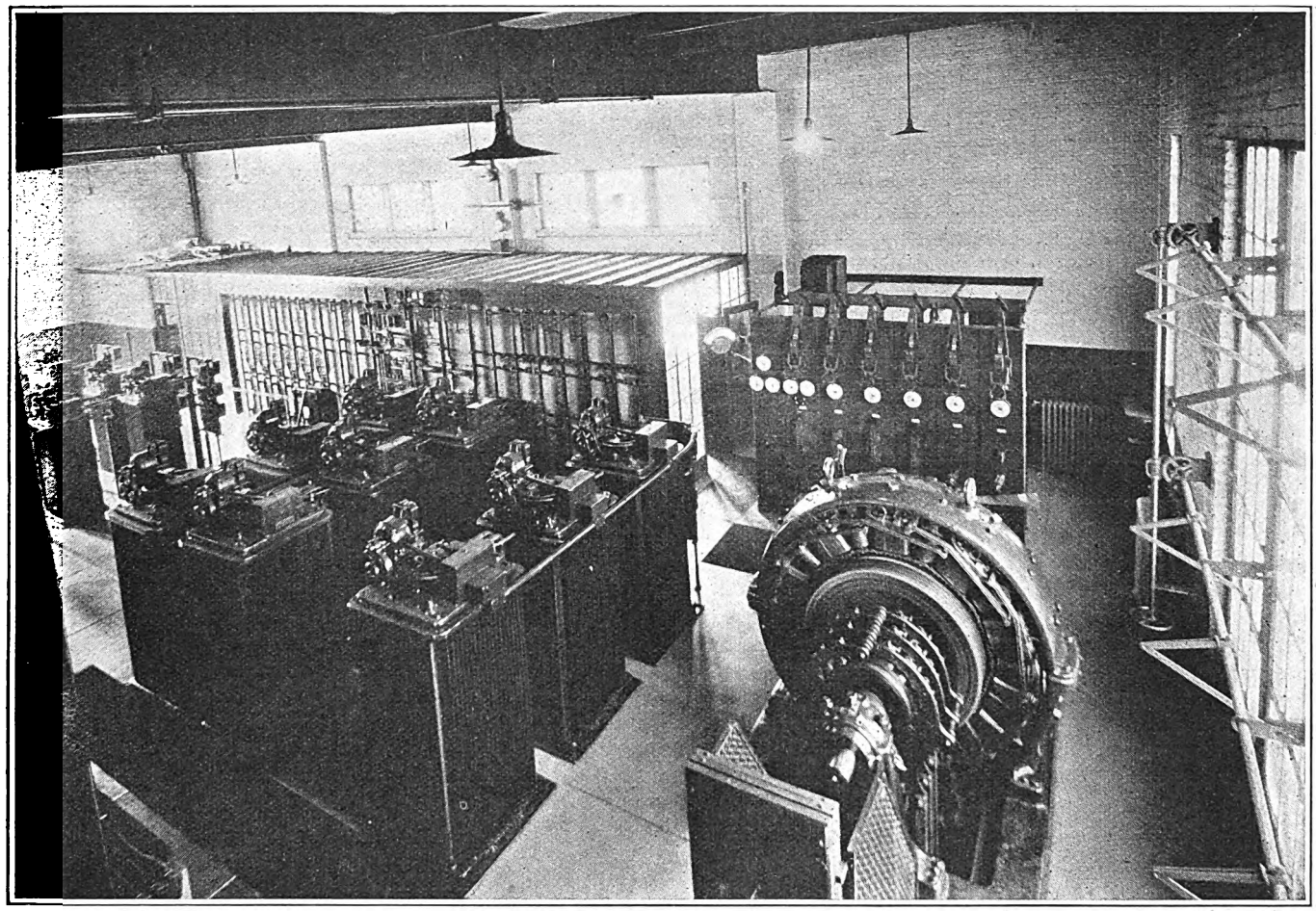
Railway and Power Substations Combined for Economical Operation

Cicero Substation of the Chicago Rapid Transit Company and the Public Service Company of Northern Illinois Presents Example of Co-ordinated Efforts to Reduce Maintenance and Operating Costs



Railway Company's Equipment Has Been Placed at Rear of Main Floor. Note Arrangement of A.C. Panels Forming Inclosure for Operator

THE Chicago Rapid Transit Company, which operates in Chicago and some of its adjacent suburbs, purchases all of its energy from the Commonwealth Edison Company, either as 600-volt direct current or as high-voltage alternating current, and performs the conversion service in substations of its own. The Public Service Company of Northern Illinois supplies power and light to all of the suburbs immediately adjacent to the city, and at a number of points its lines and those of the Commonwealth Edison Company are connected in substations of the Public Service Company, where energy is interchanged between them as the requirements of the two companies make it desirable.

When the Douglas Park branch of the Chicago Rapid Transit Company was extended last year a distance of ¾ mile into the town of Berwyn, it was necessary to provide a substation in order to improve the line voltage. With the growth of these suburbs—Cicero and Berwyn—the power and lighting requirements also increased, causing the Public Service Company to seek a site for a distribution center. The two companies made a careful survey of the territory and decided to combine the substation facilities in a single station adjacent to the right of way of the railway company. This substation, located at Cicero, Ill., houses the apparatus of the power company and a 1,500-kw. railway rotary converter with its switchboard and miscellaneous apparatus. By allocating the fixed and operating charges between the two companies on the basis of installed capacity, it was possible for the railway company to obtain a lower conversion rate than would have been possible if a separate building had been built.

Details of Installation

The building was designed and built by the Public Service Company in accord with its standard type of distribution substation. It consists of a one-story brick and concrete building with basement. Provision has been made at the rear of the main floor, by heavy

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I-beam construction, to accommodate the converter of the railway company. The machine is a 1,500-kw., six-phase, 60-cycle, 600-volt Westinghouse, hand-operated rotary converter. The a.c. and d.c. connections to the machine are carried through an opening in the floor, directly under the machine, which also serves as a duct for the intake of circulating air. The a.c. starting panel has been mounted a few feet from the a.c. end of the machine, while the d.c. switchboard has been placed at right angles to the axis of the machine in line with the main switchboard of the Public Service Company. The three railway transformers have been set in the yard at the rear of the building and are suitable for operation on either 12,000 or 33,000-volt service. They are connected in delta and at present are supplied with energy from the 12,000-volt station bus. Both high and low tension cables between the transformers and the installation within the building are carried in underground duct lines. The low-tension lines enter the station approximately 4 ft. above the basement floor and are carried upward to a pipe-frame rack, suspended from the ceiling. Here connection is made between the cables and copper bus bars. All connections between the converter and switchboards are made in the basement with bar copper. This conforms with the practice established by the power company and gives to the underside of the machine and to this portion of the basement a neat appearance.

Arrangement of Switchboard Panels

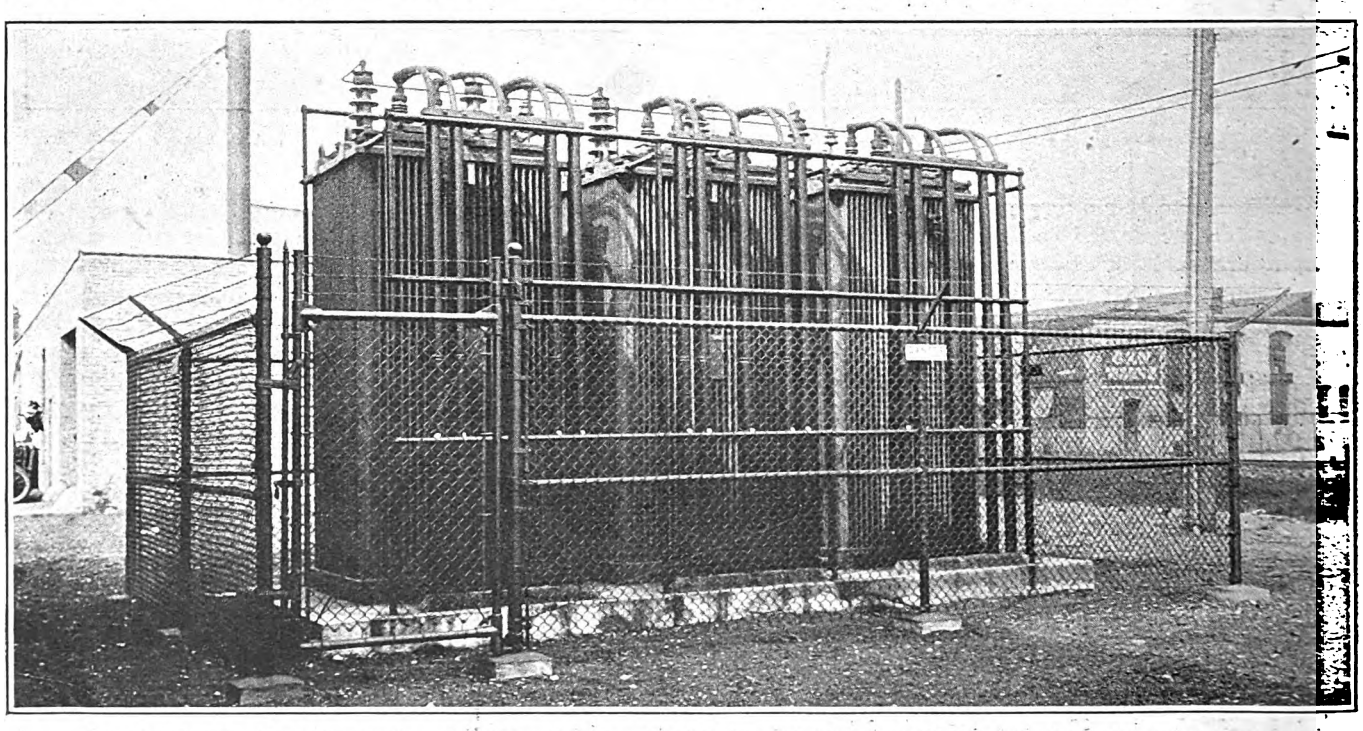
The power company uses as its standard substation design a switchboard arrangement which is different from that usually employed. The switchboard is located approximately 10 ft. from a side wall of the building with its face toward the wall. The board forms one side of a room, which is totally inclosed by means of glass partitions at the ends and a suitable roof. This is a convenient room for the operator and is the only portion of the building requiring heat during the winter.

The main switchboard of the railway company is placed in line with the power company's switchboard, but faces in the usual direction—away from the wall. This board was left out of the bank of power switchboards because the heavy circuit breakers on the top of the panels would necessitate considerably more headroom than the operator's room required. Also in the operation of railway equipment it is desirable to have the rotary in view at the time of switching. The railway switchboard consists of seven panels, namely, a.c. meter panel, d.c. machine panel, four feeder panels and one auxiliary feeder panel. On these is mounted the usual equipment for this class of service.

As both the Public Service Company and the Chicago Rapid Transit Company are purchasing power from the Commonwealth Edison Company at this point, the necessary metering and demand indicating equipment was installed on a common panel inside of the operator's inclosure.

Special Interlocks Provide Protection

In order to provide the maximum protection against operating errors, certain interlocks were interposed in the control circuit, making it impossible for the operator to damage any of the railway equipment by faulty switching when starting up and shutting down the converter. A double pole interlock, mounted on the starting panel, in such a position that it will be actuated by the movement of the starting switch, is connected in series with the oil switch control circuit. It is necessary to have the starting switch on the starting taps of the transformers before it is possible to close the oil switch. This eliminates the possibility of throwing the full running voltage on the machine when it is standing still. In series with this same control circuit are two contacts of a double-acting interlock mounted on the machine frame. This interlock is mechanically actuated by the brush-raising mechanism on the d.c. side of the rotary and acts as an additional check on the starting of the machine. It is thus impossible to close the oil switch unless the d.c. brushes are raised. Two other contacts of this brush interlock are connected in series with the d.c. machine breaker release



Low-Tension Leads from Outdoor Transformers Are Carried in Individual Conduit to Concrete Underground Ducts

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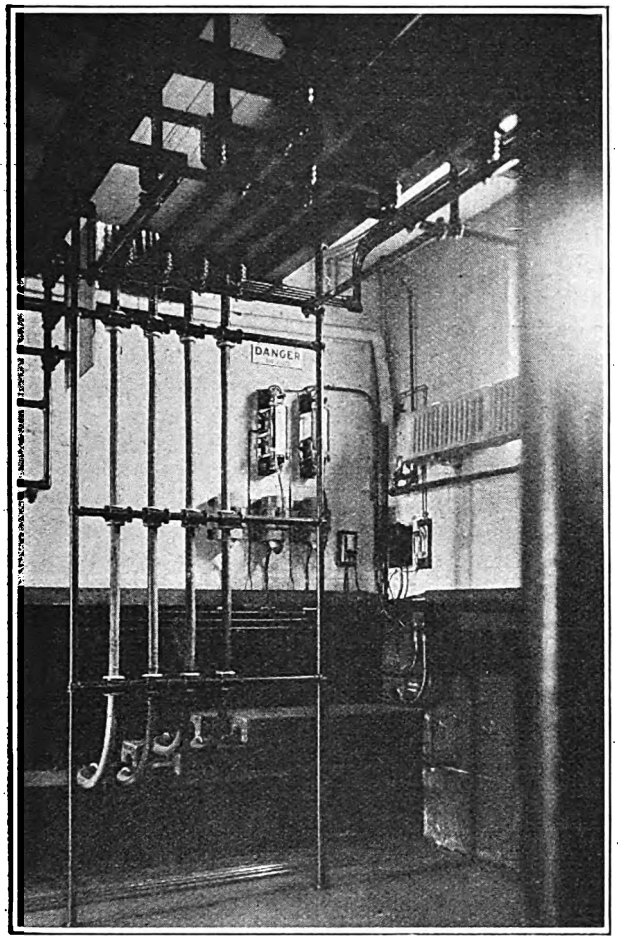
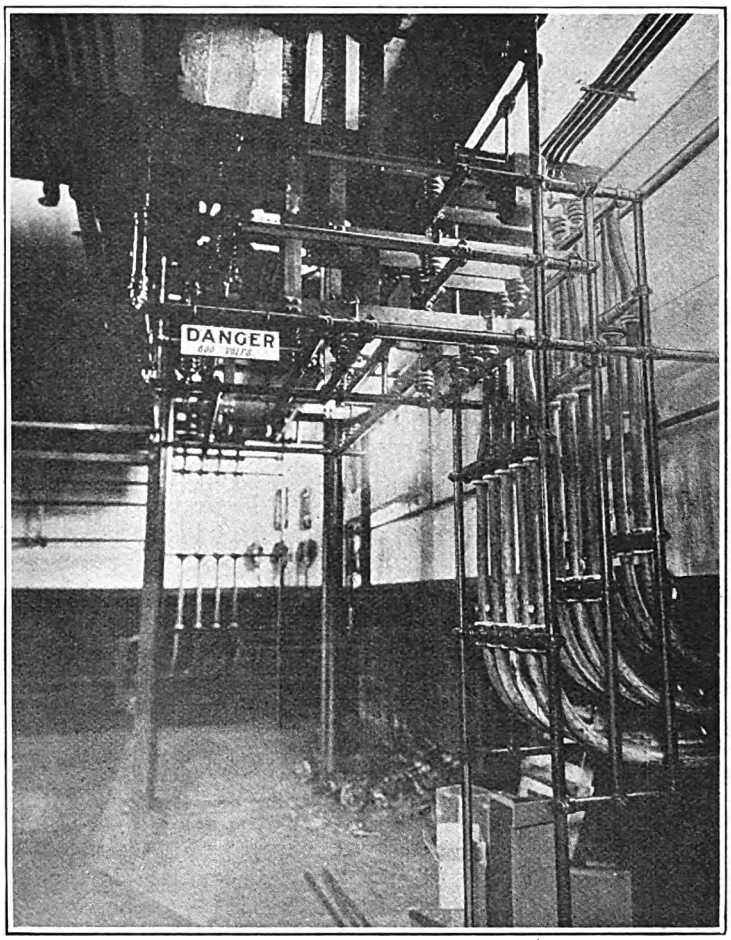


Entrance Into Duct Line for D.C. Feeder Cables. Connection Between Positive Bus Bars and Cables Is Made on Pipe-Frame Rack



A.C. Leads from Power Transformers Are Connected to Bus Bars on Pipe-Frame Rack. Guards and Signs Indicate Bare "Hot" Copper

trip circuit. When this circuit is open; that is, when the brushes on the machine are in the "up" position, it is impossible to close the machine breaker. This prevents the operator from starting the converter with the brushes down and assures the brushes being lowered on the commutator before connection to the d.c. bus.

The frame of the machine is insulated from the ground by means of leatheroid. However, a connection between the frame and ground is made through a relay which operates in case of a flashover from the brushes to the frame. This relay is also connected in the control circuit and drops out the oil switch and d.c. circuit breaker when a flashover occurs. This takes the converter off the line on both the a.c. and d.c. sides.

In addition to these interlocks the usual speed-limiting device is employed for taking the rotary off of the line in case of overspeed.

Due to the fact that this station is used for combined service, it was necessary to label buses as to voltage and to install barriers between bus bars of the two companies. Screens are provided around "live" parts of the switchboard.

From the d.c. side of the machine, the positive is carried on copper bars to the machine panel. The four outgoing feeder circuits are carried on copper bars from the feeder panels to a rack similar to the a.c. rack, where connection is made to the feeder cables. The negative from the machine is carried on copper bars directly to the underground duct line, where connection is made with lead-covered cables.

Four 1,500,000 circ.mil, lead-covered copper feeder cables are used for the positive and are carried in individual underground ducts from the station to the railway right-of-way. Two of the feeders are carried on a pole line some distance from the station, where they tap the third rail. The other two feeders tap the third rail directly opposite the substation. This substation is tied in on two double-end fed sections with the Harding Avenue substation and also feeds two single-end sections, extending from the substation to the end of the Douglas Park branch. As the load on this end becomes very light during the early morning hours, it is economical to shut down the Cicero rotary during this period, tying the single-end fed sections through the station. This is accomplished by closing one single-end and one double-end fed section to the main bus and the other single-end and the remaining double-end fed section to the auxiliary bus. The entire load is then carried by the Harding Avenue substation.

Traffic Was a Problem in 1800

WE THINK of traffic as a modern problem, but on April 19, 1800, the city of Schenectady passed this ordinance:

Resolved, That hereafter no carriage of any kind shall be allowed to remain in any of the streets or alleys within the jurisdiction of this Common Council after sunset, nor in the daytime for more than six hours at any one time, and that if any carriage shall be permitted to remain in any of the said streets or alleys for a longer time than is above mentioned, the owner or owners of every such carriage shall for every such offense forfeit the sum of 50 cents.

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Motor Buses and Accounting

The Increasing Use of Motor Buses Emphasizes the Need of a Standard System of Bus Accounts—The Problem Not a Difficult One

BY M. W. GLOVER
General Auditor West Penn Railways

NOT many years ago when electric railways commenced to build interurban lines, steam railways opposed them in every way, and even today there is considerable opposition to electric interurban railways by steam railway interests. However, it has been proved conclusively that there is a field for the interurban railway and for the steam railway, and both can operate in their respective fields without seriously interfering with each other. The same thing is true of motor buses. There is a field for the electric railway and a field for the motor bus. This fact is now recognized by electric railway operators and is shown by the large number of motor bus lines now operated by electric railways as feeders. The motor bus is a common carrier and as such should be subject to the same state or federal regulation that governs other common carriers, whether operating by steam, electricity or gas.

If there is a community without adequate transportation facilities and the existing electric railway does not consider the volume of business sufficient to warrant an extension of its lines, a motor bus line should be established, and if the electric railway fails to do this, a franchise should be granted to responsible parties for the operation of motor buses to serve the community in question. In this case, the electric railway should consider the bus line as a friendly feeder rather than an unfriendly competitor.

Traffic congestion in large centers of population is another factor to be taken into consideration in any discussion of the bus problem. Will our cities be able to take care of the ever-increasing number of automobiles in their present narrow streets? Look at the experience of Akron and numerous other cities, which have tried to replace street cars with motor buses. Imagine Pittsburgh without the Pittsburgh Railways Company, or Cincinnati without the Cincinnati Traction Company, or Indianapolis without the Terre Haute, Indianapolis & Eastern Traction Company. It is safe to predict that no city can afford to abolish its street cars and substitute motor buses until such time as the "city planning commission" now being formed finds some means of widening the streets to take care of the present traffic, which is increasing daily through the use of more private automobiles and is resulting in congestion of traffic for which some solution must be found.

Many motor bus lines have failed on account of installing the wrong type of bus, but this is not an accounting matter and should be left to our friends, the engineers, to discuss.

NEED FOR PROPER ACCOUNTING SYSTEM

The question of the proper rate of fare for a bus line will adjust itself in time and electric railway operators, who insist that a 5-cent fare is not adequate for bus service, will have the question decided on the same principle which governs all other attempts to do business at a loss. Neither a bus line nor an electric railway can continue to operate at a loss, and those who make the investment will not continue indefinitely the operation of any line which cannot pay its expenses.

So far, the principal trouble with motor bus lines has been their failure to install a proper system of cost accounting. Motor buses cannot be successfully operated without conforming to the principles of accounting, which must govern any system of cost accounting. The cost of gasoline, oil, repairs and the driver's wages have usually been considered the only operating costs. Naturally during the first few months of operation an apparent profit is shown, but this cannot continue, and when the time comes to overhaul the motor bus or when it is worn out and has to be replaced, or an accident occurs and injury to persons or property subject the bus line to a claim for damage, the fallacy of the accounting system employed is realized.

The proper remedy is to install a cost accounting system to show whether a line is making or losing money. Every element of cost must be taken into consideration. At the present time there are scarcely two motor bus transportation companies using the same system of accounts. This lack of uniformity produces income statements which, when compared with those of other lines, show ludicrous results. But they often enable the original promoters to dispose of their interests at a profit to some unsuspecting capitalist who believes there is money in operating motor buses at a lower rate of fare than is charged by electric railways for similar service. This condition can be overcome by proper regulation, and it is only just to all concerned that motor buses be subject to the same regulation as govern common carriers.

The problem of a satisfactory classification of accounts for motor buses is not difficult, as the accounting principles now followed in all classifications for common carriers authorized by State or Federal authorities conform to standard accounting practices, and it is a simple matter to prepare a classification of accounts for motor buses based on the standard classifications now in effect. The classification committee of the American Electric Railway Accountants' Association has made a study of this matter and has taken up with representatives of the Interstate Commerce Commission the question of a standard classification to be adopted for use of electric railway line which may find it necessary or desirable to commence the operation of motor buses.

A uniform classification which could be used for motor buses operated by electric railways, as well as for motor buses operated by independent interests and not subject to the Interstate Commerce Commission, is very desirable and necessary, but it will be difficult to provide a classification which will be used by all motor bus companies. A number of states have already issued regulations covering a classification of accounts for motor buses, and there is a marked difference in the classifications now used, making it impossible satisfactorily to compare the results of operations of the different companies. It is possible to use the present standard classification of accounts for electric railways, with a few subdivisions, to cover motor bus operations. In fact, the operating accounts used by some of the largest independent motor bus companies in the country are based on the Interstate Commerce classification for electric railways.

It would be manifestly unfair to adopt a classifica-

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tion of accounts suitable for a company operating several hundred buses and attempt to have this classification used by a company operating less than a dozen buses. Therefore, any system of accounts should provide a condensed classification for small companies and a more elaborate classification for large companies.

Should the Interstate Commerce Commission issue a satisfactory classification for motor buses, it should be used by all companies operating buses, whether they report to the Interstate Commerce Commission or not, and if State or Federal regulation is applied to motor buses, electric railways have nothing to fear.

When an electric railway decides to operate buses, it will be found more satisfactory to organize a separate company than to operate them as a part of the electric railway, and this has been done by many lines.

Finally, the attitude of electric railways to motor bus transportation is well stated by A. C. Blinn of the Northern Ohio Traction & Light Company:

Just remember one thing: This company—the Northern Ohio Traction & Light—is in the transportation business!

When the horse cars gave way to the electric cars this company changed over to electric motive power. When the electric car gives way to the bus, if it does, this company will still be in the transportation business, operating buses!

Plans for New York Suburban Transit

New Transit System Proposed by Which Suburban Trains Can Run Directly Into New York Through a Union Terminal Distributing System —To Be Entirely Independent of City System

LAST week the New York Transit Commission published a report by its consulting engineer, Daniel L. Turner, on the problem of suburban transit in the New York Metropolitan district. It is the first official report of a comprehensive nature put out by the New York Transit Commission to include New Jersey. The rapid transit system proposed is entirely separate from any of the existing rapid transit lines in New York, and its main purpose is to serve the suburban commuter from the north, east and west, who now largely uses the existing rapid transit lines after reaching the city.

The proposed system puts the junctions between the rapid transit distributing lines and the steam (or electrified) main line railroads in all cases outside of Manhattan Borough, and in the case of the New Jersey lines away from the Hudson River. This is because of the high value of real estate in Manhattan and on the river front. The plan does not contemplate an abandonment of the present main line railroad terminals. The Grand Central and Pennsylvania stations in New York City and the Erie, Lackawanna and West Shore Railroad stations in Hudson County, New Jersey, would be kept, but used primarily by long distance passengers.

The New York Transit Commission says that the plan is entirely tentative in character and in an informal stage. It is submitted to the various public authorities concerned, as well as to the railroad companies and civic bodies generally, for examination and comment. An abstract follows:

EXTENT OF SYSTEM

The railroad services entering New York accommodate approximately one-quarter of all the steam railroad passenger traffic in the country, and about 82 per cent of all the trains required daily to serve this traffic originate within about 40 miles of the city. Therefore, roughly, the suburban railroad traffic into and out of New York City amounts now to about 20 per cent of all the steam railroad traffic in the United States. As the number of these commuters is increasing rapidly, special transit facilities must be provided for them; otherwise they will soon saturate the steam railroad facilities and seriously interfere with the existing city transit lines in transporting purely city traffic.

The population of the Metropolitan transit district, as outlined in the accompanying maps and as represented approximately by territory included within 40 miles of New York City Hall, amounted in 1920 to about 8,600,000 people. Of this number, approximately 3,000,000 live outside of New York City and 5,600,000 within the city. It is expected that in 1924 this total population will have increased from 8,600,000 to 9,300,000; in 1930 to 10,500,000, of whom about 3,900,000 will be suburbanites; and in 1950 to 17,000,000, of whom about 7,000,000 will live outside the present limits of the city of New York. In 2000 it is expected that the population will approach 35,000,000, of whom about 22,000,000 will live outside the city limits. The population density of the various counties and boroughs making up the district in 1920 is shown in the accompanying map.

TABLE I—ANALYSIS OF PASSENGER TRAFFIC ENTERING AND LEAVING NEW YORK DELIVERY AREA

Sectors	1923 Number of Passengers Yearly	1923 Number of Passengers Daily	Per Cent of Total	Per Cent of Commuter	Per Cent of Regular	Per Cent of Sector (a)	Per Cent of Sector (b)
Long Island:							
Railroad							
*Commuter	52,000,000	162,000	15	33	...	68	68
Regular	25,000,000	78,000	7	...	25	32	32
Sector total	77,000,000	240,000	22	33	25	100	100
Westchester:							
Railroad							
*Commuter	28,000,000	87,000	8	18	...	61	61
Regular	18,000,000	56,000	5	...	18	39	39
Sector total	46,000,000	143,000	13	18	18	100	100
New Jersey:							
Railroad							
*Commuter (c)	78,000,000	244,000	22	49	...	34	58
Regular (c)	56,000,000	175,000	16	..	57	24	42
Railroad total (c)	134,000,000	419,000	38	49	57	58	100
Ferry (d)	56,000,000	175,000	16	...	...	24	...
H. & M.	43,000,000	134,000	11	...	...	18	...
Sector total	233,000,000	728,000	65	49	57	100	100
*Total commuter	158,000,000	493,000	45	...	...	...	...
Total regular	99,000,000	309,000	28	...	...	...	...
Total railroad	257,000,000	802,000	73	...	...	...	...
Grand total	356,000,000	1,111,000	100	100	100	...	...

(a) Includes ferries and Hudson & Manhattan.
(b) Excludes ferries and Hudson & Manhattan.
(c) Includes Staten Island Rapid Transit Co. St. George passengers—Commuter, 2,844,118; regular, 8,286,635; total, 11,030,382.
(d) Includes Staten Island - Manhattan ferry passengers but not railroad St. George passengers.
*Commuters are all riders at less than the regular fare.

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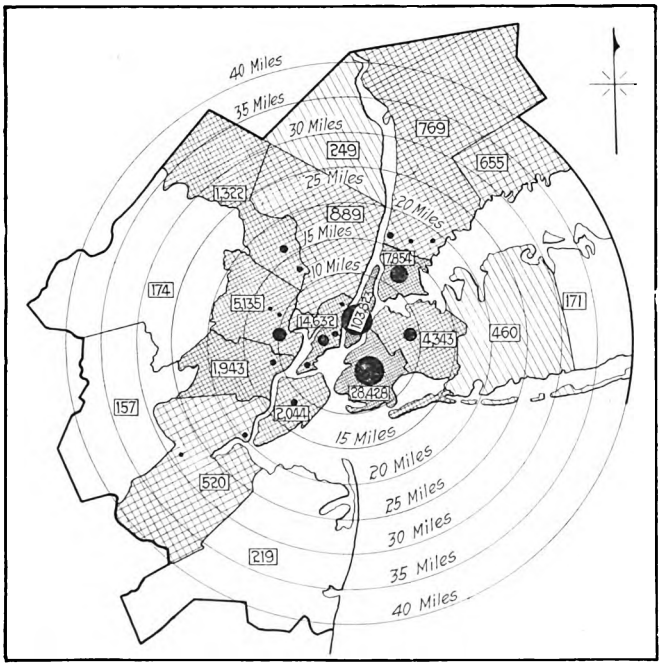
In one respect the distribution of the population in this district in New Jersey differs from that in New York State outside of New York City. The New Jersey sector has thirteen cities with a population of 30,000 or over, and a total population of 1,382,000. This means that a large proportion of the population in this sector has a local community interest and that a considerable measure of decentralization exists. Such a condition should be encouraged. In the Westchester section, on the other hand, there are only two cities having a population of 30,000 or more, and the total urban population in these cities is only 179,000, so that decentralization does not obtain in this sector to the same degree as in New Jersey.

An analysis of the passenger traffic entering and leaving this railway district is shown in the accompanying table. During the rush hour from 8 to 9 a.m., 243 trains arrive in the city from all sectors. This figure does not include the trains on the Hudson & Manhattan Railroad. Eighty-four of these trains arrive within this same hour, so that the total train arrivals amount to 327 trains in a single hour inbound. About 89 per cent of these trains originate within the Metropolitan transit district.

METROPOLITAN TRANSIT SYSTEM

To accommodate the suburban traffic originating on the steam railroads traversing the metropolitan transit district, it will be necessary to do one of two things. One is to provide additional terminals in the central business district for the accommodation of this rapidly increasing suburban traffic, thereby relieving the district terminals; the other is to shunt all of the suburban

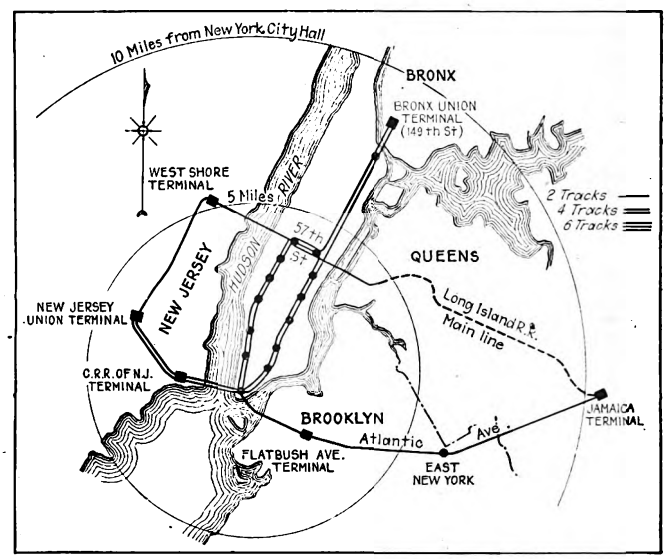


Metropolitan Transit District, Showing Present Distribution of Population

Figures are based on Federal census figures for 1920 and show number of people per square mile. The total population of each New York City borough and of 15 municipal cities adjacent to New York City is shown graphically by circles, the areas of which are proportional to number of population.

traffic past existing terminals and provide a separate and independent collecting and distributing system traversing central Manhattan for the exclusive use of suburbanites now served by the existing steam railroad lines.

It will be a mistake to follow the first of these alternatives. This would only mean concentrating the suburban traffic at a few separate points, just as is now done, creating congestion worse than now exists. From these points the passengers would have to reach



Metropolitan District, Showing Proposed Transit System
Circles represent distances from New York City Hall.

their destinations over the city's transit facilities, thereby throttling these facilities and prohibiting them from properly serving the areas within the limits of New York City that they were designed primarily to serve.

PLAN PROPOSED IS INTERSTATE

The plan proposed is shown in the accompanying illustration. It contemplates about 40.5 miles of route and 123 miles of single track. It may be described as consisting of three separate lines. One of these serves the Long Island sector to the east of the city. Another serves both the Westchester section to the north and the New Jersey section to the west, and the third serves the New Jersey sector only. The three lines generally described are:

1. The Long Island begins at Jamaica, passes through Flatbush terminal and under Battery Park, then north on the west side of Manhattan to Fifty-seventh Street, then east under the East River to Sunnyside Yards.

2. The Westchester-New Jersey line begins in the Bronx at a union suburban terminal to serve the New York Central, New Haven & Harlem lines, then south to Fifty-eighth Street, where it divides. One of these lines goes on the east side to Battery Park, thence under the river to the New Jersey terminal, to receive trains of the Lackawanna, Erie and Pennsylvania Railroads. The other branch goes west from Third Avenue and Fifty-eighth Street to Ninth Avenue, then south to Battery Park, where it terminates.

3. The New Jersey line begins at the New Jersey union terminal mentioned, then goes under the Hudson to Battery Park and up on the east side to Fifty-seventh Street, thence under the Hudson River again to Weehawken and the West Shore terminal, then back to the New Jersey Union Terminal. This provides an uptown as well as a downtown service for New Jersey commuters.

It is proposed to operate through trains through this tunnel and then over the suburban lines, which would

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be electrified. In the case of lines not electrified, trail cars, hauled in the tunnel by electric locomotives, can be operated.

For the routes of the rapid transit lines on the east and west sides of New York, it was considered essential to find a location which would not interfere with the expansion of the city's rapid transit facilities. This meant either that the new system must be carried at a deep level or new traffic arteries must be opened up. It was found that if the second course was followed, the saving in construction costs through having the lines near the surface would pay two-thirds of the cost of the street openings. Mr. Turner proposes that one of these 120-ft. streets be between Second and Third Avenues on the east side and the other between Ninth and Tenth Avenues on the west side. He also proposes three levels of traffic. Below the surface would be the rapid transit line, on the surface level local vehicle traffic, and on an upper deck express motor vehicle traffic. During the night hours, particularly in the theater district, the surface level could be given over to the parking of automobiles. Access to the upper level would be by ramps.

FINANCING OF PROJECT

Mr. Turner estimates the cost of the project at $687,000,000, divided for construction $502,000,000; for equipment $185,000,000. He suggests that the construction costs be raised as follows:

State of New York	$36,900,000
State of New Jersey	48,400,000
Nineteen counties benefited	278,700,000
Seventeen railroads involved	138,000,000
	$502,000,000

He suggests the sums payable by the states and counties be collected in eight equal installments and be raised by taxation. The equipment cost, to include line equipment, power and transmission, yards, repair shops and cars, is estimated at $185,000,000.

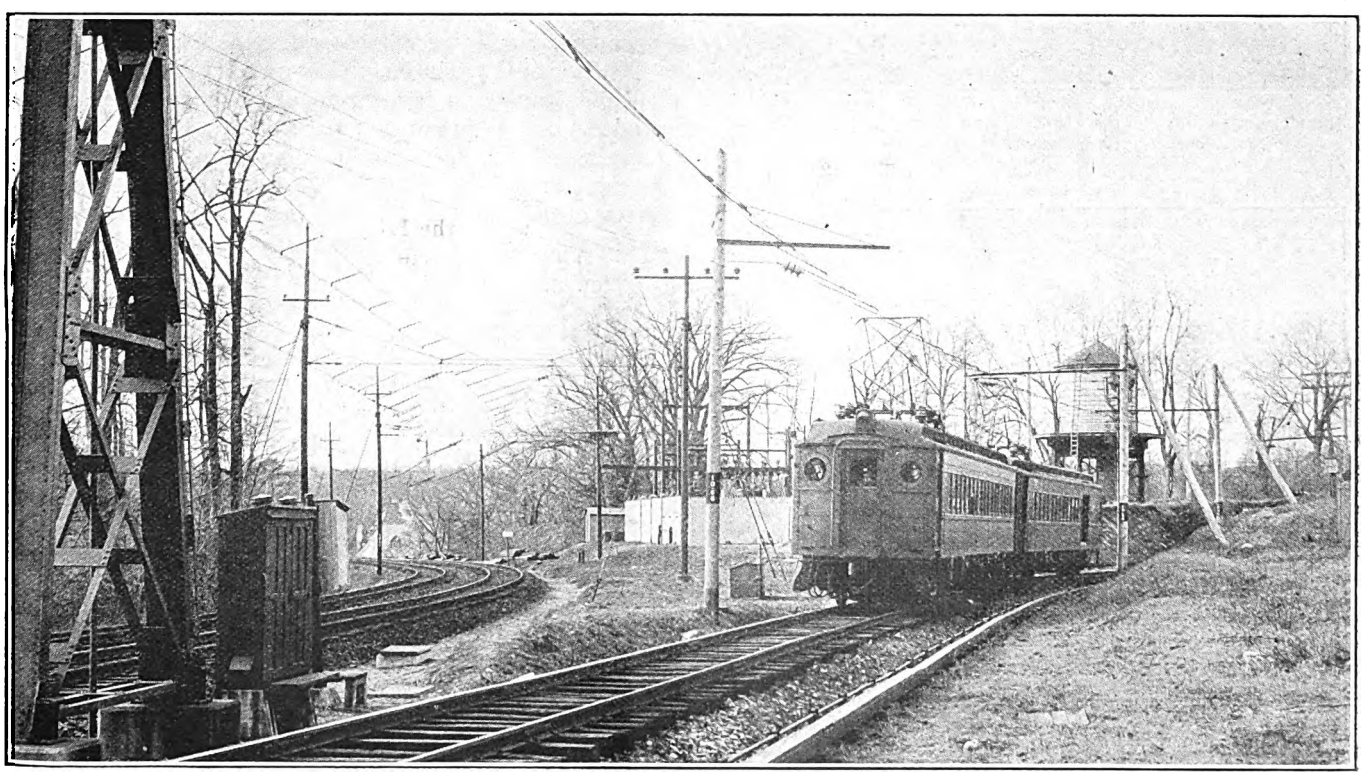
While it is difficult to arrive at any close estimate of the cost of service on the new system, it is believed that the total cost, including operating expenses and fixed charges, would amount to about 10 cents on a 400,000,000-passenger basis and about 6⅔ cents on a 600,000,000-passenger basis. This includes interest and amortization charges only on $323,000,000, or for the cost of the equipment and the cost contributed by the railroads. On the other hand, if all the cost should be financed under the usual long term bond plan, the fare would have to be about 18 cents.

Of course, some of the present expenses to the commuter would be reduced or disappear.

Philadelphia Electrification Extended

Pennsylvania Railroad Equips Its Fort Washington Branch for 11,000-Volt, Single-Phase Operation —No New Rolling Stock or Electrical Equipment Was Needed

AN INTERESTING development in railroad electrification is that on the Fort Washington branch of the Pennsylvania Railroad, operated electrically since Feb. 27, 1924. This single-track branch extends from Allen Lane station, on the Chestnut Hill branch, which was electrified in 1918, to Whitemarsh station, a distance of 6.2 miles. The country through which it passes is very rolling, resulting in numerous cuts and fills, with a maximum grade of 1.5 per cent over a distance of 2.6 miles; four curves of 2 deg. to 9 deg. obtain, the latter being 1,200 ft. long. It was necessary only to install an overhead catenary system, the existing substation at Allen Lane being adequate to handle the additional load.



Junction of Fort Washington Branch with Chestnut Hill Line at Allen Lane. The Existing Transformer Station Which Feeds the Line Is Shown in the Background

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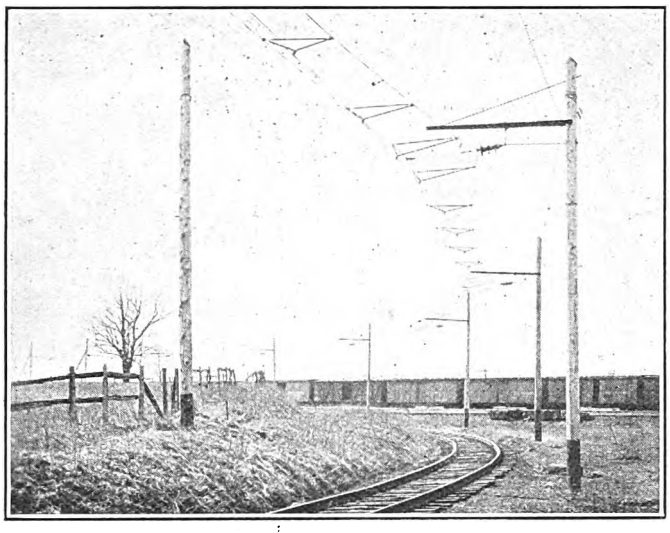
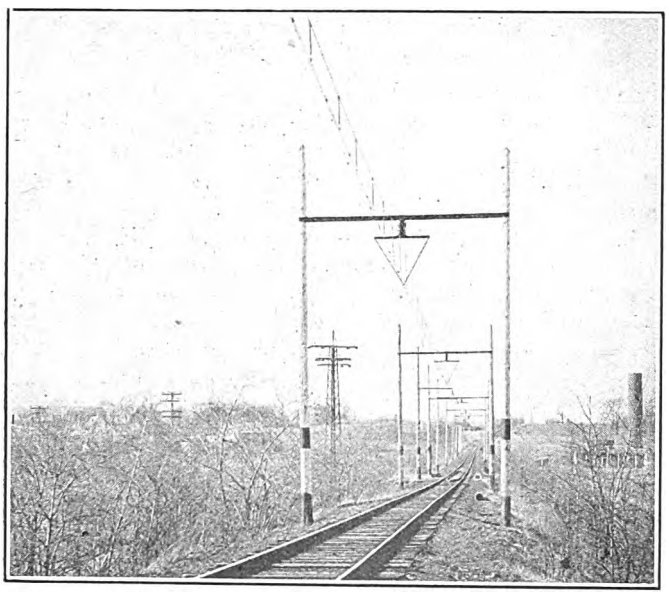
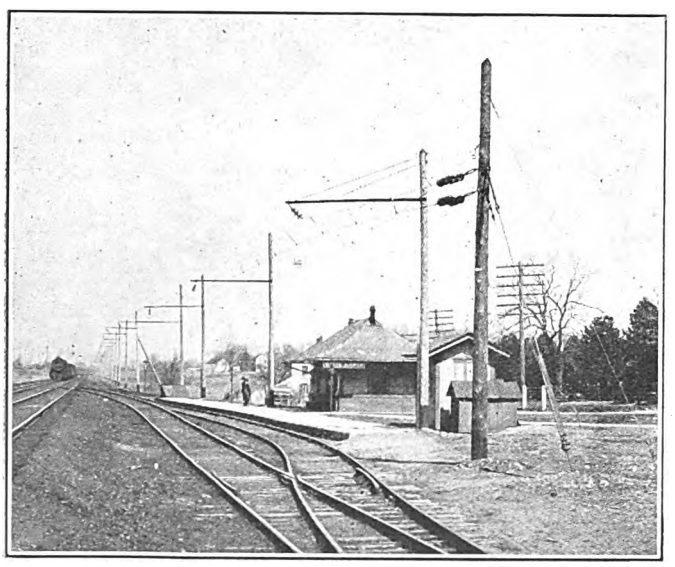


Overhead Construction on 9-Deg. Curve, Using Single String of Insulators and Double Messenger



Span Construction Across a Fill Where Back Guying of Poles Was Not Feasible. Note the Triangular Wind Braces



Whitemarsh Station, the Terminal of the Electrified Line, Showing Standard Bracket Overhead Construction

By electrifying the branch in this manner, the existing service could be handled at less expense than by steam or by any self-propelled cars, considering all fixed charges and operating expenses. The expense of constructing the overhead line was offset by the fact that it was not necessary to provide any additional electric car equipment, the existing equipment being sufficient by proper adjustment of the train schedule. The present schedule provides six trains in each direction daily, two of which run to and from Broad Street station, Philadelphia, and the remainder terminate at Allen Lane, at which point connection is made with electric trains of the Chestnut Hill branch to and from Broad Street station. The trains consist of from two to five cars.

All the work of electrification except pole setting was done by the regular linemen, who maintain the overhead wire structures on the Paoli and Chestnut Hill electrifications, under the motive power department of the Philadelphia terminal division.

Western cedar poles, normally spaced 125 ft., with angle side brackets, support the standard catenary wire system, made up of ½-in. galvanized steel messenger wire, No. 00 copper auxiliary wire, No. 000 phonoelectric contact wire, ⅜-in. x 1-in. galvanized hangers, and No. 0000 copper return wire attached to each bracket at the pole. The poles are back-guyed with ⅜-in. galvanized steel wire. Approximately every half mile the end of the bracket is guyed to adjacent poles on each side. A high fill with steep slope on each side necessitated span construction for a distance of about 1,300 ft. Opposite poles were tied together at the top by double angles which support the insulator; these bents were spaced 250 ft.

Around the 9-deg. curve poles are spaced about 100 ft. and special construction was necessary to prevent excessive vertical rise of wires due to pantograph pressure. This was accomplished by installing a second messenger wire supported from the insulators to which the first messenger is attached and a triangular hanger arrangement between messengers and trolley.

Owing to the relatively close normal spacing of poles, special bracing to prevent misalignment of trolley wire under wind pressure is not necessary. However, such bracing is provided at each span where the special bent construction is used with 250-ft. spacings. This consists of a triangular angle brace having one of the sides supported by a rigid post-type insulator and the opposite apex attached to the auxiliary wire.

As with the Paoli and Chestnut Hill electrifications of the Pennsylvania Railroad, the trolley wire carries 11,000-volt, 25-cycle, single-phase power for operating the multiple-unit electric cars. Each car is equipped with two Westinghouse No. 412-A single-phase, series-repulsion motors, each of 225 hp. hourly rating.

Diplomas for Clean Subway Stations

A COMPETITION was held during the last six months of 1923 to see which of the stations on the Underground Electric Railways of London, England, could be kept in the smartest condition. At the stations on each line where the staff have distinguished themselves for courtesy, tidiness and general good conduct, silver mounted diplomas have been issued, and will be exhibited in the station booking hall. In all, ten such diplomas were issued covering the five main lines of the system.

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Observations on the Track Structure

Relative Advantages of Various Types of Flexible and Rigid Construction—Opinion Expressed as to Type to Be Built to Meet Various Conditions—Causes of Disintegration Are Discussed and the Beneficial Possibilities of Standardization Touched On

By H. P. Hevenor
Consulting Engineer, New York, N. Y.

UPON the elimination of the old wooden stringer type of track construction in paved streets the idea was evolved of using transverse pieces of wood placed every so often, known as ties. Shortly thereafter the Dick Kerr or other type of girder rail took the place of the old-fashioned stringer rail. These basic principles developed into a generally used type of construction such as is shown in Fig. 1. The wooden ties, 6 in. x 8 in. x 8 ft., spaced on about 2-ft. centers, were tamped on a gravel or broken stone ballast. A concrete paving base between and over the top of the ties was used when necessary to support a block pavement on a sand cushion with tie rods spaced about 6-ft. centers.

The type of construction described above became generally used throughout the country for railway track in paved streets and, as time went on, received a number of modifications by different engineers. It has been developed sometimes into a very costly assembly, as for example in the old Detroit type and the new Toronto design. These modifications were brought about principally on account of conditions of the local subsoil. Construction which consists of 6-in. x 10-in. x 6-ft. 8-in. white oak ties spaced on 3-ft. centers, supported on an 8-in. concrete mattress, costs about $100,000 per mile of single track. The ties are brought to line and grade by tamping a 1-in. sand cushion underneath. The space between and over the ties is then filled in with poured concrete to a sufficient depth to support a brick paving on a sand cushion.

In the old type a 7-in. 90-lb. T-rail was used with granite nose stones providing the groove. This was modified later in Toronto by using a 7-in. modified girder rail and eliminating the granite or brick nose blocks. The first cost of the original assembly in Detroit was very high, and its comparatively short life and high maintenance requirements and the climate in which it is used made it an expensive design. This is shown in Fig. 2. A cross-section of one of the standards used in Toronto is shown in Fig. 3.

Trend Toward Substitute Ties

High cost of track and paving materials, the comparatively poor quality ties that are now obtainable and the high wages of labor for construction and maintenance have been important factors in creating a demand for a better type of track assembly. Higher speed of operation and the quicker acceleration and braking of the present-day cars have augmented the demand. The original basic type of track construction is a form of flexible structure, capable of accommodating the wave action in the rail. In steam railroad practice this principle is demanded in the entire structure.

Because the better grades of wood ties were becoming scarcer and more expensive every year, steel ties were introduced. They are being used more all the time, with every likelihood of the demand for them becoming greater. With their use new principles have been introduced and there has been a strong tendency toward a more rigid type of track construction. In a few instances this has been developed into an absolutely rigid type.

Providing that it is conscientiously built and maintained, the track assembly depreciates mostly from the following causes:

Surface water entering the structure between rail and paving.

Poor drainage of sub-soil.

Water seepage into the track assembly through adjacent paving.

Improper type of track and paving assembly to meet climatic conditions.

If a flexible track assembly and a form of rigid track paving are used, in a comparatively short time a line of cleavage is invariably established at the point where the paving meets the rail. As time goes on the surface water finds entrance to the lower structure and subjects the rail, rail fastenings, ties, spike holes and the concrete paving base to the mercy of water and frost, with disastrous results.

Flexible Paving to Go with Flexible Construction

A good type of construction, therefore, when using the flexible track principle, is to apply a hot asphalt filling over granite block paving, allowing a considerable quantity of this plastic to accumulate on top of the blocks and covering it with hot beach gravel, Fig. 4. A semi-flexible track construction may be obtained by using steel ties with a small granite block paving and an asphalt filling applied in the same manner as stated above.

For an absolutely rigid type of track structure, steel ties laid in poured concrete may be used with a compressed concrete top for the wearing surface. This kind of concrete is the only paving which absolutely adheres to and seals the rail during its life. If an asphalt surface is desired when using compressed concrete paving, it is necessary only to lower the top surface 2 in. or 3 in. to accommodate the asphalt. However, because of the wide tread and flange of the standard 7-in. grooved girder rail this does not impair the grip of the concrete adjacent to the rail.

The bitulithic concrete paving structure laid in conjunction with wood ties, which is being quite extensively used in Los Angeles, seems to combine a flexible form of paving with a flexible type of track construction. Moreover, it appears to be a solution of the problem of building track under traffic, and has the advantage of being a sealed track structure. A cross-section of the

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bitulithic construction as used in Los Angeles is shown in Fig. 5. It was described in detail in ELECTRIC RAILWAY JOURNAL for May 19, 1923. Some foreign engineers who examined this work and were very strongly impressed with its possibilities stated that they fully intended to use this principle in their own countries. In their opinion it was a step in the right direction, as they are required by the local authorities to build the track under traffic. The most prominent question that seemed to be in their minds was the tendency of vehicular traffic to skid on this paving when it was wet, which, however, is the case on all asphalt surfaces. In the places where they intended to use it there is considerable fog and rain, but with a compressed surface, skidding is largely eliminated under wet conditions.

In doing any track laying or reconstruction, one of the first questions to be asked is, Does the track have to be laid under traffic? If it does, it means not only high labor cost, including night work, but also uncertainty concerning the permanency of the work. When it is necessary to do it under traffic, the question arises, Can any or all of the cars be rerouted, can a single-track operation be arranged on a double-track line by using temporary crossovers around the work, or is there any possibility of laying a temporary track alongside the job?

Operating officials often answer, "No, we are unable to reroute on account of inconvenience to the public, and the special work is not conveniently located to do so. These lines are too busy to allow single-track operation around the work, especially during rush hours." Or the city may not allow an additional track to be laid adjacent to the work. It is necessary then to make the best of a bad proposition.

In my opinion no track should be built with cars operated on it continuously. City authorities often are greatly to blame for not allowing railways to reroute their cars or use other methods at their disposal to install the work properly. However, the municipalities are now seeing the light and are being educated to the situation. They see that track may have to be laid only twice under proper conditions instead of possibly three times when these restrictions are imposed. As one old roadmaster said, "For every day they give me without traffic, up to two weeks from the time the work is completed, I figure an extra year on the life of my track."

A FEW SUGGESTIONS ON DRAINAGE

In looking over the track construction in different communities, one sees some very odd phenomena. Irregularities are explained as being due to soft spots, or the kind of soil, or to some condition that existed before a way was discovered to cope with local sub-soil conditions. Some railways have a sandy gravel foundation throughout their entire territory with very few soft spots. Others have a saturated soil underneath their structures all the time. On the other hand it has sometimes been found that it was not the soil but the design of the track structure which allowed surface water to seep through and give no end of trouble in the winter time. By using an absolutely sealed track structure, trouble of this character can be entirely eliminated.

Another way to cope with the conditions of saturated soil is to introduce dry blind drains, using crushed stone. Some railways use a field tile or glazed clay bell and spigot pipe laid in a crushed-stone trench; and in other cases, where the soil is particularly bad, 6 in. to 10 in. of broken stone is laid the entire width of the trench on which the track structure is built.

In constructing a trolley track with paving, the existing sub-soil should normally be as little disturbed as possible. In other words, the excavation for the track structure should be as shallow as is permissible because paving and traffic have dried out and compacted the surface of the earth to a reasonable depth under an existing road or thoroughfare, and the value of this is lost if the excavation is too deep. Suggested types of construction call for an excavation from 15½ in. to 24 in. All sub-soil should be compacted with a roller as heavy as practicable under the conditions. A method often used on clay soils is to put a few inches of cinders, slag, or broken concrete material over the clay to facilitate the rolling.

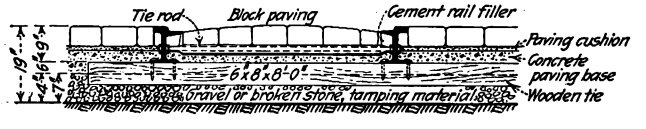

Fig. 1—A Basic Type of Track Construction Used in Paved Streets

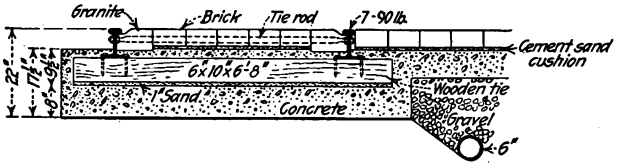

Fig. 2—Standard Construction of Detroit United Railways

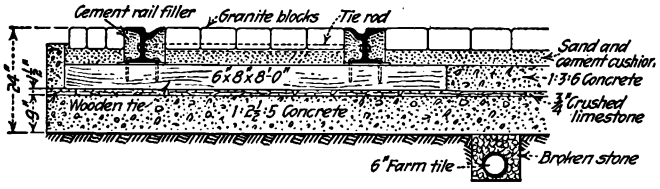

Fig. 3—Track Construction of the Toronto Transportation Commission Using 7-In. Grooved Girder Rail

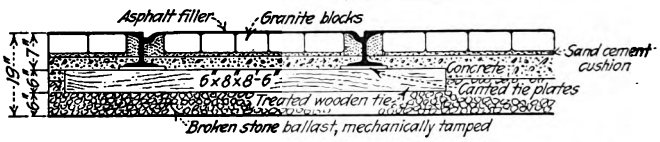

Fig. 4—An Asphalt Filler on Paving Blocks Protects This Flexible Track Construction from Surface Water

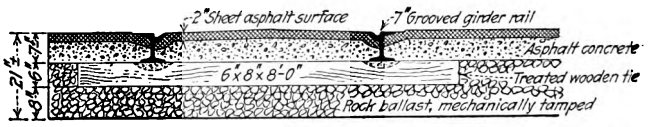

Fig. 5—Asphalt Paving on Bitulithic Concrete in Track Construction Used by the Pacific Electric Railway, Los Angeles, Cal.

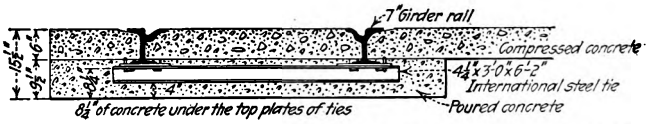

Fig. 6—Monolithic Steel Tie Track Construction Which Keeps Out All Surface Water

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A monolithic type of structure on any soft form of foundation using a steel tie with a steel rail entirely incased in concrete is good, Fig. 6. This gives a form of reinforced concrete structure with the coefficient of expansion practically the same throughout, as it is completely incased and protected against the elements. It is laid on this kind of soil as a mattress with a blind drain, or with a soil pipe, as the conditions may demand. This type of structure is very cheap in first cost and lasts throughout the life of the rail.

Steel ties lend themselves very nicely to improving the electrical return circuit. Spot-welding them to the rails, four or six to a 60-ft. rail, is an insurance against leakage from the return circuit in the event of a bad joint or a broken rail, and is a good protection against electrolysis action on adjacent structures.

Wood tie track structure lends itself to easy removal. This question was once commented upon by an official prominent in street railway circles when comparing this construction to that with steel ties. The quick response of his engineer, however, was, "We don't build track for the purpose of taking it up, but to carry cars as long as possible." The executive conceded that his engineer was right. A steel tie structure of an approved type is harder to remove than the wooden tie structure, but if its life is considerably greater, that is not a serious objection. With improved equipment and manual labor reduced to a minimum the cost of construction and reconstruction is decreasing in spite of the rise in price of materials and labor. In fact, this is the evidence that the value of the engineer to his company is rising every day as conditions become more complex.

The kind of traffic which is to pass over the track is a very important factor. The light single-truck safety car seems to subject the rail to almost no wear at all except on curves and then to only very slight wear, compared to the heavy double-truck car. Big interurban cars and trolley express cars subject the track to severe wear, especially if they are operated in paved streets. This naturally brings the question to mind, Should the heavy types be operated over paved streets at all? When they are they certainly put a severe strain on a flexible type of track, causing its rapid depreciation. It does not, however, affect a properly designed rigid type of track construction.

A practice sound in theory and proved by actual performance is to tilt the rails toward the center of the track. This brings the tread of the wheel in contact with the top center or ball of the rail head instead of making contact near the gage line. This gives greater life to the rail and preserves the gage of the track longer than under the more usual practice. It also transmits the load through the axis of the rail and eliminates the wedging action that a car causes in passing over the rails, thus preventing the opening of a line clearage between the rail and paving. This practice is possible on wooden ties by using a tilted or tapered tie plate, or it can be done by adzing. On steel ties it is accomplished by bending or canting the ends in proportion to the angle of the wheel tread.

It has often been argued that the flexible type of track construction is not as noisy as the rigid type. This is often the case when the single-truck one-man car is used. Using the double-truck, standard built car on new track, there is no difference. But after a few years the rigid track structure is not nearly so noisy as the flexible type because it does not depreciate so quickly. In the case of the single-truck one-man car, this noise is due to the car and not the track. However, these cars need only slight modifications to overcome the trouble.

Weight of Opinion Behind Standards Will Deter Use of Other Construction

The American Electric Railway Association is developing standards of track construction by means of practical experiment and scientific research. The technique of this subject is progressing rapidly. In time the type of construction may be standardized with the necessary qualifications for traffic, materials, soils and climatic conditions. With the A.E.R.A. establishing these principles, no municipality will be able to require a railway to install a type of construction under conditions which will entail a heavy loss and be contrary to approved practice. These standards will no doubt be established in accordance with the economic conditions, the capital expenditures to be based on the kind and volume of traffic on the particular line. On main arteries the best construction is the cheapest, while on lines in outlying districts, under normal speed and light traffic, a structure costing one-third less may meet all the demands made of it with an economic return on the capital investment.

Every company should standardize its track construction to conform to the recommended standard of the association, as applied to two or three different types, depending on the traffic demands and with such modifications as may be required for the particular locality. What an ideal situation this would present in the purchase and delivery of track materials, speeding up the work and reducing the costs. Steel mills could afford to carry in stock large quantities of the standard rail sections, ready for quick delivery. Spike manufacturers would need to carry only a couple standard makes. Manufacturers would not have to carry in stock a great number of rolls, dies, special machinery and equipment to meet the various demands of different companies over the country. This has been the cause of the increased cost of the materials purchased and the delay in supplying them. It would mean much to the manufacturer if he could produce this stock in off seasons to meet the demands of the construction season.

The speeding up of the work is an important factor to a number of the railways which are greatly handicapped in starting their construction work by having to wait the decision of some particular municipality before determining a paving program. This may then necessitate the company working late in the fall and using expensive methods for protection against the elements. The effort to keep work going the year around and the expense involved in shutting down work and picking it up again have been discussed considerably recently. More is being done each winter in the building trades to keep work going throughout the entire year, but this will hardly become entirely feasible with street railways in a northern climate. However, if something can be done to keep the manufacturers of track material on a yearly basis the industry will eventually derive considerable benefit.

It was the usual practice for the special trackwork manufacturers throughout the country to be extremely slack for want of work during the winter season until

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the early spring, and from that time on to be pushed to their utmost capacity. This winter, however, there has been a decided exception to the rule, due to the returning prosperity of the industry and the foresight of the engineers in telling their needs well ahead of their immediate requirements. This means a better class of work, full-time work throughout the year for the men in the industry, and a trend in the right direction toward the continuing prosperity of the country.

Los Angeles Starts Use of Double-Deck Fageol Buses

THE Los Angeles Motor Bus Company, subsidiary of the Los Angeles Railway Corporation and the Pacific Electric Railway, has ordered 20 new Fageol buses of a double-deck design, and the Los Angeles Railway has purchased five additional for its exclusive use. These constitute a trial installation to prove or disprove their adaptability to render efficient service under Los Angeles conditions. The bus company operates these new buses on the Vermont Avenue and Sunset Boulevard line. They were purchased at a cost of $12,250 each.

Among the unusual features is the equipment of these double-deck buses with pneumatic tires on all wheels, of which the railway says that it is an obvious improvement if it is found to be capable of sustaining the tremendous load to which the tires are subjected. Another feature is that the upper deck is some 3 ft. lower than the two double-deck buses used by the Los Angeles Motor Bus Company heretofore. Nevertheless, the headroom in the lower deck is 74½ in. along the central aisle and 64 in. over the seats. The upper deck seating consists of two longitudinal seats in the center of the bus placed back to back, and two cross-seats at the front end. The total seating capacity is 58, with 26 seats inside and 32 on the upper deck. The total weight is 13,200 lb., of which 5,600 lb. is on the front axle and 7,600 lb. on the rear. This gives a weight per seat, light, of 227.6 lb.

The over-all height of the vehicle is 10 ft. 1 in. The lower floor is 22½ in. above the ground, and the upper floor is 7 ft. 2½ in. from the ground.

The bus is designed for one-man or two-man operation, there being both front and rear doors. For one-man operation the door at the rear is closed and the upper deck not used. For two-man operation, of course, entrance to both lower and upper deck are made by way of the rear platform and the front door serves as an extra exit, it being operated by the driver.

The bus is equipped with a 100-hp. six-cylinder motor, which makes possible a speed of 33 m.p.h., with a full load. It is said to have an unusually fast acceleration.

Gold Bars Awarded for Five Years of Service

AN UNUSUAL form of service insignia for trainmen and inspectors has been adopted by the Union Street Railway, New Bedford, Mass. Instead of the familiar gold or silver diagonal stripe on the coat sleeve, which was the former method of indicating

A Gold Bar Sewed Vertically Near Bottom of Coat Sleeve Is Five-Year Service Insignia in New Bedford, Mass.

that a man had been five years in the railway service, a vertical gold bar, ¾ in. long and ¼ in. wide, is now sewed on the bottom of the sleeve. When a man wears several such bars an impressive effect is created. The change from the older designation to this form was made at the request of the men themselves, who borrowed the idea from the local police and fire departments.

Twenty-five of These New Double-Deck Fageol Buses Will Shortly Be in Use in Los Angeles, Cal.

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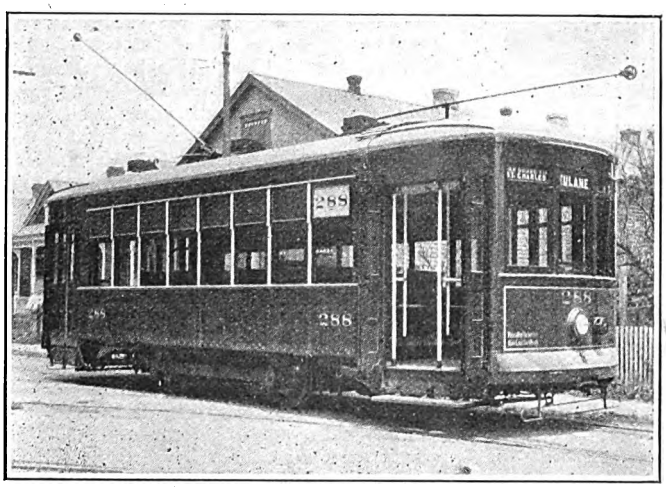
A Single-Truck One-Man Two-Man Car

Experimental Car Built by New Orleans Public Service, Inc., Is Designed Primarily for Economical Operation, but Is so Constructed that Moderately Heavy Traffic Can Be Handled

TO PROVIDE more frequent service on lines where the riding is light during most of the day but comparatively heavy during the rush hour, the New Orleans Public Service, Inc., has built at its Carrolton shop a single-truck one-man two-man car. During the slack periods it is planned to operate cars of this type on a 15-minute headway with one man, replacing the present 30-minute service provided by double-truck two-man cars. In rush hours, however, the new cars can be operated by two men if this is found necessary.

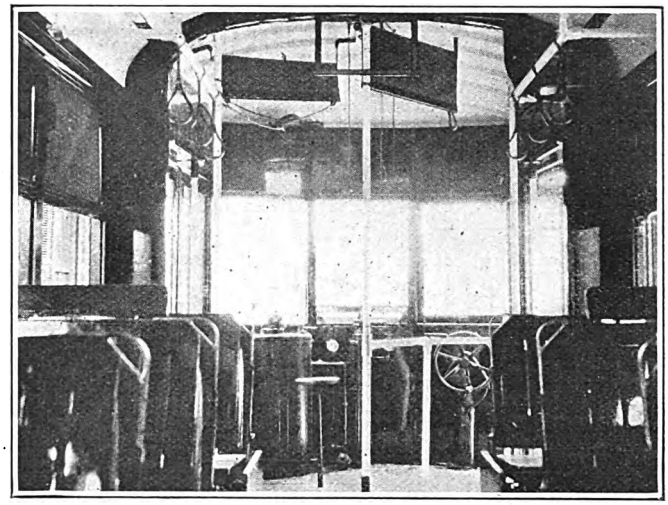
Novel features of this experimental car are the arrangement of doors and location of the stanchions. The cars are double-ended, and four sets of double folding doors are provided. The front right-hand doors are operated by National Pneumatic engines controlled by the motorman's brake handle in accordance with standard safety-car practice. The right hand rear doors are manually operated. The doorway at the motorman's right is divided in the middle by a vertical stanchion running from floor to roof. A similar stanchion behind the operator divides the aisle at the bulkhead line. Between these two in the middle of the entrance, but some distance back from the step, is a third stanchion. This one, however, is only waist high and is connected by a horizontal rail to the other two. When the car is run by one man, passengers enter through the forward half of the double doors and pass close by the operator, paying their fares as they enter. Passengers leave the car by the rear section of the double doors, passing on the other side of the railing.

When the car is operated by two men, however, the conductor sits at the left of the railing on the rear platform and passengers enter through the manually operated doors on the right side of the car. The lever controlling these doors is on the center post. In this case, the stool which is shown in the accompanying illustration can be placed behind the railing for the conductor's use. As hand collection of fares is established practice in New Orleans, no provision has been made for a fare box. The car, however, is equipped with an International hand-operated register.



Car Built by New Orleans Public Service, Inc., as an Experiment to Determine Applicability to One-Man Operation

Besides making possible the operation of this car by one man or two men, as may be desired, the plan of having doors on both sides at both ends permits operation on either the inside or outside tracks in the neutral ground on Canal Street. On the inside tracks on that street passengers board and leave the cars on the left-hand side.



Novel Arrangement of Doors and Stanchions Serves a Double Purpose

The seating capacity is 32, which is provided by six cross seats on each side and a 2-passenger seat on each side at each end. Hale & Kilburn wood slat seats are used.

The car body is built of steel with wood-filled T-posts. White Agasote headlining is used beneath an arch roof. Ventilation is secured by means of six Utility ventilators. The truck is of the Brill 79-EX2 type and carries two Westinghouse No. 514 motors. The total weight is 29,000 lb.

Other equipment on this car includes two O-B trolley bases, headlights and trolley catchers; More Jones 6-in. trolley wheels, a Faraday car signal system, Pantasote curtains, Keystone signs, H-B lifeguards, Peacock hand brakes, G. E. type CP-27 air compressor, and an aluminum cell lightning arrester.

If this experimental car proves successful and the company wants more cars of this type it is planned to purchase them outside rather than to build them in the railway shops.

Personal Appearance Emphasized in Atlanta

NEAR the door leading from the trainmen's room in the downtown dispatchers' station to the street the Georgia Railway & Power Company, Atlanta, Ga., has placed a full-length mirror, above which is a sign reading:

"Before you go out to tell people you represent this company, look yourself over to see if you do."

Similar mirrors and signs have been placed in the various carhouses.

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Association News & Discussions

Reducing Claims Expense Through Good Public Relations*

By W. T. Bie
Attorney Wisconsin Public Service Corporation, Green Bay, Wis.

CLAIMS obviously are closely linked with operation and service. To avoid paying out a substantial portion of the gross income for claims two things must be uppermost in the mind of the operating head: (1) To avoid accidents, (2) to give such service that public sentiment will be with the company rather than against it.

At the convention two years ago C. E. Warwick of our company read a paper on the prevention of claims,† going into detail on the bonus system formulated and put into practice by him. Undoubtedly the preventive methods adopted by him are the principal reasons for the claim record made in Green Bay in 1923.

The other essential necessary to save money on claims is to give such service that public sentiment will be with the company rather than against it. Previous to 1912, when the Wisconsin Public Service Corporation took over the Green Bay property, the traction company had been made a football in every local political fight for years. A number of lawyers availed themselves of every opportunity to damn the street car company, and opportunities were frequent. As a result the street car company did not dare to go into court on any case involving a jury question, for such questions were resolved into verdicts for the plaintiff.

My association with the Wisconsin Public Service Corporation dates from the fall of 1913, shortly after it took over the Green Bay property. At that time several suits were pending against the company for damages aggregating $150,000. These cases were all settled without trial by paying out considerable money.

From that time on every accident, no matter how trivial, was reported and carefully investigated. The company, in its advertisements and in its general dealings with the public, pursued a policy calculated to educate the public to a belief that the company was operating to serve the public. No opportunity was lost to emphasize that fact.

Investigated by Personal Letters

In the investigation of claims a carefully worded letter is written, with a questionnaire inclosed, for the answers of the witness. The letter has a personal tone. It is signed by an individual without any title appended. It deals with men rather than a street car company. It puts the issue squarely up to the witness: Was the man handling the auto to blame, or the man handling the street car? When the witness sits down to answer his questionnaire with the issue of men in his mind, he is pretty sure to be fair in his answers.

Every questionnaire received is acknowledged by a second courteous and personal letter. Even if the witness answers only one question, and answers "I don't know" to all the others, a letter of thanks acknowledges receipt of the questionnaire. In the past ten years the names of 4,415 witnesses have been reported in accidents. It is safe to say that 4,000 of them received two letters each. Four thousand opportunities to get acquainted with a car rider, and to make a friend of that car rider, were taken advantage of. These letters were not signed with a rubber stamp, nor were any carbon copies used. They were personal letters. A special effort was always made to get the correct spelling of the name from the city directory. If the name was misspelled in the first letter, the second letter was addressed exactly as signed to the questionnaire by the witness.

Costs Gradually Reduced

The progress that the company has made in reducing accident payments is shown in an accompanying table.

SUMMARY OF ACCIDENT PAYMENTS BY YEARS, WISCONSIN PUBLIC SERVICE CORPORATION

Year	Total Settlements	Per Cent of Gross	Lawsuits
1914	$3,177	2	0
1915	4,870	3	2
1916	3,847	2.3	0
1917	1,467	1	1
1918	1,007	0.5	0
1919	4,604	2	1
1920	2,096	0.7	4
1921	1,432	0.5	0
1922	959	0.4	3
1923	371	0.1	3

In 1916 two important steps were taken to prevent accidents: The open platform was abolished on all city cars and the near-side stop was adopted. In 1917 the results of the campaign to avoid accidents and to make friends became more noticeable. In 1919 discipline suffered on account of high war wages and we had several bad accidents for which we were to blame. Our entire organization had been weakened by the absence of several employees, officials and attorneys in the army and navy. In 1920 conditions improved. We had no bad accidents and successfully defended four suits. Our gross income reached its peak this year, due to booming industries and a high rate of fare.

In the fall of 1921 Mr. Warwick put his bonus system into practice and the result was noticeable at once. It kept every operator's mind alert at all times to avoid accidents; it made operators desirous of getting favorable reports from passengers, and therefore more courteous and obliging to passengers at all times. It gave them more of a personal interest in their work.

About the same time the company built an extension on Shawano Avenue and put in better and more frequent service on all lines. New Birney cars, operated by one man, replaced the old cars. People began talking about the good car service the city had. The good spirit of the operators, as well as their desire to give good service, permeated the cars and the entire city.

About this time an issue of the company's preferred stock was offered for sale to the general public, the employees acting as stock salesmen. The campaign slogan was "Be a Partner." Any one who wished could share in the company's profits. The fact that the company was actually serving the public at large was brought home to nearly every one in the city, and the employee salesmen demonstrated the fact that the "company" consisted of ordinary human beings.

All of these matters brought about a decided change in the atmosphere surrounding the street car system. Boosters were more numerous than knockers. We had reached the stage where we could handle claims fairly, settle them justly, but did not fear submitting a case to a jury when we knew we were in the right. The bonus system was pretty well advertised, and when the motorman appeared at the attorneys' table in court the jury understood that to a certain extent, at least, it was his battle as well as the company's. Our gross income in 1922 dropped about 10 per cent lower than the previous year. Business had slumped and the high rate of fare was unpopular. We had 179 accidents in 1922, the greatest number in the history of the company. The bonus system could not counteract the great increase in the number of automobiles on the streets, but the most noticeable effect of it was that the motorman had such control of his car that only minor accidents happened in cases where, with less perfect control, serious injury or death might have resulted. We tried three cases, getting jury verdicts in all of them.

In the winter of 1922-23 the city commission passed an arterial highway ordinance, with arterials on several streets traversed by the car tracks. This was a great move for safety. The

*Abstract of a paper before the Electric Railway Section, Wisconsin Utilities Association, Milwaukee, April 17-18, 1924.

†Abstracted in ELECTRIC RAILWAY JOURNAL, Aug. 26, 1922, page 301.

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number of accidents in 1923 decreased to 162, notwithstanding increased automobile traffic. The rate of fare was decreased approximately 10 per cent, but the gross income for 1923 showed an increase of 15 per cent over 1922, in spite of the decreased fare, and the number of passengers carried showed an increase of 25 per cent. From a gross income of $163,000 in 1916, it rose to $279,000 in 1923, an increase of 72 per cent in seven years. The first three months of 1924 show a big increase over the same period in 1923.

Receipts Exceed Expenditures

Accidents on which claims were made in 1923 may be summarized as follows:

MONTHLY SUMMARY OF ACCIDENTS AND DAMAGES, 1923, WISCONSIN PUBLIC SERVICE CORPORATION

Month	Number of Accidents	Paid for Damage to Property	Paid for Personal Injury	Collected for Damages to Street Car
January	19	0	0	$57
February	9	0	0	103
March	19	$43	0	0
April	10	12	0	0
May	5	4	0	0
June	15	0	0	9
July	19	8	0	40
August	13	11	0	0
September	11	0	0	0
October	15	5	0	73
November	16	188	0	60
December	11	0	$100	47
	162	$271	$100	$389
Total paid out for accidents				$371
Excess collected				$18

Disregarding what we collected for our damages in accidents, we paid out one-tenth of 1 per cent of our gross income for claims in 1923.

The Car Operator Is the Company's Salesman

I have tried to emphasize the importance of public relations in the handling of claims. Constant efforts must be made to make friends. The car operator is the one man more than any other who represents the company in the eyes of the public. He must be courteous and efficient. Safety and efficiency go hand in hand. It is useless to talk "safety" when efficiency is below par. When cars are late or overcrowded safety is necessarily jeopardized, and the operator struggles along as best he can. Accidents for which the company is held to be at fault may be usually traced to a failure in efficiency rather than to a failure in safety practices. It is culpable negligence for a company to fail to give adequate service. Even though an operator by extraordinary diligence is able to avoid accidents where service is not adequate, when the traveling public is dissatisfied with the service, passengers called as witnesses or jurors will be unfriendly.

Good Service a Good Investment

Service must be not only adequate, but the company in its service should keep one step ahead of the demands of the public. This is particularly true when the company has power, light and gas departments in addition to the railway department. In such cases the railway department is the good-will developer, not only for itself but for the other departments as well.

A public utility company that fails today to utilize its street railway as a good-will developer is twenty years behind the times. A little money invested in giving good street car service will buy more good will than any amount of advertising. It is an operating crime to keep passengers waiting on the streets in cold weather for cars that are off schedule and then to make them fight their way in and out of overcrowded or cold cars. One day of such service will cause a loss of all the good will built up by a year of good service. On the contrary, service that will take the passenger home satisfied, and with a kindly feeling because the company took him home quickly and comfortably in cold weather, will go a long way toward avoiding complaints on high gas and light bills.

The street railway in Green Bay carried more passengers in the past winter than ever before in its history. Undoubtedly other street railways properly operated had the same experience. Automobile owners are learning that the best winter substitute for gasoline is the street car ticket. This business must be held, and the only way it can be held is by increasing track facilities and equipment so as to keep one step ahead of the actual needs. Keep the public satisfied by efficient service and the handling of claims will be an easy matter.

Claim Department Can Help

The claim department itself can do much to better public relations. We never decline a claim as soon as it is made. Every claimant is treated courteously and is convinced that his claim, no matter how meritless, will be given serious consideration.

When an auto accident happens we instruct the claimant to treat the matter as his own, and after his auto is repaired to bring in his repair bill. By that time we will have had the accident investigated, and if we are in any way to blame for it we will take care of his bill. If we find his claim to be without merit, we so inform him by a courteous letter stating the reasons why. He may come back a second time, and frequently we then show him the signed statements of disinterested witnesses who blame him for the accident. We tell him that we cannot pay a meritless claim for two reasons: (1) because we have no right to spend money without reason because it affects the rate of fare, and (2) because by paying a claim we admit that our operator was to blame and he loses his bonus.

Absolute fairness with a claimant is imperative. I have never tried to dispose of a claim for which we were liable for less than what I thought the damage actually was. In a few cases where an ignorant claimant, or one mistaken as to his rights, was willing to accept less money than I felt he was entitled to, I voluntarily gave him more than he asked. Ordinarily, of course, the claimant demands more than he should have, and then it is necessary to convince him that his demand is exorbitant. I know from various sources that I have made friends in the handling of claims. Frequently a claimant comes to the office saying that he heard that the company would do the right thing, and therefore he came to the company direct rather than to an attorney. Local attorneys often send claimants to see us direct and tell them that we will be fair with them.

To summarize, to cut down the disbursement of the claim department it is necessary:

1. To cut down the number and the seriousness of accidents by proper preventive and safety measures.
2. To make the street railway a subject of complimentary comment rather than the opposite, by giving real service, prompt, ample, safe and efficient.
3. To investigate all claims promptly and carefully.
4. To treat all claimants with absolute fairness and consideration at all times, settling proper claims promptly, fairly and willingly and declining improper claims in a way that will impress upon the claimant the company's necessity for declining them.

American Welding Society Holds Annual Meeting

A FOUR-DAY meeting of the American Welding Society was held in the United Engineering Societies Building, New York, N. Y., April 23-26. The technical session of the society, held Friday, consisted of a symposium on the subject "Flexibility vs. Rigidity in the Design of Welds." Short talks were made by exponents of the different types of welding, to show whether a weld should be made more rigid or flexible than the part which it joins. J. C. Lincoln, vice-president Lincoln Electric Company, spoke on the design of welds when made by the carbon arc process. His conclusion was that if the right speed of welding is used the expansion of metal in plates ahead of the weld, which tends to draw the plates together in cooling, and the expansion of the edges of the plates, which tends to open them up at the finished end, can be made to balance each other and thereby eliminate warping.

Flexibility and rigidity as resulting from gas welding was discussed by S. W. Miller, research engineer Union Carbide & Carbon Research Laboratories. He laid emphasis on the importance of making a weld with the same physical properties as those of the base metal. C. J. Holslag, chief engineer Electric Arc Cutting & Welding Company, discussed the design of welds when made by the metal arc process. He said that a weld will always be a casting unless some method of forging is used and that progress in the art would be more rapid if the basic principles and limitations are frankly taken into account. Resistance welding was discussed by H. A. Woofter, electrical engineer Thomson Electric Welding Company. J. H. Deppeler, chief engineer Metal & Thermit Corporation, discussed the subject from the thermit welding standpoint.

Reports of the officers and various committees of the society were presented at the business meeting Thursday, and the following officers were elected for the ensuing year: President, E. H. Ewertz, the Bethlehem Shipbuilding Corporation; vice-presi-

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dents, T. A. Wry, for New York and New England; J. D. Conway, for the Middle Eastern Division, and H. S. Mann, for the Middle Western Division. The directors at large elected were J. H. Deppeler, A. S. Kinsey, W. A. Slack and E. M. T. Ryder, Third Avenue Railway, New York.

Fire Protection for Carhouses and Cars

THE committee on electric railway carhouses and cars of the National Fire Protection Association has prepared a comprehensive report covering tentative regulations for electric cars and locomotives; wiring of electric carhouses and auxiliary buildings operated by electric traction companies; and construction, maintenance and protection of carhouses.

This is the first report of the committee, which was formed in 1923 and which consists of A. M. Schoen, chairman; H. H. Adams, W. S. Boyd, N. E. Drexler, J. C. Forsyth, Louis Harding, J. S. Mahan and J. T. Staub.

The regulations presented in the report for tentative adoption are intended to replace the sections on car wiring and equipment of cars and carhouses which appeared in the National Electrical Code, edition of 1920; the section on railway carhouses in the regulations on sprinkler equipments, edition of 1922, and also to supersede the rules and requirements for the construction and protection of standard railway car storage and operating houses, edition of 1907.

Advance copies of the report for the purpose of preparing discussion and criticisms may be obtained by addressing the National Fire Protection Association, 40 Central Street, Boston, Mass.

U. S. Chamber of Commerce Meets in Cleveland

AT THE twelfth annual meeting of the Chamber of Commerce of the United States, held in Cleveland, May 6 to 8, two men prominent in public utilities were elected to the board of directors. These were John W. Shartel of Oklahoma City and Lafayette Hanchett of Salt Lake City, Utah. In the case of Mr. Shartel, this was a reelection. Two other utility men remain on the board from last year, namely, P. H. Gadsden of Philadelphia and Paul Shoup of San Francisco.

The attendance at the convention was large, and the American Electric Railway Association was represented by a considerable number of the delegates and alternates appointed to attend. As the association's executive committee met in Cleveland on May 7, many other railway men were able also to be in attendance.

The subjects taken up by the National Chamber of Commerce this year did not include any relating primarily to electric railways, the principal subjects being: business and agriculture, European readjustment, and the responsibility and integrity of business. The report of the directors of the national chamber, however, referred at considerable length to the work during the last year of the transportation committee, whose reports, so far as they have related to electric railways, have been published in these columns.

There was also a report of the results on the conclusions of this committee, as contained in Referendum No. 43, submitted to the members. This referendum was based on the report of the transportation committee, and contained fourteen recommendations. The vote on each was in the affirmative by the two-thirds majority required. Of these fourteen recommendations the last three related in part to electric railway or bus service. They follow with the vote recorded:

12. The committee recommends that wherever experience indicates that it will be in the public interest, regulatory bodies should facilitate the utilization of motor transport to replace uneconomical forms of rail service, to relieve yard and terminal congestion, and to extend existing steam and electric railway services. In favor, 1,608½; opposed, 322½.

13. The committee recommends that the rates and services of motor common carriers, both freight and passenger, should be subject to regulation by the state and federal commissions which have jurisdiction over the operation of other common carriers, having particularly in view insuring to the public adequate, economical and continuous service. In favor, 1,765½; opposed, 200½.

14. The committee recommends that in addition to bearing an equitable share of the general tax burden, the road users should pay the entire cost of maintenance of improved highways through special taxes levied against them, such special taxes being applied exclusively to that purpose. In favor, 1,283½; opposed, 436½.

This vote was concluded May 6. There are 1,002 organizations eligible to vote and the total voting strength is 3,270; thus the vote recorded was about 60 per cent of the total voting strength.

The directors also called particular attention to recommendations in the transportation report on greater coordination of transportation agencies and the need for simplification of taxation of steam and electric railways.

A feature of the Cleveland meeting was a series of addresses on standards of business conduct. The first was Wednesday evening by Secretary Hoover, who saw in associations an agency through which high standards in business conduct could be established and enforced. On Thursday morning Judge Edwin B. Parker, chairman of the committee on business ethics of the chamber, presented a concrete code.

I.C.C. Order on Section 15a

Interurbans to Be Required to Supply Information to Enable Commerce Commission to Make Individual Determination as to Application of Law

IN FINANCE DOCUMENT No. 3392 the Interstate Commerce Commission has made its report and order on the application to electric railways of Section 15a of the interstate commerce act. The report refers to the hearing* given electric railway officials before the commission on March 19, summarizes the evidence placed before the commission on that occasion which drew the distinction between interurban lines and steam railroads. The report states that, "Considering the responsibility as well as the benefits of carriers under Section 15a, it seems clear that Congress intended to exclude interurban electric railways generally from its operation, and to include them only when engaged in such transportation of freight as would cause them to resemble steam roads in the performance of that function."

The commission then goes on to say:

"There are many electric roads which closely resemble the steam roads in some particulars of freight transportation, and are not greatly dissimilar in others, whose status under section 15a is involved in considerable doubt. From the nature of the problem it is obvious that no hard and fast rules can be laid down upon which reliance can be placed in classifying the carriers. Each road must be considered by itself. In determining whether a particular carrier is 'engaged in the general transportation of freight' within the meaning of the statute, as we have construed it, consideration may properly be given to relative amounts of freight and passenger traffic, connections with steam roads and business performed over such connections, amount and manner of handling through and interstate traffic, amount of equipment interchangeable with steam roads, character of right-of-way, territory served, and handicaps under which the carrier labors in handling freight, such as those arising from municipal regulations, curvature and kind of track, station facilities and characteristics of equipment.

"No attempt was made at the hearing to establish a record upon which the status of any particular carrier could be determined. All that can be done upon this record is to arrive at the general principles of classification which will effectuate the purpose of the legislation. It is obvious that the operations of electric roads and their relations with steam roads will change from year to year, perhaps bringing an additional number within the scope of the section, and exempting others. It is necessary to effect a classification covering operations of such lines for the years since the act became effective, as well as for the future. To meet this situation, all electric railway operating companies will be served with the general orders issued from year to year under section 15a, requiring reports of value and of railway operating income. They will also be required to respond to a questionnaire calling for information upon matters deemed controlling in determining the status of electric lines. This information will be required of all electric lines subject to the act, but those which claim exemption from the provisions of section 15a may so state, omitting for the time being data with respect to values and income required by the regular order. Such further proceedings will be had as may be found necessary in dealing with individual companies."

The questionnaire referred to in the commissioner's report comprises the following:

"It is ordered that each electric rail-

*Covered in some detail in ELECTRIC RAILWAY JOURNAL for March 29, page 511.

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way operating company subject to the interstate commerce act be, and it is hereby, required to make, under oath, full and true answers to the following questions:

"1. What was the amount of respondent's freight revenue, passenger revenue, and total transportation revenue for each of the years 1920, 1921, 1922, and 1923?

"2. With what railroads (stating whether steam or electric), and at what points does respondent have track connections?

"3. Does the respondent have joint freight tariffs and through freight rates with any other road or roads? If so, state names of such roads and whether steam or electric.

"4. What is the character of respondent's freight business, the principal commodities handled, and the percentage of freight tonnage, if any, handled in carloads?

"5. Approximately what percentage of the freight revenue of respondent is derived from interstate traffic?

"6. How many freight cars are operated by respondent and what is their character? To what extent are they interchanged with steam roads?

"7. Does respondent receive from and deliver to connections standard steam railway equipment, and, if so, to what extent?

"8. To what extent is respondent's freight service interfered with by municipal regulations or characteristics of road, track or equipment?

"9. What percentage of respondent's road is on public streets and what percentage on private right of way?

"10. To what extent and how closely is respondent's road paralleled by steam roads?

"11. What material changes, if any, have taken place in any of the particulars covered by questions 2 to 10, inclusive, since March 1, 1920?

"12. Does respondent claim exemption from the provisions of section 15a of the interstate commerce act?

"It is further ordered, that answers to the foregoing questions shall be submitted in typewriting, numbered to correspond with the questions, and on paper approximately 8x10½ in. The name of respondent shall appear at the top of the first sheet. The original response, verified by oath, and three copies thereof, shall be forwarded to the commission on or before June 1, 1924, addressed to George B. McGinty, its secretary, Washington, D. C."

City Transportation Requirements

IN AN address on metropolitan planning for future transportation requirements, given at the Philadelphia Engineers' Club on April 15, J. Rowland Bibbins of Washington declared that every large city should plan ahead for its transportation requirements on the basis of double its present population. This is because of the present rapid drift of the population to cities. In 1880, 27 per cent of the population of the country dwelt in towns and cities, whereas in 1920 more than 50 per cent did so. Within the last 10 years many of the larger cities have had increases of 25 per cent or more in population. This growth is accompanied by striking changes in character of districts within each city.

Theoretically, the increase in population should also be accompanied by a still greater increase in transportation facilities, but as a rule the physical facilities for transportation, like streets, highways, trackage, storage for peak transportation and even carrier equipment have barely increased in arithmetic ratio to the population, if at all. By 1940 a population of at least 130,000,000 may be expected in this country. This means from 65,000,000 to 70,000,000 people in the cities, or more than the number in the entire United States between 1890 and 1900.

These people can be transported only if all means for transportation are coordinated. The time for superficial expedient measures has passed.

The problem of financing transportation improvements is one largely of rush peak capacity. All interests in a community should be enlisted to prepare and support a plan for development. The transportation plan should be based on the assumption that the American public will finally support the best service it can secure. Technical study is required on a number of research problems. Among them may be mentioned: Development of traffic signals; segregation of various kinds of city traffic; determination of parking time; introduction of the express idea in traffic routing with increases of 10 to 20 per cent in street car schedule speed and means for bodily transfer between express lines and feeders; means for roadway widening; night delivery and collection of central-district freight to relieve the streets in the daytime, etc. In Mr. Bibbins' opinion, transportation is the key to the future in metropolitan planning.

Central Traffic Association

THE next regular meeting of the Central Electric Traffic Association will be held at Hotel Tuller, Detroit, Mich., May 21 and 22.

Heavy Traction at A.S.M.E.

THE railroad division of the American Society of Mechanical Engineers, which will hold its spring meeting in Cleveland, May 25 to 29, will have as the topic of discussion "Recent Developments in Heavy Electric Locomotives." Two papers will be presented on this topic, one by N. W. Storer, Westinghouse Electric & Manufacturing Company; the other by W. B. Potter, General Electric Company.

Iowa Convention June 27

THE annual convention of the Iowa Electric Railway Association will be held at Fort Dodge on June 27, it is announced by President F. C. Chambers. The meeting will be held immediately following that of the Iowa Section of the N. E. L. A. at Fort Dodge on June 24-26, as many of the men are interested in both associations.

New York Traffic Problems to Be Discussed

FOR the purpose of discussing traffic problems of the New York metropolitan area and its immediate environs, totaling some 5,528 sq.mi., a conference has been called for May 20, to be held at the Town Hall, 121 West Forty-third Street, New York City, beginning at 10:30 a.m. This meeting is sponsored by fourteen civic bodies, including chambers of commerce, merchants' associations and boards of trade. It will be in charge of the Committee on the Regional Plan of New York and Its Environs. M. R. Boylan, George Keegan and C. E. Morgan will attend as delegates for the local railways.

In connection with the conference, there will be held from May 19 to 24, in the halls of the Russell Sage Foundation, an exhibit of maps and drawings showing how traffic and street layout problems are being handled in the various communities.

American Association News

Midyear Meeting Pays Its Way

W. H. SAWYER, general chairman of the committee on general arrangements for the St. Louis Midyear Meeting March 4 last, has made his final report to the executive committee. The revenue consisted of the sale of 756 tickets at $10 each, or $7,560. Total expenditures amounted to $7,503.75, leaving a credit of $56.25 above expenses. In reporting to the executive committee Mr. Sawyer commented that it was his understanding that this was the first Midyear at which the revenue exceeded the expense.

Special Reports Available

THE following reports have been prepared by the American Electric Railway Association and are available to member companies in good standing upon request:

Electric Railway Operations in 1923: Gives comparison of revenues, operating expenses, net revenues and passenger traffic of 406 companies for 1923 and 1922. It also gives for 288 companies complete comparative income statement, operating expenses by primary accounts; the same statements again on a per car mile basis; operating and traffic statistics and ratios; and unit figures derived from them. The 288 companies are classified into city and interurban companies and companies operating both city and interurban lines and each of these groups is further subdivided into three smaller groups according to the size of the company.

Automobile Operating Costs: Cost figures of passenger automobiles, divided between operating and non-operating costs, have been collected from all sections of the country and are presented in detail in this compilation. Comparable figures for a large number of Ford, Dodge and Buick cars have been obtained and general average figures for these makes of cars have been worked out.

Special Factors Affecting the Working Conditions of Electric Railway Trainmen: Contains information covering a number of miscellaneous conditions such as the establishment of pension systems, allowances of time off periodically, contributions to cost of uniforms, awarding of service stripes, free transportation for men and families, bonding of conductors, etc.

In addition to the above, supplements to the Fare Bulletin, Wage Bulletin and Cost of Living Studies have been prepared, bringing them up to date.

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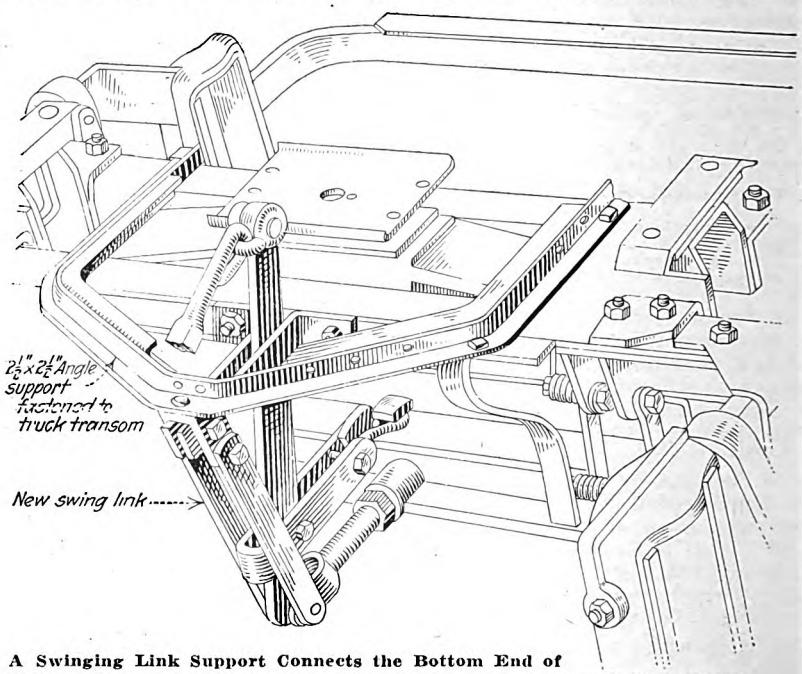
Maintenance of Equipment

Link Support for Truck Live Lever

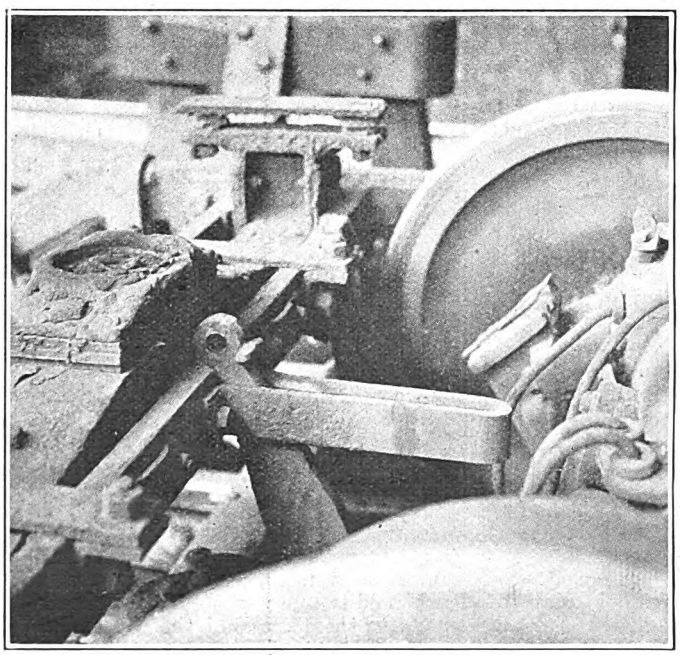
ON THE Brill 39-E trucks used on the Third Avenue Railway, New York City, the pony brake beam is located underneath the driver brake beam at the truck bolster. The fulcrum of the truck live lever is connected to the driver brake beam through a link, and the lower end of the truck live lever connects to the pony beam through a hand slack adjuster. This type of truck was found particularly suitable for use with the underground conduit contact system in New York, where suspension for the contact plows is provided on the trucks. This takes up considerable space on the trailer ends of trucks, and the brake beam for the pony wheels cannot be located close to the wheels.

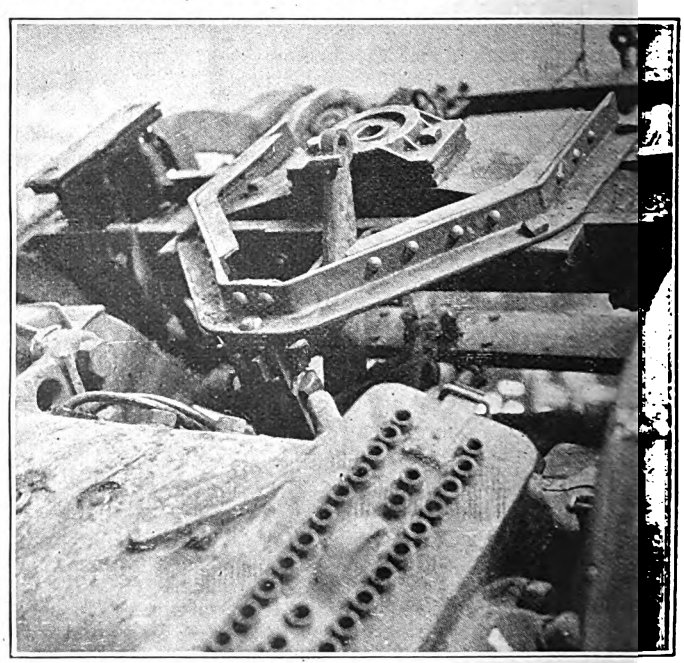
The old standard construction of truck brake rigging for the 39 E has the live lever hanging from the body brake rod, with the lower end of the live lever attached to the pony brake beam as just described. With an application of the brakes, the rotation of the pony wheels in one direction tends to tilt the brake beam and pull the live lever down. The Third Avenue Railway Company has experienced difficulty from this tilting of the pony brake beam, which was enough in some cases to allow the end of the live lever to strike the pavement.

To overcome the difficulty a new type of link support has been designed and is being applied to all the trucks of this design operated by the company. Since it is essential that the live lever be free to move, the links have been attached to the hand slack-adjuster clevis at its lower end. These links, which are of 2½-in. x ½-in. bar, are hung at their upper ends from a small bracket in the form of an inverted U. The entire suspension is supported from a frame constructed of a 2½-in. x 2½-in. angle, reinforced on



A Swinging Link Support Connects the Bottom End of the Truck Live Lever with a Suspension Frame on the Truck Bolster





At Left, Original Construction for Truck Brake Rigging on 39-E Truck. At Right, New Suspension Provided for Truck Live Lever

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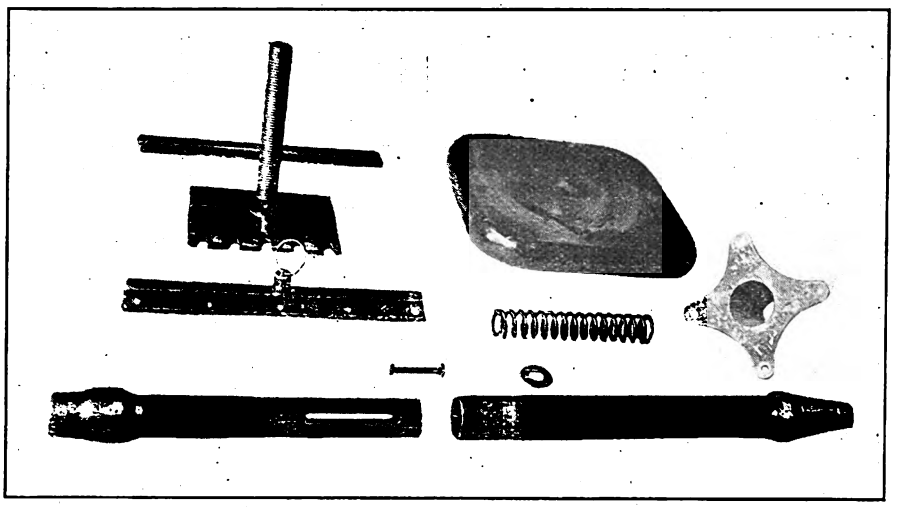
the inside by two 1½-in. x 1½-in. angles, the whole being bolted to the truck transom. Further support is given by the live lever guide. The original U-shaped guide is cut open and the outside ends are bolted to the U-shaped bracket which holds the hanger links. The link support eliminates the tilting action of the pony brake beam and prevents the live lever from being lowered out of its normal position. Accompanying illustrations show the old and new types of construction.

Jib Hoist Serves Whole Armature Room

A SWINGING hoist that serves the entire armature room has recently been installed at the Fulton County plant of the Georgia Railway & Power Company, Atlanta, Ga. The vertical column is a 10-in. I-beam, pivoted so that it will swing through about 180 deg. The horizontal arm, which is a 6-in. I-beam, carries a Sprague ½-ton electric hoist. Practically any point on the floor can be reached. An armature can be picked up from the stand where it has been rewound, swung over to the rolling pans, which are used in place of dipping vats, and from there carried to the baking oven. The electric hoist can be operated from any position along the length of the horizontal beam, there being three trolley wires paralleling the beam and furnishing current to the hoist. Much time and effort have been saved since the installation of this apparatus.



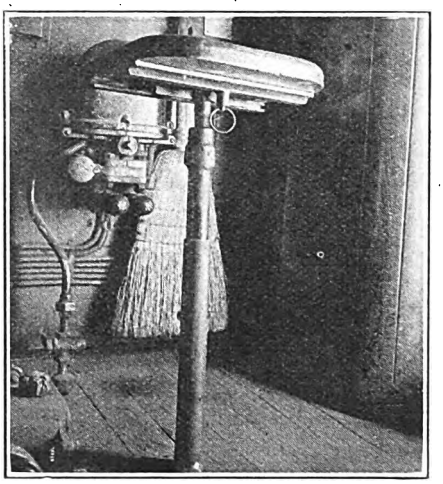
Dismantled Parts of New Nicholls Stool, Which Provides for Up and Down and Forward and Back Adjustment

Improved Stool Adopted by Denver Lines

BY G. BENBROOK

THE Denver Tramway Company has recently adopted the Nicholls motorman's stool, designed and patented by Stephen Nicholls, mechanic at the Denver Tramway shops.

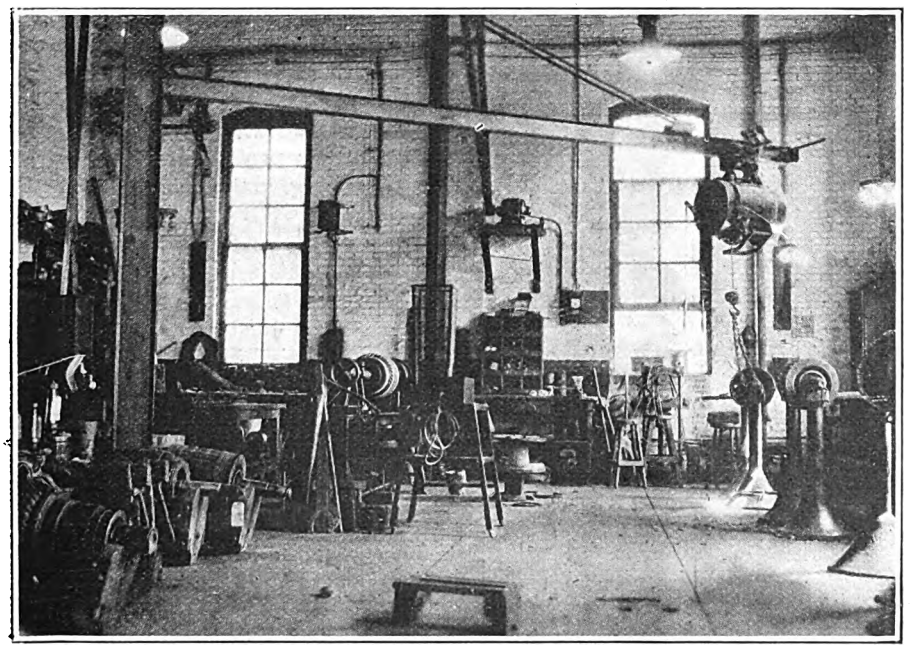
This stool has the advantages of being adjustable in height and also in proximity to the operating equipment, and of being solidly and rigidly mounted. The seat and seat post are entirely removable from the vestibule by simply picking up. The post base has a conical end which fits into a base plate installed flush with the vestibule floor. This feature is much appreciated by shopmen who do work on the controller and air brake equipment, as they can readily remove the stool if it interferes with their work.



Double Adjustable Stool on Denver Tramway Car

The seat top is fitted on the under side with two grooved plates which slip onto the post top plate. The position of the seat on the post is laterally adjustable. A pull-down spring key engages with notches in the top plate and locks the seat in the position desired relative to the post. A screw and nut provide for height adjustment. These two adjustments are much favored by the operators as they can readily fix the position of the seat to suit their particular statures.

The post of the stool is in two parts. The upper part, into which the top plate screws, fits inside the bottom section and rests on a coil spring. The post is made an integral piece by means of a bolt extending through the two sections. The inner piece is slotted to receive the bolt and to allow for the spring action.



The Hoist Rotates so that Winding Racks, Dipping Pans and Baking Ovens Can Be Reached

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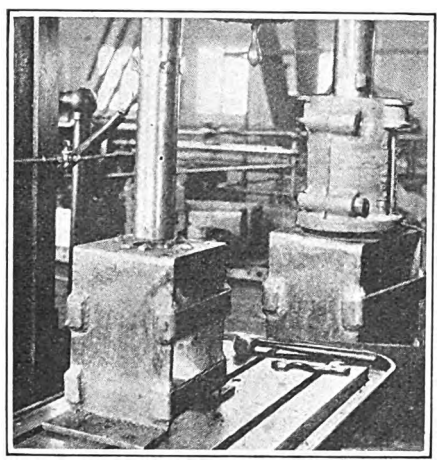
Boring Axle Collars on Drill Press

IN THE shops of the Pittsburgh Railways a single spindle drill press is used for boring out axle collars on Westinghouse 52 motors. The halves of a collar are fastened together by two opposite bolts and placed on a box-shaped fixture. The top of the fixture has a hole for guiding the boring bar and six pointed set screws for holding and aligning the collar.

The fixture is made up of ½-in. x 10-in. steel in the shape of an inverted "U," braced on the open sides with 1½-in. x ¼-in. steel welded to the frame. The top of the fixture is 15 in. above the base, allowing room



Fixture and Bar for Boring Axle Collars on Drill Press. At Right, Axle Collar in Position for Boring

for the boring bar to make a complete cut through a collar. The set screws are ⅝ in. x 4 in. with square heads turned up to a point. However, enough of the head is left to provide grip for a wrench. These screwheads serve to hold the collar in position and also permit the collar to be aligned by running the proper screw in or out.

The centering of the fixture is simple, consisting of running the boring bar into the hole on the top of the fixture and clamping the fixture to the table. The collar is then placed on the pointed set screws with the dust flange acting as a centering guide. The points come just inside this flange.

Adjustments to alignment follow a trial cut with the boring bit. During the boring operation the collar is held to the fixture by means of two small hand screw clamps.

By the use of this method the number of axle collars bored has been increased to eighteen per day from six on an engine lathe.

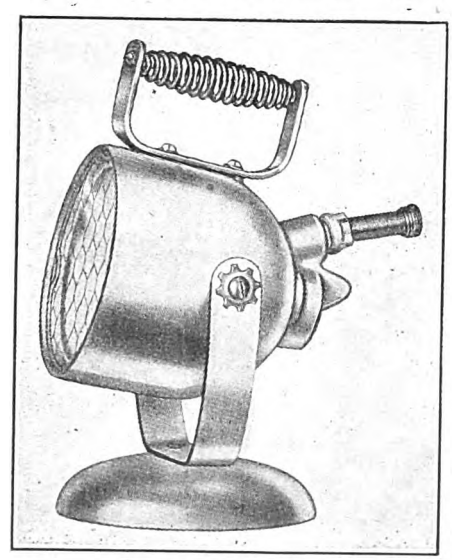
New Equipment Available

Improved Welding Rod Brought Out

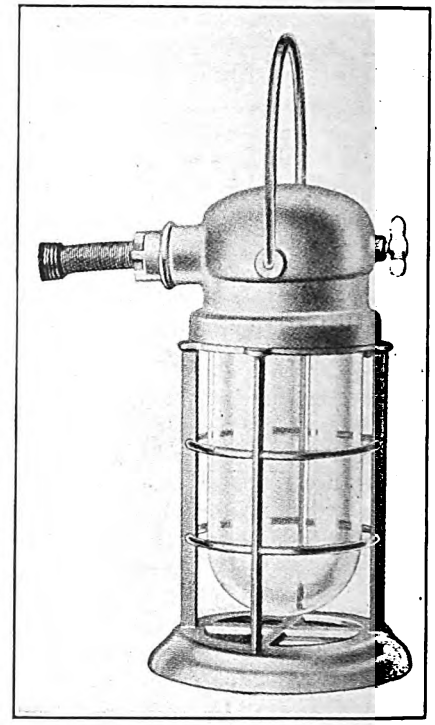
FOR welding by the carbon arc, the Rail Welding & Bonding Company, Cleveland, has brought out the "Una" joint rod, No. 200. The rod is coated and the base is a high-grade low carbon steel. The elements necessary for producing the required physical properties in the metal are introduced into the weld as a coating on the basic steel rod. Rods are not coated until chemical analyses and tests of the physical properties show that they come up to required specifications. Frequent control tests are made to keep the composition of the coating within the required limit, and a final test is made to insure a uniform product. A detailed discussion of the essential elements, together with test data of joints made by this rod, is contained in the company's bulletin No. 107.

Portable Electric Lanterns

TWO electric lanterns of novel type are being placed on the market by the Crouse-Hinds Company, Syracuse, N. Y. One of these is the type LM, which is a convenient portable inspection lantern for use in railway yards, shops, storerooms and other places where a strong, well-protected lantern is needed. The case is of cast aluminum, with a cast iron base, so as to give substantial support and prevent the lantern being easily upset.



An Electric Spot Lantern for Inspection Use



This Lantern Can Be Used Where Inflammable Vapors Are Present

A wound wire handle is mounted on the case for convenience in carrying and for directing the beam of light as desired. The body has a friction adjustment, so that the light can be revolved around a horizontal axis from 90 deg. above to 45 deg. below the horizontal. A lug prevents excessive movement. The front is inclosed by means of a wire glass, held against a gasket by a spring wire retaining ring. Provision is made so that it can be easily removed. The lighting cord enters the case at the back and is protected by a spiral wound spring, and a bushing.

The type VSB lantern is of the vapor-proof type for providing safe and convenient light in oil houses or places where an excessive amount of dust or a combustible vapor or gas is present. This lantern has a swinging bail, a water-tight cord outlet with reinforcement to prevent chafing of the cord. The globe, either plain or colored, permits the use of any lamp up to and including 75 watt.

The guard and globe can easily be removed for lamp replacement. The base gives the lantern a substantial support when placed upon the floor or ground. The body is of aluminum and the guard and base are of brass with galvanized finish.

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The News of the Industry

Parking May Be Barred on Eleven Streets in Los Angeles

No parking on eleven principal streets of Los Angeles business district and the limiting of all parking downtown to thirty minutes instead of forty-five minutes is recommended to the city of Los Angeles by the parking survey committee which was created by the Council last year. In addition to the specific recommendation for changes in the parking rules, the committee has established definite policies regarding the relative importance of the use of city streets. In view of the fact that the personnel of the committee represents leading business and civic interests, the agreement on general policy is regarded as highly important. The City Council appropriated $10,000, enabling the committee to carry out a detailed survey and eliminate snap judgment from its report.

Four north and south streets and seven east and west streets should be free from parking, thus expediting through traffic movement, the committee reported. The committee also recommended that parking be eliminated around Pershing Square, which is the downtown park and the favorite haunt for real estate promotion buses and sightseeing cars.

Other recommendations included the following:

Continuance of the present parking ban throughout the entire downtown district from 4 to 6:15 p.m. daily.
Barring of real estate sale promotion buses from entire downtown district.
Strict regulation of taxicab stands.
Elimination of special parking privileges in front of theaters, etc.
Strict prohibition of second line parking.

In classifying the several uses of streets in their relative importance, the committee said that movement of traffic was the prime purpose of streets.

With regard to the relative importance of the various uses of the streets, traffic movement was considered greatest, the committee report saying:

We believe the conclusion sound that it is not the owners and users of the stored vehicle or the parked vehicle that mainly contribute to the business activity in the commercial center of the city, but that it is the owners and users of moving vehicles (street cars and automobiles) who constitute the purchasing and business factor in that district.

Germans Here to Study Rapid Transit

Three Germans representing the Hamburger Hochbahn Aktiengesellschaft arrived in this country on May 4 for the purpose of studying rapid transit. Wilhelm Mattersdorff and Wilhelm Stein, directors of the elevated railways of Hamburg, and Gustave Le), chief of the Hamburg state civil engineering department, are the three visitors. After inspection of the subway and elevated lines in New York City they will visit Boston, Schenectady, Buffalo, Detroit, Chicago, Baltimore and Philadelphia. They are also interested to see the latest types of street cars and the newer operating practices.

Boston "L" Proposes Bus Expansion

Indications are that the Boston Elevated Railway soon will receive from the City Council of Boston a franchise to operate a bus line all the way from West Roxbury to Park Square in Boston, by way of the beautiful parkways in the city. The Elevated petitioned for the franchise, and included Boylston and Arlington Streets, Commonwealth Avenue, Charlesgate West, Fenway, Brookline Avenue, the park system and Center Street to West Broadway. This would be a most attractive ride.

When the case was heard before the Council jitney committee on May 5 there was registered an almost unanimous opinion in favor of the project, and it was one of the largest hearings of citizens ever held by a Council committee. The only opposition voiced was against certain details, and especially against buses operating in Commonwealth Avenue, the city's finest residential thoroughfare. This avenue can be avoided. The Council members indicated that they would be in favor of such bus line, desiring only to retain control over the actual route, stops and transfers, and before there is a final decision in the matter there will be a conference between Elevated officials and the Council committee.

This is regarded as an important opening wedge to an extensive bus service by the Elevated within the city limits.

Edward Dana, general manager of the Elevated, addressed the hearing, outlining the company's policy in this respect. He said in substance:

The Elevated trustees have under consideration the expansion of its bus lines. This means in certain cases the discontinuance of trolley car service. I think I may state it as a general policy of the trustees to discontinue car lines in favor of bus service on short runs where the traffic density does not warrant the expensive relaying of expensive rails which are wearing out.

This does not necessarily mean that on long runs the bus will replace the trolley. Buses couldn't handle mass transportation as well as railway service. Experience in this and other cities has shown that the street railway is the most economical means of transportation when traffic is heavy. Bus lines are an auxiliary to the railway system.

In the problem of furnishing transportation, subway, elevated and surface trains, trolley cars and buses all have their parts to play. The city of London demonstrates that, and there the percentage of people carried by bus is the greatest we know. In London a third of the people transported by the city's carriers travel by bus.

The bus is more an element for light traffic, and an auxiliary to the railway system, than one of economy.

Chicago Purchase Conferences Progressing

A "neutral" board of nine members will supervise the control and operation of the co-ordinated surface and elevated lines of Chicago during their period of transfer from the companies to the city. This was virtually decided at the seventh purchase conference between representatives of the city and the lines, held on May 6.

Three members of the board will represent the city, three more will be from the companies and the balance of the power will be lodged in three others, who will be chosen jointly.

At the beginning of the series of conferences held to discuss all phases of the proposed municipalization of the lines Mayor Dever contended that the city should have a majority of the representation. The bankers present at the conferences, however, pointed out that since the railways would hold the securities of the city issued in payment for the properties, they should likewise have as close as possible to a majority control until the city has paid off 51 per cent of the indebtedness incurred when the purchase is consummated.

Consideration of the price to be paid for the lines remains as the big problem for the conferees to settle. While neither the officers of the city nor the representatives of the properties have issued any statements about the conferences, it is know that little progress has been made in that respect.

Three proposals are under consideration by the Mayor. They provide:

1. That the city pay the market value of the securities.
2. That the $162,500,000 total of the surface lines' capital account be accepted as the basis for price negotiations.
3. That a new valuation based on present day costs be made.

The first is generally regarded as the favorite of the Mayor, although he has not committed himself to any plan.

Competition in Syracuse on Bus Privilege

The Syracuse Railway Co-Ordinated Bus Line, Inc., Syracuse, N. Y., has been incorporated to operate a stage or omnibus route with capital of $50,000. James F. Hamilton, Rochester; Benjamin E. Tilton and William P. Gannon, Syracuse, are the directors. The law firm of Gannon, Spencer & Mitchell, Syracuse, is counsel for the corporation.

At the same time and in competition the Whitehouse Trucking Company is petitioning for a license for city-wide operation of motor buses in Syracuse with a 7-cent fare and transfer privilege. This company has operated a large motor trucking business in Syracuse and is prepared to establish bus lines to serve all sections of the city.

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Mr. Delaney to Head New York City's Board of Transportation

Mayor Hylan of New York has declared his intention to appoint John H. Delaney, chairman of the prospective Board of Transportation under the recently enacted transit law. The Mayor says he expects to take this action on July 1, when the Board of Transportation takes over from the present State Transit Commission the task of routing, planning and building new subway lines.

The Mayor has not intimated the names of the two associate commissioners to co-operate with Mr. Delaney, but he has indicated that each commissioner ought to receive at least $15,000, which is the amount paid the present Transit Commissioners.

In extenuation of the Board of Estimate's course in virtually scrapping all recent plans for new subways, the Mayor declared that the plans submitted by the Transit Commission for the approval of the Board of Estimate "would not be recognized as the same plans when finally voted upon by this board, they have been so completely revised and modified to correct errors and eliminate blunders that have been discovered by the Transit Conference Committee appointed by this board."

The Mayor has also said he believed the time for putting the new law into effect "was purposely delayed in order that a public clamor might be aroused to compel the Board of Estimate to adopt plans that had been prepared by the present Transit Commission for subways that would connect with the transit-corporation controlled subways."

In replying to Mayor Hylan's aspersions, Transit Commissioner Harkness said that the plans which the Mayor criticised as full of blunders were prepared by the same engineering staff that made the plans for all the subways, going back to the first of them more than twenty years ago; that it is the most experienced staff of subway engineers in the world, and the very "same staff whose services Mayor Hylan, requests the State Transit Commission to place at the disposal of the future Chairman (Mr. Delaney) of the Board of Transportation."

Discrimination Charged With Respect to Oakland Fares

The Key System Transit Company in the past has been selling a round-trip fare for 36 cents from San Francisco to Oakland, Cal., including a coupon of admission to Idora Park. This kind of a ticket is not being sold from other points in the Oakland territory to Idora Park, where the one-way fare is the same as from San Francisco to the Park. Also no such arrangement is in effect via the Southern Pacific from San Francisco to Alameda-Neptune Beach, where the one-way fare is the same as from San Francisco to Oakland-Idora Park.

Protests have been filed with the Railroad Commission by the city of Alameda and the Neptune Beach management, alleging that the practice is discriminatory and in violation of the State Constitution and the public utilities act.

The commission has rejected certain temporary tariffs issued by the Key System effective on April 30. It will now be incumbent upon the transportation company, should it desire to carry the matter further, to commence a formal proceeding in order that the issues may be decided upon the question of fact and in conformity with the law.

New Bus Lines of Connecticut Company

The Connecticut Company will start local bus service in New Haven on May 15, when machines will start operation from the "Green" out Goffe Street to Springside Avenue in Westville. Heretofore the company has been operating a number of long distance lines out of New Haven. In addition to this prospective service the company began on May 5 a bus line on South Lenox Street, Waterbury, Conn. The new service was referred to by W. J. Flickinger, assistant to the president, at the joint meeting of the Connecticut Company Section of the A.E.R.A. and of the Connecticut Company Railway Club of New Haven on May 6, which took the form of a housewarming at the new bus garage in New Haven. The company now has forty-eight buses in service with two 29-passenger buses on order. The forty-eight buses represent an investment of $278,000, but, considering the stores for buses and new garage, the total investment approximates $400,000.

L. S. Storrs, president of the company, emphasized the point that while the company would use buses extenssively, it was his expectation that the railway would for many years to come do the big bulk of the business.

Railway Joins in "Clean-Up" Drive

During the period from April 21 to May 5 the Chicago Surface Lines cooperated with the city authorities of Chicago by taking part in a city-wide "clean-up" campaign. Coming, as it does, immediately after the period when March and April rainy weather makes it particularly difficult to keep cars clean, this was made the occasion for an intensive drive to direct attention toward the importance of cleanliness of equipment and property.

In the equipment department, particular attention was paid to the condition of car floors and windows. The members of the supervisory force of the department devoted a large part of their time toward directing and following this work, so as to accomplish the best results possible. A consistent effort is also being made in the equipment department to carry this interest in cleanliness beyond the period of the "clean-up" drive. Preliminary plans are under way for the installation of additional car washing and cleaning facilities at car houses and shops.

Another phase of the "clean-up" campaign was the purchase of new uniforms by trainmen to prepare for the annual inspection on May 1. More than 6,000 trainmen purchased new uniforms. The demand was so large that the uniform stock of local stores was entirely exhausted.

Former Railway Commissioner on Cleveland Arbitration Board

James W. Holcomb, street railway commissioner at Cleveland in 1922 and 1923, has been named as the fifth member of the board of arbitration which will decide the dispute between the Cleveland Railway and its platform employees over a wage increase and changed working conditions.

The other members of the board of arbitration are: Atty. Charles Higley and Thomas P. Schmitt, a director of the railway, representing the company, and United States District Attorney A. E. Bernsteen and Max Hayes, editor of the *Cleveland Citizen*, Cleveland labor publication, representing the men.

The men are demanding a wage increase that would make the maximum rate of pay 90 cents an hour after the first year of service, with a minimum wage to start with of 85 cents an hour. Their present wages are 55, 57 and 60 cents an hour. The men are also asking two weeks' vacation with pay each year, one day off with pay in eight, and time and a half for all overtime, Sunday and holiday work.

John J. Stanley, president of the company, says that to meet the men's demands it would be necessary to charge a 10-cent fare in Cleveland.

The board will hold its first meeting on May 15. Attorney William L. Day will represent the men before the arbitrators, while Attorney Harry J. Crawford will act for the company.

Deadlock in Pittsburgh

The conference looking toward an adjustment of the differences between the Pittsburgh Railways and its employees on the wage issue held on May 8, at which were present company and carmen's officials, with Mayor Magee acting as mediator, ended in a deadlock. It is reported that the men are preparing to take another strike vote. Another meeting took place on May 7 at which propositions were advanced by the Mayor, the company and the men. The men are seeking a scale of 75 cents for the ensuing year and 77 cents for next year under a two-year agreement and for certain changes in the working conditions.

Conferences on New York State Wages

Representatives of the employees of the Rochester, Syracuse and Utica lines of the New York State Railways conferred on May 7 with President Hamilton in the hope of obtaining another proposition to submit to the men. If a satisfactory arrangement cannot be reached arbitration will be resorted to, with the company probably demanding separate arbitration proceedings in each city. The men recently rejected the offer of President Hamilton for a renewal of the contract which expired on May 1 with a wage reduction of 2 cents an hour. This would make the new scale 49, 51 and 53 cents an hour. The vote was almost unanimous. The demands of the men, submitted a short time ago, called for a scale of 66, 68 and 70 cents and a six-day week, with a 10-cent increase over the amounts for operators of one-man cars.

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Fare Hearings Concluded in Baltimore

The Maryland Public Service Commission has concluded hearings on the petition filed by the United Railways, Baltimore, making application for permission to increase the fare rate from 7 cents. The commission is expected to hand down its decision in the near future. At the same time action also is expected on the request made by C. D. Emmons, president of the railway, to have the company's property valued.

Although the petition filed by the company left the amount of increase to the commission, in the arguments by counsel for the United Railways, it was said that the company wants an increase of ½ cent and also seeks relief pending the valuation. A great many applications for the elimination or extension of fare zones have been made to the commission and the company representatives told the utilities board that with a ½-cent increase in fare some of these could be granted.

City Sues Railway Operating at Hartford

Papers have been served on company officials by which the city of Hartford, Conn., has instituted action against the Connecticut Company, providing for an attachment to the value of $100,000, and claiming specific performance by the company of all provisions of the Tucker grant, an accounting by the company, $100,000 damages, the appointment of a receiver of fares and income of the company within the city of Hartford, and "such other and further relief as justice and equity may appertain."

The case has grown out of the failure of the company to pay the city an amount estimated to be about $50,000, representing 2 per cent of the gross fares collected within the city limits in the calendar year of 1923. Payment was due in February. The complaint cites the particular phases of the agreement which the city alleges have not been fulfilled by the company.

By vote of the Democratic majority in the Common Council several weeks ago, one-man cars were banned in Hartford, effective in June.

Memphis Men Granted Three Cents an Hour Increase

Under a recent decision of an arbitration board motormen and conductors of the Memphis Street Railway, Memphis, Tenn., have received an advance in wages of 3 cents an hour, making the scale for first-year employees 45 cents and hour, second-year men 50 cents and older employees 55 cents. The decision of the board affects 600 trainmen, carhouse and shop repair men. The wage increase, which is retroactive to April 1, will mean $54,000 annually to the railway management. The contract provides that the men will work six days out of every week. Pay at the rate of time and a half is allowed for overtime in addition to the regular pay. E. B. LeMaster, representing the Memphis Street Railway on the board, filed a minority report declaring the increase was unwarranted and "no burden should be added to the public unless the evidence submitted to the board clearly justifies it." It is reported that the company will announce in a short time an 8-cent fare with ten tickets for 75 cents.

President Hamilton Enlightens Author of Five-Cent Bill

President George E. Hamilton of the Capital Traction Company and Senator McKellar of Tennessee, author of the 5-cent fare bill for the District, clashed on May 5 at the hearing on the fare bill over the original financing of the company and the right of Congress to disregard arbitrarily the findings of the Public Utilities Commission and provide a 5-cent fare. Senator McKellar insisted that bonds of the Washington & Georgetown Company, of a face value of $4,000,000, had been reckoned at $8,000,000 in making the transfer of the property. Mr. Hamilton proceeded to explain that the securities of the Washington & Georgetown Company were highly regarded in Washington; that the assessed value of the stock was $275 a share and that there was the expectation that the bonds would be exchanged for the stock. He finally insisted that the sale price of the Washington & Georgetown Company was not considered by the Public Utilities Commission in fixing the fair valuation of the Capital Traction Company, and, therefore, had no connection with the present rate of fare in the District.

New Bus Line Opened in Philadelphia

Operation of a new bus line in the Stenton section of Germantown was started on May 3 by the Philadelphia Rural Transit Company, a subsidiary of the Philadelphia Rapid Transit Company. A certificate of public convenience for operation of the line was granted a few days ago by the Public Service Commission.

The new bus line begins at the intersection of Mount Airy Avenue and Stenton Avenue, and extends thence along Stenton Avenue to Washington Lane, thence along Washington Lane to Chew Street, thence along Chew Street to Belfield Avenue, thence along Belfield Avenue to Haines Street, thence along Haines Street to Germantown Avenue, thence returning along Germantown Avenue to High Street, along High Street to Belfield Avenue and thence over the same route to the place of beginning.

The company is operating twenty-nine-passenger single-deck buses. The fare is the same as that of the company bus route previously placed in service, namely, 10 cents cash fare for a one-way trip. The privilege of interchange in a forward direction exists between the bus route and connecting lines, surface, subway or elevated, of the Philadelphia Rapid Transit Company by means of an exchange ticket, the price of which is 3 cents. In the case of passengers transferring from the Philadelphia Rapid Transit Company lines to the buses, however, 3 cents cash, in addition to an exchange ticket, must be paid.

Office of Street Railway Commissioner at Toledo Open

Members of the Board of Street Railway Control at Toledo, Ohio, declared that the field is open for a successor to W. E. Cann, whose resignation as street railway commissioner, to enter the motor manufacturing field, is noted elsewhere in this issue. The members of the board will probably take the matter up at a special meeting before June 1.

W. W. Knight, president of the board, is now in California, but is expected to return about May 20. The regular monthly meeting is scheduled for May 15, at which time the resignation will be acted upon.

It has been hinted that W. T. Jackson, city service director, may be appointed to the office and combine the work of the two departments temporarily. This plan would save both city and car-riders money, it is believed, and provide a man for the commissioner's job thoroughly acquainted with present plans and future needs.

E. L. Graumlich, engineering assistant to the commissioner, has also been mentioned as a possible successor to Mr. Cann. He went to Toledo after experience in the office of the Street Railway Commissioner at Cleveland.

$1,000,000 Improvements in Philadelphia Approved

The committee on transportation and public utilities of the City Council of Philadelphia recently voted approval of the ordinance introduced by Councilman Hall authorizing the Philadelphia Rapid Transit Company to issue first mortgage bonds up to $1,000,000 for the purpose of retiring $389,000 of the company's real estate mortgage bonds and to provide funds for necessary transit improvements. The bonds to be issued for these improvements, which were outlined in the ELECTRIC RAILWAY JOURNAL, issue of April 19, will be twenty-year 6 per cent bonds, secured by mortgages on the company's real estate.

When the matter was taken up by the committee Councilman Cox called attention to the fact that there still is in Council a bill, introduced several months ago, authorizing the P. R. T. to create a loan of $1,000,000 for financing the purchase of buses for the Philadelphia Rural Transit Company. Mr. Cox was told the new loan ordinance will supersede the one to which he referred, and that the $1,000,000 is to be used for making certain improvements named in the new bill instead of for the purchasing of motor buses.

Appeal of City of Buffalo Against Higher Fare Dismissed

The United States Supreme Court on May 5 dismissed for want of jurisdiction, without a written opinion, the appeal of the city of Buffalo from the decision of the New York Supreme Court upholding an order of the New York Public Service Commission increasing the rate of fare to be charged by the International Railway from 5 cents to 7 cents, with four tokens for

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25 cents. No Federal question was found to be involved.

The city sought to appeal on the ground that the constitutional inhibition against violation of contracts had been encroached upon. The city contended that under franchise contracts granted predecessor corporations the rate of fare in Buffalo was limited to 5 cents, with free transfers. The State Public Service Commission once held that it had no authority to grant an application by the company for increased fare. This case was taken to the State Supreme Court, which held to the contrary. The Public Service Commission then proceeded to a hearing and granted the increase. This the city resisted, losing in the state courts and then attempting to carry the case to the United States Supreme Court.

Byllesby Officers Advanced

Directors of H. M. Byllesby & Company, Chicago, have elected Arthur S. Huey chairman of the board and John J. O'Brien president, to succeed the late Col. H. M. Byllesby. Robert J. Graf has been elected first vice-president. The same men have been elected to fill these offices for the Standard Gas & Electric Company and the Northern States Power Company. All three were associated with Colonel Byllesby and with him composed the executive committee. Henry C. Cummins and Albert S. Cummins, nephews of Colonel Byllesby, were both elected vice-presidents, the former of H. M. Byllesby & Company and the latter of the Standard Gas & Electric Company and the Northern States Power Company.

Low Fares on California Line to Stimulate Traffic

The Railroad Commission of California has authorized the Peninsular Railway to reduce to a new low basis for a six months' experimental period reduced one-way and thirty-ride commutation fares between all points on the line.

As illustrated, the one-way fare at the present time between San José and Los Gatos is 40 cents, the new fare will be 25 cents; between San José and Mayfield the present fare is 60 cents, the new fare will be 50 cents; the present thirty-ride family commutation ticket between San José and Los Gatos is $8, the proposed fare $5.

The Peninsular Railway, owned by the Southern Pacific Company, has never been a financial success. The total corporate deficit as of Dec. 31, 1923, was $3,438,107, with an income loss in 1923 alone of $377,737.

The application to the commission states that practically every one owns an automobile in the territory through which the line operates and that the revenues have been steadily decreasing. In the year 1923 the railway operating revenue was $16,492, less than during the year 1922, and the first three months of 1924 show a very severe decrease over the same months of the year 1923.

It is to be hoped that the further reductions in the fares will attract sufficient additional business at least to pay operating expenses and taxes.

Detroit Municipal Will Not Deal with Union

A petition on stationery bearing only a union printer's label and signed by 3,200 platform employees of the Detroit Department of Street Railways has been presented to Joseph A. Martin, acting Mayor, informing him that they have authorized a committee to represent them on all questions of wages and working conditions. The committee named included sixteen platform employees and in addition W. D. Mahon, William B. Fitzgerald and R. L. Reeves, all Amalgamated officials.

Mr. Martin advised a delegation of union officials who sought to call his attention to new grievances that the law and the City Charter must be obeyed in letter and spirit by city employees and officials or their connection with the city government will end. This delegation included the first international vice-president of the Amalgamated Association. Its members complained that the street railway commission had forbidden the circulation of petitions addressed to the acting Mayor, at carhouses. It was intended by means of these petitions to verify the statements that the delegation represented a majority of the men, and that they were forbidden by the commission to collect union dues in the carhouses. It was contended by the representatives of the men that the commission's stand violated an unwritten understanding that the *status quo* was to be maintained in the present wage controversy pending the coming conference between Mr. Martin and the Street Railway Commission.

The petition presented to Mr. Martin was circulated during the week ended May 3 in violation of a departmental order, according to a statement by Ross Schram, assistant general manager of the D. S. R. It was stated that division superintendents stopped the circulation of the petition because it is a long standing rule that no petitions, no matter what their nature, are to be circulated among the railway men while at work. This ban, it was claimed, was especially aimed against political petitions. Mr. Schram stated that regardless of the policy of the D. S. R. or D. U. R. in the past, no dues will be collected in the future on D. S. R. property.

Mr. Martin has again made it clear that the city cannot deal with the union. The present controversy started when the men recently asked for a 14 per cent increase in wages and a revision of working conditions. On the basis of the earnings of the company for 1923 this increase would more than wipe out the surplus shown from operation.

Traffic Survey Work Started at Los Angeles

The Los Angeles Board of Public Utilities on April 22 opened up special offices for the use of R. F. Kelker, Jr., of Chicago, who has been engaged to make a survey of the transit situation for the city of Los Angeles.

In accordance with a joint agreement between the city of Los Angeles and Los Angeles County, an expenditure of $40,000 will be shared equally by the city and the county for this work. Of this amount Mr. Kelker will receive $15,000 for his services.

Mr. Kelker will include in his studies subways, open cuts, elevated lines and motor bus operation as well as surface railway service. The idea behind the inquiry is to provide for a program for future development. It is expected that the work of the engineers will start at once.

Michigan Roads Elect Officers

At a meeting of the stockholders of the Grand Rapids, Holland & Chicago Railway, the Michigan Railway and the Michigan Electric Railways, G. R. Cottrelle, Toronto, was elected president of the Michigan Electric Railways, with J. F. Collins vice-president and general manager. B. C. Cobb, New York, was elected president of the Michigan Railways, with Mr. Collins general manager. Niel M. Viergever, Grand Rapids, and O. H. Degener, Jackson, were elected secretary and treasurer respectively of all three companies.

War on One-Man Car Renewed on Coast

The war on one-man cars has spread to Berkeley, Cal., following their withdrawal from Oakland. Mass meetings have been held, and legal action is threatened to force the cars out of service, despite the fact that one-man cars are being operated in Berkeley under a six months' agreement, arranged on April 21.

Demand for removal of the one-man cars followed a collision on Sunday, April 27, between a one-man car of the Key System Transit Company and a Southern Pacific electric train at Ashby Avenue and Adeline Street in daylight. The crossing at this point was protected by two flagmen who are said to have displayed the proper signals. No one was hurt, but one girl has since been prostrated by her experience as a passenger on the one-man car. Officials of the Key System and Berkeley police started an investigation.

Following the accident, the foes of one-man cars held an indignation meeting to which Vice-president and General Manager W. R. Alberger of the Key System was invited.

The Berkeley trouble served as a spur to those Oaklanders who have been protesting against the operation there of the safety type of cars. The latter have been taken off the long runs on Telegraph Avenue in Oakland, but are still running on a number of feeder lines in that city. Petitions have been circulated and the City Council has been asked to take action in this case.

In the meantime, the city of Oakland is going ahead with its complaint to the State Railroad Commission against the service of the Key System, which is soon to come up for a hearing.

The Oakland Chamber of Commerce has appointed a special transportation committee and mailed a questionnaire to its 3,000 members requesting them to offer suggestions as to how the railway service can be improved. One of the criticisms most frequently heard concerns the character of the cars now in use on some of the lines.

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News Notes

Mount Vernon and Yonkers Included in Electrification Bill.—Governor Smith has signed the Garnjost bill, as Chapter 626 of the Laws of 1924, amending Section 53-a of the Public Service Commission law, requiring the electrification of all railroads within the limits of a city adjoining the city of New York before Jan. 1, 1926. The section requiring the electrification of all railroads in Greater New York became a law in 1923 and the amendment to the law affects the cities of Mount Vernon and Yonkers.

Parking Rules Necessary.—The "park as you please" order which was tried out in Akron, Ohio, for ten days as an experiment has proved a failure, with the result that it has been abandoned and stringent parking rules put into effect. Merchants and many auto drivers themselves voiced loud protests against the plan. Other cities in northern Ohio, notably Canton, Massillon, Alliance and Warren, are invoking stringent parking regulations.

Wages Same for Another Year.—Trainmen on the city division of the Northern Ohio Traction & Light Company, Akron, Ohio, at a mass meeting held recently voted a continuance of service for another year at the present wage scale. It is probable the Canton and Massillon City men and the interurban men will do the same. The old wage contract expired May 1. Few changes were made in the working conditions.

Urges Early Date on Hearing.—Earliest possible hearing of the application of the city of Los Angeles, joined in by the Railroad Commission, for an order requiring construction of a union passenger station and elimination of grade crossings in that city is urged upon the Interstate Commerce Commission by the Railroad Commission of California in a telegram recently forwarded to Washington.

Bus Permit Granted.—The Delaware River Coach Company, a subsidiary of the New Jersey & Pennsylvania Traction Company, Trenton, N. J., has been granted a twenty-five-year franchise by the City Commission of Trenton, N. J., to operate a bus line between Trenton and Morrisville, Pa.

Demands to Be Sent Officials.—The presentation of demands to be embodied in the new working agreement between the Tri-City Railway, Davenport, Iowa, and the union is to go to the company officials by the executive committee of the union. The present agreement, signed a year ago, provides for the opening of negotiations at least thirty days prior to the expiration of the agreement. June 1 is the date of this expiration.

Many Hurt When Car Gets Beyond Control.—More than thirty persons were injured just before 6 o'clock on May 7 when a one-man Ogden Avenue car got beyond control on the grade down the 155th Street viaduct in New York City and smashed into a crowded trolley standing in its path. George Serfert, motorman of the one-man car, was among the injured. He was taken unconscious to Columbus Hospital. William E. Thompson, superintendent of traffic for the Third Avenue Railway, said that he had been unable to ascertain the cause of the accident owing to Serfert's condition.

Tax Expert Honored.—J. H. Moran, general auditor of the Boston Elevated Railway, has been appointed by Governor C. H. Cox to represent the Commonwealth of Massachusetts at the seventeenth annual conference on taxation at the Hotel Chase, St. Louis, on Sept. 15. This honor has been conferred on Mr. Moran by the Governor because Mr. Moran has become very well known in Massachusetts as a specialist on taxation problems.

Six Buses Serve.—Two more buses have been added to the equipment of the Wisconsin Traction, Light, Heat & Power Company for service from Appleton, Neenah and Menasha. This brings the total number of buses serving these cities up to six.

Chicago "L" Posters Reproduced.—*World's Work* for May contains a two-page story, with six illustrations of artistic posters, recently issued by the Chicago Elevated Railways and the North Shore Line.

New Council for Cincinnati Commission.—John V. Campbell, former Hamilton County prosecutor, was elected to succeed Judge Frederick L. Spiegel as legal counsel for the Rapid Transit Commission of Cincinnati, Ohio, at a meeting of that body May 3. Judge Spiegel's resignation was recently accepted, to take effect July 1.

Cars Will Observe Highway Signs.—Street cars in La Crosse will observe the arterial highway stop signs the same as any other vehicle does, according to a recent announcement of Superintendent C. L. Hedges of the Wisconsin Railway, Light & Power Company. Beginning at once, cars will come to a full stop when crossing or entering an arterial highway, whether there are passengers getting on or off.

Many Injured.—One woman was killed and twenty-seven injured seriously on May 3 when two interurban cars of the Southwest Missouri Railroad collided on a curve a mile west of Lowell, Kan.

May Operate Buses.—The Janesville Traction Company, Janesville, Wis., has under consideration the question of abandoning its Washington Street and Cemetery Street car lines. If permission is given by the commission the company proposes to purchase buses for use on these lines.

City Gets Right for Construction.—The Public Service Commission recently issued to the city of Philadelphia certificates of public convenience for the Broad Street subway and the Chestnut Street surface car-subway recommended by the Philadelphia Rapid Transit Company. This was the last requirement needed before beginning the work on the proposed high-speed transit lines. The commission's order authorizing the Broad Street subway provides for a tube under Broad Street, with necessary branch lines extending northeast and northwest that may be planned later; a subway in Ridge Avenue, extending from Broad Street to Eighth Street, to Walnut Street, over the Schuylkill River by a new bridge near Sansom Street, thence in Chestnut Street to Forty-second Street, and thence by elevated railway over Woodland Avenue to the city line. The project will cost about $11,000,000.

Another Paper Appears.—"United Service" is a new monthly publication being issued by the Spokane United Railways, Spokane, Wash., for its employees. M. W. Birkett, vice-president and general manager of the company, stated that he hoped the publication would become an institution and grow with the company. Its aim is to promote friendship and understanding, to arouse interest among employees and to provide a means of communication for all branches of the service.

Fares Increased.—An increase in fare on the lines of the Wahpeton-Breckenridge Street Railway, connecting Wahpeton, N. D., and Breckenridge, Minn., line from 5 to 7 cents as a temporary measure has been granted jointly by the North Dakota and the Minnesota Railroad Commissions.

Ohio Company on Strike.—City and interurban employees of the Stark Electric Railroad, Alliance, Ohio, went out on strike on May 1 following the refusal of the company to accede to their demands for a 9-cent increase in wages. The company originally asked a 10-cent cut in hourly wages, but later modified this to a 4-cent cut. The men rejected the offer.

Arbitration to Start May 19.—Arbitration proceedings looking toward a settlement between the Scranton Railway, Scranton, Pa., and its employees, who have sought a 17-cent wage increase, will commence on May 19. This was decided recently following the decision of Bishop Hoban to act as third arbiter. The two other arbitrators are Attorney John M. McCourt for the company and L. F. Hart for the car men. Arbitration of wages is the carrying out of an agreement of a month ago whereby the men accepted the rush-hour run sought by the company and consented to let the matter of wages go to arbitration. This terminated at that time the four-day strike, which was referred to in the ELECTRIC RAILWAY JOURNAL in the issue of April 12.

More About One-Man Cars in Jersey.—In No. 1 of Vol. 4 of "Whys and Other Whys of the Trolley Situation," published by the Public Service Railway, Newark, N. J., the connection between one-man cars and better service is explained. The company claims that when this type of car is operated the service is better, headways shorter and the public accordingly pleased. The company contends further that they can be operated with the same speed as two-man cars and that they can be operated with a high degree of safety. Also that operation of the one-man cars works no hardship upon the trainmen. Co-operation is asked of the patrons of the Public Service Railway, the men and management in return pledging their utmost efforts in providing good service.

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Financial and Corporate

Plan Arranged for Extension of Michigan Railroad Bonds

The management of the Michigan Railroad, Jackson, Mich., has approved the extension for ten years of the maturity date of its $4,050,000 of first mortgage 6 per cent bonds due on May 1, to May 1, 1934, giving the holder at the same time his choice of two options.

Under option A the holder of a $1,000 bond who deposits his bond in acceptance of the option, upon consummation of the plan, will receive $1,000 principal amount in first mortgage bonds to which will be attached the extension contract and new semi-annual coupons for interest at the rate of 6 per cent per annum and $200 par value (two shares, par value $100 per share) of Michigan Railroad 6 per cent preference stock.

Under option B the holder who deposits his bond in acceptance of that option, upon consummation of the plan, will receive $1,000 par value (ten shares par value $100 per share) of 7 per cent cumulative prior preferred stock of the Michigan Railroad and $800 par value (eight shares, par value $100 per share) of 6 per cent preference stock of Michigan Railroad.

It is explained to the holders of the Michigan Railroad first mortgage five-year gold bonds, Series A, 6 per cent, due May 1, 1924, that for many months the management of the Michigan Railroad has been endeavoring to arrange for the refinancing of the $4,050,000 of first mortgage 6 per cent bonds due May 1, but that prevailing conditions make it impossible to sell a new issue of securities for the purpose of refunding these bonds, so that the company will not be able to pay in cash the principal thereof at maturity.

The outstanding $4,050,000 first mortgage bonds are part of an original issue of $4,500,000, of which $450,000 bonds have been acquired and canceled through operation of the sinking fund. The company also has outstanding $4,000,000 of general mortgage bonds due May 1, 1924, and a floating debt of approximately $1,500,000 for advances on open account. All of the general mortgage bonds, the floating indebtedness above mentioned and all of the capital stock of the Michigan Railroad are owned by a subsidiary of the Electric Railway Securities Company.

The extended bonds will be redeemable, at the option of the company, at their face value and accrued interest at any time upon forty-five days' published notice. The extension agreement to be executed by the company will contain protection provisions and for annual sinking fund payments beginning Nov. 1, 1926.

President Cobb states that the Electric Railway Securities Company, the holding company for the Union Railway Gas & Electric Company, of which the Michigan Railroad is a subsidiary, has agreed "to cause to be canceled or otherwise satisfied all the general mortgage bonds" and the floating debt of the railroad company, "so that the company then will have no funded indebtedness other than the first mortgage bonds and no floating indebtedness except current accounts."

Receivership in Birmingham Formally Lifted

Receivership under which Birmingham's railway system has operated since 1919 was lifted on May 3 with the formal order of Judge William I. Grubb of the United States District Court, discharging Lee C. Bradley and J. S. Pevear, co-receivers. The Birmingham Electric Company, which purchased the properties of the Birmingham Railway, Light & Power Company and of the Birmingham Tidewater Railway at the recent receiver's sale, immediately took over full charge of the operation of the lines.

All debts of the Birmingham Railway, Light & Power Company and of the Birmingham Tidewater Railway have been paid and the final details of the reorganization have been completed, according to the reports filed in court prior to the order discharging the receivers.

Work on track changes by which the Tidewater Line, formerly an independent line, will be consolidated with the other railway lines, under an agreement between the company and the city, will start as soon as material has been received, it is stated. Something like sixty days will be necessary to complete the changes, according to statements of company officials.

In the transfer of all properties of the Birmingham Railway, Light & Power Company, Birmingham, Ala., and of the Tidewater line to the newly organized Birmingham Electric Company, referred to in the ELECTRIC RAILWAY JOURNAL, issue of April 26, the Edgewood Street Railway was not included.

April 1 Deficit in Cincinnati $607,342

Exclusive of the deferred city franchise tax for the period from Jan. 1, 1920, to Oct. 1, 1923, which aggregates $1,312,500, the report of W. J. Kuertz, Cincinnati street railroad director, for March shows that the accumulated deficiency of the Cincinnnati Traction Company to April 1 is $607,342. Of that amount $429.342 represents return on capital, and $175,000 franchise tax due the city from Oct. 1, 1923 in addition to $3,000 franchise tax due the city of Norwood. The total revenue obtained by the company during March was $782,890 while the expenditures were $815,447 leaving a deficit for the month of $32,557. The total number of revenue passengers for the month was 9,032,651, as against 9,509,607 for the same period last year, or a decrease of 476,956. Increased cost of fare, use of automobiles and inclement weather are assigned as some of the reasons for the falling off of street car patronage.

$642,076 Net After Interest Charges for Key System Transit

The Key System Transit Company, Oakland, Cal., has reported to the California Railroad Commission for the year ended Dec. 31, 1923, regardless of ownership or control. On Dec. 31 the Key System Transit Company acquired the properties formerly owned by the San Francisco-Oakland Terminal Railways, which operated such properties from Jan. 1 to July 16, 1923. From July 17 to Dec. 30 the properties were operated by Hugh Goodfellow, Warren Olney and W. I. Borbeck, trustees for the bondholders. The report shows:

Operating revenue	$7,219,595
Operating expenses	5,527,960
Net revenue	$1,691,634
Revenue from auxiliary operations	137,837
Total net operating revenue	$1,829,471
Taxes	418,551
Operating income	$1,410,920
Non-operating income	20,263
Gross income	$1,431,184

The last-mentioned figure represents the amount available for rent of leased roads, interest payments on funded and unfunded debt, dividends on stock and additions to surplus. The annual interest charges of the Key System Transit Company have been reported to the commission as $789,108. The operating expenses of the company include $599,575 account of depreciation.

$500,000 of Railway Stock Offered to Customers and Investors

The Charleston Interurban Railroad, Charleston, W. Va., is offering direct to local investors $500,000 of its 6 per cent cumulative participating preferred stock of a par value of $100 a share at the market at a price to yield about 7 per cent. The stock will participate equally in additional dividends in any year after $6 per share has been paid on 15,000 shares of common stock.

The company explains that it plans to use 4,250 shares of the preferred stock for the purpose of acquiring all the capital stock of the Kanawha Valley Traction Company and Charleston Dunbar Traction Company and 750 shares for the purpose of providing funds for paying for certain improvements to the property of the company, and that the residue of preferred stock will be used only for the purpose of purchasing or retiring its bonds, or acquiring or making additions, extensions or improvements to its property. None of the stock is to be used for additions, extensions, or improvements unless the net earnings of the company for the year preceding the proposed use of preferred stock for such purpose shall at least equal the interest requirements on its funded indebtedness plus twice the amount of the annual dividends on the preferred stock then outstanding

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and proposed to be issued for such purpose. In any case the par value amount of stock so used is not to exceed the actual cost or fair value, whichever shall be lower, of the additions, extensions or improvements for which the stock is used.

The company explains that the earnings available for dividends on the preferred stock and for depreciation are more than five times the dividend requirements on the preferred stock to be issued. The company reports a surplus of $191,153 for 1923 available for depreciation and dividends after the payment of taxes and operating expenses. The Kanawha Banking & Trust Company, Charleston, is participating with the company in the offering.

Fonda, Johnstown & Gloversville Earnings Down

A comparison of the total revenues and expenses and net revenue from operation of the Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., for the fiscal year, with similar figures for the year 1922 follows:

	1923	1922
Railway Operating Revenues—		
Freight revenue, steam division	$569,014	$487,220
Passenger revenue, steam division	51,811	42,104
Passenger revenue, electric division	778,124	816,464
All other revenue from transportation	57,049	52,561
Revenue from other railway operations	14,859	11,296
Total operating revenues	$1,471,218	$1,409,648
Railway Operating Expenses—		
Maintenance of way and structures	$165,595	$166,201
Maintenance of equipment	157,015	129,941
Traffic expenses	7,580	9,187
Power	88,570	74,870
Transportation expenses	394,409	368,181
General expenses	85,522	82,099
Total operating expenses	$898,695	$830,481
Net operating revenues	$572,523	$579,167
Per cent operating expenses to operating revenues	61.09	58.91

Gross revenues for the year were $1,471,219, the largest in the history of the company and an increase of $61,571 over the previous year. All classes of revenue showed an increase, with the exception of the electric division, which decreased $38,341, partly due to the strike on the lines of the Schenectady Railway.

The net income available for dividends was $169,469 in 1923 compared with $189,014 in 1922. Preferred dividends took $30,000 in each of these years, leaving a balance to profit and loss in 1923 of $139,469 compared with $159,014 in 1922.

Bamberger Electric Makes Favorable Showing

The Bamberger Electric Railroad, Salt Lake City, Utah, came out on the credit side of the sheet in operation during 1923, according to the annual statement filed with the Public Utilities Commission recently by Julian Bamberger. The net operating revenue was $127,943 and the operating income $79,694.

The report shows that in 1923 the Bamberger Electric received $585,343 from operating revenues, which included a passenger revenue of $428,577. During the year the road increased its passenger revenue $7,154 over that of 1922.

Despite an increase in freight and passenger revenue during 1923, the Bamberger Electric showed a decrease of $36,072 in net revenue as compared with 1922, the additional expense being caused by an increase of $51,668 in operating expenses over the preceding year. The company paid $8,539 more taxes in 1923 than in 1922, which made the decrease of $44.611 in operating income under that of last year.

The total valuation of the road increased in 1923 over the preceding year by $47,595. In 1922 the balance was $4,155,589 as compared with $4,203,184 at the end of last year.

Permissible Return Earned in New Orleans

The New Orleans Public Service, Inc., for the first time since its organization as the successor to the local at New Orleans, for the first three months this year earned a little more than the rate of return of 7.50 allowed, on a rate base of $53,628,449. It earned during that period a rate of return of 7.66 on earnings of $1,026,922 as against 7.48 on $990,595 for the similar period in 1923. It is not likely that the earnings will be maintained at the recent rate in the months that are to follow, for with the coming of hot weather and the closing of the schools and the exodus to the country and seaside a decline may be expected. Certainly the increase is too small to hold out any immediate prospect of a reduction in the price of gas, electric light and power and railway fares. However, the report shows that with better equipment the corporation has been able to increase its earnings, giving promise ultimately of a reduction of charges all along the line. The gross income of the corporation for the twelve months from March, 1923, to March, 1924, was $3,591,906, or a rate of return for the year of 6.91.

INCOME STATEMENT OF NEW ORLEANS PUBLIC SERVICE, INC.

	Railway Department		All Departments	
	Three Months	Twelve Months to March 31, 1924	Three Months	Twelve Months to March 31, 1924
Operating revenue	$1,882,068	$7,567,255	$4,014,885	$14,688,031
Operating expenses, including renewals and replacements reserve	1,269,386	5,196,112	2,546,835	9,508,297
Net operating revenue	612,682	2,371,143	1,468,050	5,179,734
Taxes and uncollectible consumers' accounts	215,208	842,493	454,156	1,712,308
Net operating income	397,472	1,528,645	1,013,895	3,467,426
Miscellaneous income	5,166	22,544	13,028	124,480
Gross corporate income	$402,639	$1,501,189	$1,026,923	$3,591,906
Income deductions	.....	.....	563,991	2,214,957
Balance available for sinking fund requirements, dividends and surplus reserve, in accordance with ordinance No. 6822, C.C.S.	.....	.....	$462,931	$1,376,949
Rate base			$53,628,449	$53,447,368
Per cent earned			7.66	6.91

Smaller Loss for New York Transit Lines for Quarter

Although the operations of electric railway companies in New York City for the quarter ended Sept. 30, 1923, resulted in a loss of $413,000, the improvement over the corresponding quarter of the previous year was $281,000. The rapid transit lines showed an improvement of $564,000, but failed, however, to meet all fixed charges during the quarter by $679,000. The showing made by the surface lines was not as good as in the same quarter of the previous year. Operating revenues fell off $270,000. Net corporate income for the current quarter amounted to $266,000 or $283,000 less than last year. The following comparative income statement made public recently by the New York Transit Commission summarizes the results of operation for the quarter, compared with the previous year:

Item	Quarter Ended Sept. 30 1923	1922
Passenger fares	$31,525,530	$30,893,507
Other operating revenues	2,330,706	2,417,116
Total street railway operating revenues	$33,856,236	$33,310,623
Street railway operating expenses	$23,902,817	$23,770,802
Street railway taxes	1,945,574	2,019,379
Income from street railway operations	$8,007,844	$7,520,442
Other income	1,281,568	1,519,227
Gross income	$9,289,415	$9,039,669
Fixed charges	9,702,045	9,732,829
Net corporate income or (*D*) loss	*D*$412,631	*D*$693,160

The operating ratio on rapid transit lines decreased from 68.19 for the quarter ended Sept. 30, 1922, to 65.89 for the quarter ended Sept. 30, 1923, whereas on surface companies it increased from 75.24 to 76.74. For all companies the operating ratio decreased from 71.36 to 70.60.

Cities Service Has Good Report

The report of the Cities Service Company, New York, for 1923, which has just been issued, shows a substantial increase in earnings over the preceding year. The gross earnings were $16,602 562, as compared with $14,658.971 in 1922, and net to stock was $13,468,760, as compared with $11,847,119. This was the equivalent, after the deduction of preferred dividends, to $18.28 a share earned on the average amount of common stock outstanding during the year. In 1922, $14.88 was

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earned on the common stock then outstanding.

Gross earnings of the Cities Service Company which came from public utility subsidiaries alone increased 35 per cent to $11,278,508 from $8,347,546 in 1922. In spite of the fact that the oil industry became demoralized because of the abnormal overproduction of crude oil, the gross earnings of the company's oil division showed a decline of less than $1,000,000, the amount for 1923 being $5,324,054, as compared with $6,311,425 in 1922.

The earnings from utility properties alone were not only sufficient to take care of all expenses, interest charges and the preferred dividend, but also provided a substantial balance for the common stock, all of the earnings from the oil operations of the company's subsidiaries being applicable to the common stock.

The company operates 372 miles of electric railway with 822 cars. It serves a population of 650,000 and in 1923 the railway lines carried 97,199,484 passengers.

Public Hearing on Valuation Petition.—The State Corporation Commission has set May 6 as the date for a public hearing in Petersburg, Va., on the petition of the Virginia Railway & Power Company for a valuation for rate making purposes by the State Corporation Commission. The commission has set May 5, for a similar hearing in Richmond on a petition to value the Richmond property in the same way.

Receivership Lifted. — The Coney Island & Brooklyn Railroad, Brooklyn, N. Y., on April 1 resumed the operation of its lines, which had been in the hands of the receiver, Lindley M. Garrison. The lines controlled by this company are the Franklin Avenue, DeKalb Avenue and Smith Street lines of the Brooklyn-Manhattan Transit System.

Securities Authorized in Reorganization.—Another step in the reorganization of the Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, was completed recently when the Public Utilities Commission authorized the Cleveland & Southwestern Railway & Light Company to issue $8,500,000 of securities, of which $4,000,000 will be preferred stock, $400,000 common stock, and the remainder bonds.

$4,439,664 Damages Claimed in Montreal.—Rendition of account with damages of $4,439,664 from trustees and former directors of the Montreal Tramways & Power Company, Ltd., are asked by the new board in an action in which the writ was taken out recently. It is alleged that the affairs of the company have been mismanaged, and that the sum represented in the action has been lost. It is to recover this money that the claim has been laid.

Surplus of $6,209.—The revenue of the Eureka Street Railway, Eureka, Cal., in 1923 was $85,583. The net surplus for the year was $6,209. On the city lines 1,510,783 passengers were carried. This is a municipal line.

Loss for Year $10,208.—The Northwestern Pacific Railroad, San Francisco, Cal., reports to the Railroad Commission for the year 1923 that its operating revenue was $7,994,091 and operating expenses $5,908,323, giving a net operating revenue of $2,085,768. Interest, rent, taxes and other deductions totaled $2,274,074. The net corporate loss for the year was $10,208. The surplus at the beginning of the year amounted to $4,397,627. Miscellaneous additions to surplus for 1923 amounted to $13,487 and miscellaneous deductions were $93,492, leaving an accumulated surplus at the end of the year of $4,307,415.

Surplus Shows Improvement. — For the fiscal year ended Dec. 31, 1923, the Tygarts Valley Traction Company, Grafton, W. Va., earned $51,317. Operating expenses were $37,165 and net earnings $14,152. After the consideration of interest on funded debt, taxes and other items, the net gain for the year was $8,998. In 1922 the surplus was $7,940.

Issue of $1,570,000 for Transit.—The Rapid Transit Commission of Cincinnati, Ohio, recently directed a bond issue of $1,570,000 for the completion of the rapid transit. When this issue is made the original appropriation of $6,000,000 for the subway and rapid transit will be complete. The bonds bear interest at 5¾ per cent.

Accumulated Deficit $557,881.—The Union Traction Company, operating in Santa Cruz, reports to the California Railroad Commission for the year 1923 that its operating revenue was $73,059, and operating expenses $90,996, giving a net operating loss of $17,937. Interest, rent, taxes and other deductions totaled $35,485. The net corporate loss for the year was $52,926. The deficit at the beginning of the year amounted to $236,075. Miscellaneous additions to surplus for 1923 amounted to $339 and miscellaneous deductions were $249,219, leaving an accumulated deficit at the end of the year of $557,881.

Net Revenue Increased.—The electric railway properties of the Boston & Maine Railroad, namely, the Portsmouth Electric Railway and the Concord Electric Railways, operating in Portsmouth and Concord, N. H., realized a total revenue of $314,912 in 1923. This is compared with $332,786 for the year ended Dec. 31, 1922. The total operating expenses showed a falling off from $288,925 in 1922 to $263,645 for the year ended Dec. 31, 1923. The net revenue for 1923 was $51,267, against $43,861 in 1922.

Poor Showing in Everett.—According to reports filed by the Pacific Northwest Traction Company, Everett, Wash., and its subsidiary company, the Puget Sound International Railway & Power Company, the year 1923 was less profitable to these companies than the preceeding year. The Pacific Northwest Traction Company operates the electric interurban lines between Bellingham and Mount Vernon, a stage line between Mount Vernon and Everett and an electric line between Everett and Seattle. The Puget Sound International operates the Everett Street railway system. Its stock is all held by the Pacific Northwest. The net income transferred to profit and loss was $177,482, or $85,557 less than for 1922.

City Loses Appeal Against Railway.—The Pennsylvania Supreme Court on May 1 refused to allow the city of Philadelphia to appeal against the decision of the Superior Court in upholding the finding of the Public Service Commission in the Philadelphia Rapid Transit Company valuation case. Denial of the right to appeal was based on the city's failure to ask for that privilege within thirty days from the date of the Superior Court's order. The Superior Court sustained the Public Service Commission in finding that the valuation of the Philadelphia Rapid Transit property was more than $200,000,000, and in justifying the present rate of fare.

Savin Rock Amusement Property Sold by Connecticut Company.—The Connecticut Company, New Haven, on April 30, agreed to sell to Frederick Levere all of its holdings at Savin Rock, West Haven, for the sum of $350,000. The property includes a considerable strip of shore front, the railroad grove, the park and White City. The terms of the sale, it is understood, call for $50,000 down and the balance in ten years. The transaction must be indorsed by Federal authorities. According to Mr. Levere's attorney plans are being worked out to rejuvenate Savin Rock and bring large amusement enterprises to the shore.

Gold Bonds Offered.—A. B. Leach & Company, Inc., and P. W. Chapman & Company, Inc., New York, are offering at 99½ and accrued interest, to yield more than 7 per cent, $1,500,000 of the Durham Public Service Company, Durham, N. C., refunding mortgage 7 per cent gold bonds, series "A." The bonds are dated April, 1, 1924, and are due April 1, 1949. The proceeds of this issue of bonds will be used for the retirement of the company's outstanding general mortgage gold bonds and to reimburse the company for additions and betterments already made to the properties, and for other corporate purposes.

$1,409 Loss for California Road.—The Bakersfield & Kern Electric Railway, Bakersfield, Cal., reports to the Railroad Commission for the year 1923 that its operating revenue was $105,042; operating expenses $97,501, giving a net operating revenue of $7,541. Miscellaneous non-operating revenue amounted to $60. Interest, rent, taxes and other deductions totaled $9,010. The net corporate loss for the year was $1,409. The surplus at the beginning of the year amounted to $54,482.40. Miscellaneous additions to surplus for 1923 amounted to $45.34, leaving an accumulated surplus at the end of the year of $53,118. Bakersfield is a city of about 20,000 inhabitants.

Railway Bonds Extended at Increased Interest.—Drexel & Company, Philadelphia, and Bonbright & Company, Inc., New York, announced on April 26 that on May 1 they would buy at par and accrued interest the 5 per cent improvement mortgage bonds of the North Hudson County Railway. At the same time the Public Service Railway, Newark, successor to the North

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Hudson County Railway, announced that it would extend these bonds so that they would mature on May 1, 1926, with interest at the rate of 6 per cent per annum, payable May 1 and Nov. 1. The present lien of the mortgage indenture securing the bonds will remain unimpaired for the principal and 5 per cent of the interest on the extended bonds, which will be guaranteed as to principal and interest, including the additional 1 per cent of interest, by indorsement by the Public Service Corporation of New Jersey.

Net Revenue Shows Decrease.—The report of the Tacoma Railway & Power Company, Tacoma, Wash., showed that railway operating revenues of the company for 1923 were $1,567,849, a decrease of $17,925 from the year before, while the railway operating expenses were $1,318,515, or $64,207 more than for the previous year. The net revenue of $249,334 was $82,183 less than for 1922. The traffic account showed 27,260,794 regular passengers carried, 468,175 revenue transfers and 2,801,893 free transfers, a total of 30,530,862 passengers, in addition to which there were 1,196,696 free rides to employees. The average fare received from revenue passengers was 5.481 cents, and considering all passengers, including free rides it was 4.978 cents.

Wants to Operate Buses.—The Washington & Rockville Railroad, of Montgomery County, Md. has made application to the Maryland Public Service Commission for permission to discontinue its service between the District of Columbia and Forest Glen, Md., and substitute bus service. In its application the company said that in 1923 the gross receipts were $26,578 and operating expenses and taxes totaled $23,033 without provision for depreciation or return upon investment. It further claims that there has been a further decrease in patronage this year and now the operating expenses and taxes are greater than the revenue. The petition said that if the discontinuance of the line would retard development the company would agree to run one-man safety cars until there is an improvement in conditions.

Miami Beach Line Sold.—In a recent review of its operations Fitkin & Company, New York, reports that since the first of the current year the firm has acquired a number of utility properties, among which is the Miami Beach Electric Company, which operates the street railway systems in Miami and Miami Beach, Fla.

Accumulated Surplus $30,734.—The Angels Flight Railway, operating in Los Angeles, reports to the California Railroad Commission for the year 1923 that its operating revenue was $39,780 and operating expenses $25,944. Interest, rent, taxes and other deductions totaled $3,875. The net corporate income for the year was $10,105. The surplus at the beginning of the year amounted to $28,429. The company declared dividends of $7,800 during the year, leaving an accumulated surplus at the end of the year of $30,734.

Loss for Nevada County Line.—The Nevada County Traction Company, Grass Valley, Cal., reports a net corporate loss for 1923 of $5,376.

Book Reviews

Car Lighting by Electricity

A practical treatise on the construction, operation, inspection and maintenance of the car lighting systems in use on American railway cars. By Charles W. T. Stuart, foreman of car lighting, Philadelphia terminal, Pennsylvania Railroad. Published by Simmons-Boardman Publishing Company, New York.

This book covers very completely the practical features of lighting systems for railway cars. These include the storage battery system, the various types of head-end turbo-generator systems, and the axle generator systems. The matter included is almost entirely descriptive, the aim being, as stated in the preface, to present the various phases of car lighting in a manner so that the principal worker in the field, the engineer, or the student, may find a comprehensive presentation of such phases of the subject as may have a direct interest for him, or that may, in a general way, assist in the betterment of the art of car lighting.

EMF Electrical Year Book

Edited by Frank H. Bernhard and a staff of contributing editors. 1,672 pages, 9 x 12, illustrated. Published by Electrical Trade Publishing Company, Chicago, Ill.

The EMF Electrical Year Book, which is now issued for the third time, is according to the statement on the title page "An encylopedia of current information about the expanse of the electrical industry, with a dictionary of electrical terms, and a classified directory of electrical and related products, and their manufacturers in the United States and Canada." No departure has been made in this third edition from the original plan of the book. The manufacturers' company entries in the general alphabetical treatment of topics have been considerably condensed, and certain listings of manufacturers have been dropped. In the place of this material several hundred illustrations have been added throughout the book. The arrangement is entirely alphabetical, as in a cyclopedia, making the information readily available. Electric railway information accordingly is scattered throughout the book, although there is a short summary and statistical article on the subject.

Mechanical Engineers' Handbook

Prepared by a staff of specialists. Lionel S. Marks, editor in chief, professor of mechanical engineering Harvard University. Second edition, revised; 2,000 pages, flexible, 4½ x 7. Published by McGraw-Hill Book Company, Inc., New York City.

This is the second edition of Marks Mechanical Engineers' Handbook. The first was published in June, 1916, since when it has run through eleven printings, with a total of 65,000 copies. The second edition has been thoroughly revised, and the material in every section has been brought up to date. Much new material also is included. The subjects which have undergone most change in this edition are: hydraulics, heat, iron and steel, non-ferrous metals and alloys, bearings, steam boilers, internal combustion engines, aeronautics, and air compressors.

As in the previous editions, the material is combined into fifteen main sections. Section 10, covering transportation, includes the subjects of automobiles, railway engineering, marine engineering, and aeronautics. Consideration of electric railway transportation as such has been entirely omitted, but the handbook contains much information and data of practical use to the electric railway mechanical engineer.

Super-Power as An Aid to Progress

By Guy E. Tripp. The Knickerbocker Press, New York. 60 pp.

This book is a reprint of various articles and addresses by Mr. Tripp on the subject of super-power. They have been collected and form an interesting treatise on many of the social, economic and political aspects of the subject. Mr. Tripp attributes a large part of the progress in civilization during the last century to the increase in the amount of power under the control of man. This has permitted him to increase his production without a corresponding increase in his own labor. The corollary to this is that as power is made more abundant, more easily utilized and more available to more people, further progress will be made, and this in part is the purpose of the publication of these addresses.

A Motorman's Message to You

By John Henry Boyce. Published by the author at South Bend, Ind. 23 pp.

The message is, briefly: Think, do the best you can, give service, avoid accidents, help sell transportation. The author, who has been in the train service of the Chicago, South Bend & Northern Indiana Railway since 1909, moralizes in a constructive way on these thoughts, and concludes with the warning: "You are the dispatcher of your own career over the railroad of time, and you can either clear the tracks to the City of Success, or you can wreck your career in the Valley of Defeat." It would be well if there was wider acceptance of the kind of philosophy contained in this little book.

Handbook on Fire Protection

Compiled and published by Western Actuarial Bureau (Fire), Chicago, Ill.

This handbook, which is published in loose-leaf form, has been prepared to cover safe practices in building construction. Nine general sections are included, covering classification of buildings, walls, protection of openings in fire walls, protection of openings in exterior walls, floors and roof and supports, floor openings, roof openings, courts, exterior attachments. Diagrams and descriptive matter are included to illustrate safe practice.

It is proposed to add sections to the book from time to time. Some of the special sections proposed are on electric railway car houses and cars, to be considered at the National Fire Protection Association convention this month.

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Personal Items

Mr. Spencer in New Office

Toronto Municipal Railway Official Advanced to Post of Assistant to the General Manager

A. T. Spencer, engineer of way of the Toronto Transportation Commission, Toronto, Ont., operating the municipal electric railway there, has been appointed assistant to the general manager of the commission, D. W. Harvey. Temporarily, at least, no successor to Mr. Spencer as engineer of way will be appointed, and he will continue to supervise the operations of the way department.

Mr. Spencer has had full charge of the commission's heavy program of track rehabilitation and extension. This has, indeed, been a big job. He has rebuilt all but 50 miles of track and has improved the lines formerly operated privately and tied them in with the old so-called Civic lines. It is not derogatory to the Toronto Railway to say that the lines which the city took over on the acquisition of the property were in bad physical shape. This was well known then. It is certainly well known now.

A. T. Spencer

Mr. Spencer was appointed to the important position of engineer of way of the Toronto Transportation Commission in May, 1921, in anticipation of the extensive rehabilitation program which began when the commission took over the local lines the following September. This work might have been proceeded with in a leisurely manner, but the idea of leisure in rehabilitating the property of the Toronto Railway did not enter into the thought of the Toronto Transportation Commission. The city had suffered too long from bad tracks, poor cars and other inconveniences to be at all tolerant of any program which countenanced dallying with the work in hand.

Consequently, quantity production methods had to be worked out for the reconstruction of nearly 200 miles of track, and the proposition was handled so well under the direction of Mr. Spencer that all of the work was done during the past two seasons, and this year's program will be quite small. In order to carry out this work successfully in the very short space of time in which Mr. Spencer accomplished it, he had to resort to many novel methods and to exercise a great deal of ingenuity. The story of his resourcefulness in this direction was written without his knowledge in an article which appeared in the ELECTRIC RAILWAY JOURNAL for April 1, 1922.

Mr. Spencer brought to the work which he did at Toronto a fund of information gained while serving with other railways and while engaged in other similar lines of work. For a few months prior to his appointment under the Toronto Transportation Commission in May, 1921, he acted as assistant engineer in the railways department of the Hydro-Electric Power Commission of Ontario. Before that he had been connected with the Montreal Tramways, first as assistant engineer in charge of maintenance of way, and later as chief engineer of this department. Previous to that, he was employed by the Canadian Pacific Railway on grade revision in New Brunswick, Quebec and Ontario. In 1907 he was appointed assistant engineer of the Montreal Park & Island Electric Railway, and it was from this company that he went to the Montreal Tramways.

Mr. Spencer entered upon his engineering career in 1901 with the Dominion Coal Company and the Sydney & Louisburg Railway. He was born in Nova Scotia, and there received his general and technical education. In all the work that he has done, Mr. Spencer has shown a remarkable capacity for carrying out the job efficiently.

Mr. Cann, Toledo Commissioner, Enters Bus Field

Wilfred E. Cann, who has been Street Railway Commissioner at Toledo since the beginning of service-at-cost operation under the Milner ordinance, has resigned, effective June 1, or sooner if convenient. The notice of resignation was sent to Mayor Brough and the board of control on May 3.

Mr. Cann was appointed by former Mayor Schreiber and took office on Feb. 1, 1921. Before going to Toledo he was assistant to the general manager of the Detroit United Lines in Detroit. He had charge of interurban properties of the company for several years.

He announced at Toledo that he has accepted an advantageous offer from the Brockway Corporation, Cortland, N. Y., in charge of the engineering department. This company makes a complete line of gasoline motor bus chassis in three models and a line of trackless trolleys made in two distinctive models. It is said that Mr. Cann expects to maintain a residence at Toledo for a year and may arrange to have his office in some Middle Western city.

In a letter to the Mayor Mr. Cann said:

> The pleasant associations I have enjoyed in Toledo, my firm belief in the service-at-cost plan of operation and a sincere desire to see Toledo's transportation system established on an efficient basis are factors that have made it extremely difficult for me to arrive at my present decision. I am deeply grateful to the members of the board for their kindly assistance and support. If at any time I can be of service to the city I trust you will feel free to call upon me.

J. M. Stoddard Promoted to General Manager

John M. Stoddard, for the last twelve years superintendent and assistant to general manager of the Long Island Electric Railway and the New York & Long Island Traction Company, Jamaica, L. I., has been appointed general manager of the former company, succeeding Gen. Lincoln C. Andrews, who was recently appointed co-receiver with E. J. Ashmead of the New York & Long Island Traction Company.

J. M. Stoddard

Mr. Stoddard entered the railway field in 1894 as ticket agent and telegraph operator of the Grand Trunk Railroad. Eight years later he was appointed train dispatcher for the Rapid Railway, which operated between Detroit and Port Huron. Next Mr. Stoddard became connected with the Public Service Railway, Newark, N. J., in 1904 as an assistant division superintendent. He resigned this position in 1905 to become connected with the Brooklyn Rapid Transit Company, Brooklyn, N. Y., where he served in the capacity of dispatcher, assistant trainmaster and supervisor of inspectors. In 1910 Mr. Stoddard entered the employ of the New York & Long Island Traction Company as chief of the timekeeping and mileage department. His untiring devotion to the job, coupled with his natural ability, won for him the position of superintendent of that company as well as the Long Island Electric Railway, succeeding in that position I. B. Clarke, resigned.

R. L. Weber, chief electrical engineer of the Kansas City Railways, Kansas City, Mo., has gone to Boston to take up his duties as engineer in the electrical division of Stone & Webster.

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H. H. Porter Made President of Brooklyn City Railroad

H. Hobart Porter, a vice-president of the road, was on May 6 made president of the Brooklyn City Railroad to succeed Frank Lyman, advanced to the new office of chairman of the board. Clinton E. Morgan, general manager of the company since 1921 and vice-president and general manager since November, 1922, continues in these capacities in full charge of operation.

Lindley M. Garrison, receiver for the old Brooklyn Rapid Transit Company, appointed Mr. Porter in 1920 as director of operations of the surface lines of that company in addition to the Brooklyn City Railroad, of which he was then the operating chief. Under that arrangement he was responsible for the operation of the line of the Nassau Electric Railway, the Brooklyn, Queens & Suburban Railroad and the Coney Island & Brooklyn Railroad.

Mr. Porter is a member of the firm of Sanderson & Porter. In addition to his connection with the Brooklyn City Railroad he is president and director of the American Water Works & Electric Company, president and a director of the Brooklyn City Development Corporation, vice-president and a director of the James Mills Orchards Corporation, director of the National Surety Company, director of the Plattsburgh Traction Company, vice-president and director of the Queens Borough Gas & Electric Company and a director in the Washington Water Power Company, the West Penn Company, the West Penn Power Company, the West Penn Railways and the West Pennsylvania-Monongahela Company.

Major Philip Mathews, United States Army, retired, has been appointed chief executive officer of the New York Transit Commission, effective May 15. Major Mathews succeeds in this capacity Gen. Lincoln C. Andrews, who resigned about a year ago. He is a graduate of West Point. He went to France in February, 1918, and was chief of staff for the Eighty-third Division. From 1921 to 1923 he served as assistant to Col. Haskell, director of American Relief in Russia, being in charge of railway transportation. This appointment is a step in the reorganization of the commission in accord with the passage of the Adler bill creating the new City Board of Transportation.

Obituary

Frank G. Ewald, chief engineer of the Illinois Commerce Commission, died on April 27 in Evanston.

Franklin J. Spaulding, insurance manager for the Brooklyn-Manhattan Transit Corporation, successor to the Brooklyn Rapid Transit Company, died on May 1. He was born in Springville, Erie County, N. Y., and went to Brooklyn in 1895. The same year he entered the employ of the Brooklyn Rapid Transit Company. He was the originator of the idea of the insurance reserve fund and was made manager for the trustees of that fund.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Steady Business Conditions Indicated

Orders for Materials Handling Equipment Reflect This—Comments of Electric Railway Executives from All Parts of the Country Give Same Indication

THE manufacturer of materials handling equipment has an unusual opportunity to be informed on business conditions generally, for his product goes into practically every industry. Speaking to a representative of the McGraw-Hill Company, Inc., on last Monday, Charles Piez, president Link Belt Company, with plants in Chicago, Philadelphia, Indianapolis and on the Pacific Coast, and offices in the principal industrial centers, summarized the status of that company's business.

"Our plants as a whole," said Mr. Piez, "are running at 85 per cent of their normal forty-eight hours per week capacity. The Philadelphia plant in January, February and March did not show up so well, but there has been a large increase in orders and production in April and we look for a continued upward trend in the Eastern territory. For the Middle Western plants business has been brisk, and the same applies, but in increasing measure, for the Coast plant and office.

"Such hesitation as exists on the part of buyers is due, so the buyers themselves state, to the disturbance of the forthcoming election and the Washington political situation. Financial and business conditions of the country generally, however, are sound and stable."

At a recent meeting of the American Electric Railway Association executive committee, whose membership hails from all parts of the country, each executive was asked as to the trend of riding and business conditions in general in his community. In some cities riding was off slightly and in others it was better than the corresponding month last year. Most of those executives from cities where the riding was off slightly in March attributed it to the late spring and the fact that Easter this year came in April instead of March, which brought the Easter shopping riding a little later this year than last. There was no distinctive indication of any change in business upward or downward and the impression gathered was that conditions generally are steady. These indications tend to show that, while there is some falling off in certain lines, the talk about a general slowing up of business is largely psychological and the reflection of the pessimistic mind.

Metal, Coal and Material Prices

Metals—New York	May 6, 1924
Copper, electrolytic, cents per lb.	13.312
Copper wire base, cents per lb.	15.625
Lead, cents per lb.	7.65
Zinc, cents per lb.	6.15
Tin, Straits, cents per lb.	47.50
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.425
Somerset mine run, Boston, net tons	2.325
Pittsburgh mine run, Pittsburgh, net tons.	1.875
Franklin, Ill., screenings, Chicago, net tons	2.175
Central, Ill., screenings, Chicago, net tons.	1.90
Kansas screenings, Kansas City, net tons..	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.50
Weatherproof wire base, N.Y., cents per lb.	17.50
Cement, Chicago net prices, without bags.	$2.20
Linseed oil (5-bbl. lots) N. Y., per gal.	$0.97
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	12.25
Turpentine, (bbl. lots), N. Y., per gal.	$0.925

Key System Transit Spends $18,000 on New Motors

As the beginning of a policy of modernization of its rolling stock, it is reported that the Key System Transit Company, Oakland, Cal., will soon be in the market for new cars.

In line with the same policy the company has recently ordered twelve new GE-240 motors from the General Electric Company to be installed in some of its center-door cars of the type used in service to the Oakland ferry.

These motors will replace GE-66 motors and will cost $18,000.

An order has been placed for six new double-end air equipments, consisting of D.H.-25 motor-driven air compressors with three-point suspension, compressor governors and M-24-A brake valves. The total cost of new control equipment recently ordered by the Key System for installation at Oakland is set at $11,700 and of the air equipment $5,508.

New Company Organized to Make Lumnite Cement

The Atlas Aluminate Cement Company has been formed, with offices at 25 Broadway, New York City, to manufacture high alumina cement. For some time an increasing interest on the part of engineers has been shown in the French high alumina cements, which have at the end of twenty-four hours a greater strength than that of portland cement at twenty-eight days, and resistance to the chemical attack of sea water and sulphate bearing ground water. Although more expensive than other cements in first cost, because it is manufactured from raw materials consisting largely of high grade aluminum ore, the exceptional characteristics of this cement have developed in Europe a substantial market for the product. For this reason the Atlas company was formed to acquire the so-called Spack-

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man patents, which cover the manufacture of all high alumina cement in the United States. After several months' experiment the company is now prepared to produce "Lumnite" cement at its factory at Northampton, Pa., in ample quantities to meet any demand.

The special qualities of "Lumnite" cement are said to make it particularly valuable in railway construction and maintenance. Reconstruction or repair of concrete work may be made one day and put in service the next with a minimum of interference with traffic, shop work and use of terminals, yards and carhouses.

Lumnite cement is essentially aluminous. Its chemical composition in round numbers is as follows:

	Per Cent
Silica, magnesia, insoluble, loss, etc.	5
Alumina (Al_2O_3)	40
Lime (CaO)	40
Iron oxides	15

Western Advertising Concerns Pass to Collier

The Western Advertising Company, which controls the advertising space in the street cars of St. Louis and St. Louis County and one of the largest concerns of its kind in the country, and the Ewing Hill Company, which holds car advertising contracts in southern Illinois, have been purchased by Barron Collier, New York City. The Western and the Ewing Hill companies, allied organizations, have offices in the Merchants-Laclede Building, St. Louis. The purchaser will assume the management of the local offices on June 1.

The Western Advertising Company was organized by Ewing Hill in 1886. Daniel A. Hill, Webster Groves, Mo., president of the Western, will continue with the new management either in St. Louis or New York City, but his brother Ewing Hill, vice-president of the Western and president of the Ewing Hill Company, will retire. Mr. Collier was a vice-president of the Ewing Hill Company. Bruce Dougan is second vice-president of the Western and G. M. McGunnegle secretary-treasurer. Other officers of the Ewing Hill Company are: J. B. Lackey, New York, secretary, and Daniel A. Hill, treasurer.

Rolling Stock

Pittsburgh Railways, Pittsburgh, Pa., has placed orders for 225 cars in three different lots, 100 multiple-unit semi-steel, center-entrance cars with the Pressed Steel Car Company, 60 multiple-unit, semi-steel, center-entrance cars with the Standard Steel Car Company and 65 one-man, two-man cars from the Standard Steel Car Company. The cars are almost identical with respect to their specifications. The seating capacity of all will be the same, namely, fifty. The one-man, two-man cars, however, will weigh 35,000 lb., compared with 36,000 lb. for the others. These cars also will be equipped with K-43 G2 control and Van Dorn couplers. The general dimensions of the cars will be identical. The specifications for the 160 m.u. cars, of which the other 65 will be duplicates, except for the differences already noted, are as follows:

Date of order	March 24 and April 22
Date of delivery	Beginning August
Seating capacity	50
Total weight	36,000 lb.
Bolster centers, length	21 ft. 6 in.
Length over all	45 ft. 0 in.
Truck wheelbase	5 ft. 6 in.
Width over all	8 ft. 2 in.
Height, rail to trolley base	10 ft. 4 in.
Body	Semi-steel
Interior trim	Cherry
Headlining	Haskelite, white enameled
Roof	Monitor
Air brakes	Not yet decided
Armature bearings	Plain
Axles	A.E.R.E.A. Standard
Bumpers	Hedley anti-climber
Car signal system	Not yet decided
Car trimmings	Not yet decided
Side bearings	Stucki
Control	Westinghouse remote switch
Couplers	Not yet decided
Curtain fixtures	Not yet decided
Curtain material	Not yet decided
Designation signs	Pittsburgh standard
Door-operating mechanism,	Pittsburgh standard
Fare boxes	Cleveland
Fenders or wheelguards	Not yet decided
Gears and pinions	Nuttal helical
Hand brakes	Peacock staffless
Heater equipment	Consolidated
Headlights	Not yet decided
Journal bearings	Plain
Journal boxes,	Symington A.E.R.E.A. Standard
Lightning arresters	K-3 condenser
Motors	Westinghouse 514-P, inside hung
Paint	Chrome orange
Registers	International R7
Sanders	Nichols-Lintern
Sash fixtures	Not yet decided
Seats	Cross and longitudinal
Seating material	Rattan
Slack adjuster	Pittsburgh Railways
Springs	Not yet decided
Step treads	Feralun
Trolley catchers or retrievers,	Not yet decided
Trolley base	Nuttall 13-E
Trolley wheels	6-in. diameter
Trucks	Arch bar
Ventilators	Perry and Peerless
Wheels	Rolled steel 26-in.

New Orleans Public Service, Inc., New Orleans, La., has announced the specifications for fifty-five new cars. These cars are very similar to the 900 type of the company, of which twelve are now in operation and six more are on order from Perley A. Thomas. They differ only slightly from the 800 type, of which seventy-five were built by Brill and twenty-five by Thomas. They are designed along lines similar to the 400 type, but are heavier and stronger, with the idea possibly of using them to haul trail cars at some future date. The steel posts on the light-weight 400 type have been replaced by wood posts on the platforms and wood-filled tee-posts between the windows. The detailed specifications follow:

Type of car,	Double-end double-truck passenger
Seating capacity	52
Bolster centers, length	22 ft. 5½ in.
Length over all	47 ft. 8 in.
Truck wheelbase	4 ft. 10 in.
Width over all	8 ft. 7 in.
Height, rail to trolley base	11 ft. 5¾ in.
Body	Copper bearing steel
Interior trim	Cherry
Headlining	Agasote
Roof	Arch
Air brakes	25 Westinghouse and 30 G.E.
Car signal system	Faraday
Car trimmings	Bronze
Control	K-68A
Curtain fixtures	Forsyth
Curtain material	Pantasote
Destination signs	Keystone
Door-operating mechanism,	National Pneumatic
Wheelguards	H. B. Lifeguards
Hand brakes	Peacock staffless
Headlights	Crouse-Hinds
Journal bearings	Bronze, lead-lined
Journal boxes	M.C.B. standard 4¼x8 in.
Lightning arresters	Aluminum cell
Motors,	60 G.E. No. 263; 50 Westinghouse No. 306
Registers	International, hand operated
Sanders	Nichols-Lintern
Sash fixtures	O. M. Edwards
Seats	Hale & Kilburn
Seating material	Wood, slat
Slack adjuster	American Brake
Step treads	American Abrasive Metals
Trolley catchers	Ohio Brass
Trolley base	Ohio Brass
Trucks	Brill 76-E2
Ventilators	Railway Utility honeycomb
Wheels	33 in., cast iron

El Paso Electric Railway, El Paso, Tex., has appropriated $50,000 for the purchase of seven new cars of the Birney one-man type.

Key System Transit Company, Oakland, Cal., it is reported, will be in the market soon for new rolling stock.

Indianapolis Street Railway, Indianapolis, Ind., will purchase twenty-five modern cars. The amount estimated to purchase the cars is put at $315,000.

New Orleans Public Service, Inc., New Orleans, La., is contemplating the purchase of additional cars of the type described elsewhere in this issue. The experimental car recently completed was built in the company's shops, but it is planned to purchase other cars of this type from car builders.

Detroit Department of Street Railways, Detroit, Mich., awarded the contract on bids opened April 8 to the McGuire-Cummings Manufacturing Company for furnishing fifty Peter Witt type car bodies at $8,665 each. Contract was also awarded the General Electric Company for furnishing fifty electric equipments at $3,388 each. The contract for trucks for the above cars was not awarded. Bids were asked on 100 complete outfits, but it was decided to order only fifty at this time and possibly order fifty more later.

Track and Line

Sacramento, Cal.—A contract will probably be let within the next few days for the construction of the new union electric terminal in Sacramento. Bids were opened by J. B. Rowray of the Sacramento Northern on April 24. They are on a 100-ft. x 58-ft., three-story building. In addition to the material that will be used in the structure itself a considerable amount will be expended for cross-overs and other special work included in the terminal plan.

Trade Notes

American Insulating Machinery Company, Philadelphia, Pa., has brought out a new signal based on familiar principles but embodying certain novel features. The main changes consist in the simplification of the apparatus, a reduction in weight placed on the poles, the elimination of bore studs and the substitution of micarta for certain metal parts.

International Steel Tie Company, Cleveland, Ohio, reports prospects for business this year are excellent. The company is now shipping ties for 7 miles of track to the Havana Electric Railway, Havana, Cuba. This construction consists of 5 miles of new track and 2 miles of rebuilt track. Another recent shipment is for 4 miles of track at Portland, Ore. Another lot of ties sent to San Diego, Cal., will complete 28 miles of track which that company now has laid with International ties.

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New York, May 17, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 63
Number 20

Causes of Hot Bearings Studied

IN AN analysis recently made by a superintendent of equipment of a large railway system of causes which contribute largely to hot bearings several interesting points were brought out. The most serious causes were mechanical defects, such as excessively worn fits between the bearings and their housings and also between the housings and the motor frame. In some cases in taking up this wear by canvas shims, the thin bronze shells of the bearings had been forced inward, so as to clamp the axle too tightly. The introduction of mud or dust into the bearing housings, while the covers were open for lubrication, was shown to be another source of trouble. Loose, lost or badly fitted covers also permitted the entrance of dust and water while the cars were in service.

Other causes for hot bearings included broken babbitt, bearings turning in their housings, dust collars missing and check plates broken.

On many railways the lubrication of bearings is done by night forces, and as the clearance between the motors and the car framing is small, where cars are not provided with trapdoors the oiler must reach overhead and pour his oil blindly into an opening which he knows exists. Under such conditions dirt and mud are almost sure to fall into the housing, and in time this will filter through the waste and grind out the bearings and shafts.

It is thus seen that lubrication of motor bearings includes much besides the proper choice of a lubricant and the decision as to the amount to be used. An extensive study of the amounts of oil used, period of oiling and number of hot bearings on 57 railways is presented in this issue. A very valuable article by Mr. Bethel on packing bearings was published in this paper April 19, 1924.

Old Goods in a New Package

IF YOU walk through the shops of the street railway company in a certain large and rapidly growing city, you will see a number of ancient cars being completely rebuilt.

"When we get through," said the master mechanic proudly, "we will have practically a new car."

So far as material goes, his statement is true. Almost the only part of the old car which is being retained is the monitor deck roof. New side posts, new sills, new floor, new platforms, new sheathing, and new equipment are being used. Physically the rebuilt car will indeed be "practically a new car."

But, in spite of all that, it will not be a really new car. It will not look like a new car. It will have an old-fashioned and inconvenient arrangement of seats, doors and steps. The excess weight so commonly found in obsolete types of cars will be retained in this rebuilt vehicle. The symmetry of line, which is a noteworthy feature of many modern cars, will be lacking. In fact, the very portion of the old car which is being so carefully preserved, the monitor deck roof, is one of its least attractive features.

On paper this railway can show that the immediate expenditure is less than would be required to purchase an equivalent amount of new rolling stock. But it is extremely doubtful whether this capital saving is enough to pay for hauling the excess weight over the road day after day. The fact seems to have been overlooked that under the guise of economy, the railway is offering the public old goods in a new package. No such policy can succeed for long.

The public likes to ride in modern street cars. The fact that a car has new window posts, new sills, new running gear, etc., has no special appeal to the passengers. If the vehicle has the lines of an old car, it is an old car in their eyes. That being the case, it would be a much sounder policy to invest money in really new cars that will have a definite merchandising value and reduce operating expenses, than to put even a smaller amount of money into vehicles which can never be really modern in appearance or design, or satisfactory to the patrons.

Making the Stores System Serve the Men, Not the Men the Stores

MOST electric railway shop foremen realize that the efficient handling of materials used in maintenance work has much to do with shop efficiency. Few, however, can point to definite savings that have been accomplished by rearrangement of the supply system to assure that materials will be ready when needed and close at hand. One master mechanic, however, claims to have increased the output in truck overhauling 25 per cent by close attention to materials needed for replacement, such as bolts, nuts, rivets, truck brake levers, brake shoes, hangers, wheels, gears, etc.

A space immediately adjacent to the truck overhauling department has been arranged for the systematic storage of small quantities of the material needed in truck overhauling. By having this near the work much time is saved in getting parts, and by having the storage systematically arranged the various parts needed can be found quickly when required and without the long waiting often involved at the central store room.

Previous to the inauguration of this system the men

This is the issue in May that is devoted essentially to maintenance subjects

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lost considerable time in going to and from the general shop supply room to get replacement parts. It was also necessary often to issue rush orders to other departments. New brake hangers were required and the forge shop had to supply them immediately; welding repairs were needed for various truck parts and the work was rushed through the welding department. By providing a few spare parts such as are needed most frequently this class of rush work has been done away with. When used, they are replenished from the central store room, and drawing the stock from the central store room for the unit store room serves notice on the storekeeper to replenish his stock, in advance of the actual need for it by the overhauling unit.

As soon as possible after trucks have been removed from cars and placed in the overhauling shop, the foreman or assistant foreman makes an inspection of the equipment and lists parts that need replacement or require work of other departments. This list is handed to the man designated to see that the repair parts needed are kept on hand in the truck repair storage. The overhauling crews are instructed as to parts that should be replaced and other special work that must be done in addition to the regular cleaning and overhauling.

By this systematic procedure, substantial economies have resulted and the morale of the shop forces has been increased as the men are relieved of chasing up material and can concentrate their effort entirely on truck overhaul.

Space for overhauling repairs in most electric railway shops is at a premium and shop efficiency on a man-hour basis is exceedingly low, but by some small changes in storage and requisition methods economies are possible.

Public Sentiment Prevails in Pittsburgh Strike

THE strike of the Pittsburgh Railways trainmen over last week-end was quickly settled in the court of public opinion. Sentiment was overwhelmingly against the demands of the men for substantial wage increases. This, coupled with very prompt and decisive action on the part of the Mayor to protect the property of the railway at all costs, soon made union officials and men realize that the strike was a miserable failure. So they voted to go back to work on an offer of the company to pay the same wages and in addition half the cost of one uniform during the two years covered by the agreement, which means that the company will contribute about $14.25 per man above his wages during the contract.

The Pittsburgh management is to be congratulated on its positive though kindly stand toward this wage proposal. Not only has the outcome been of value to the industry, but it will make it possible for the Pittsburgh company to work itself into a secure position, insuring a high grade of service to local people. The public seemed to understand the gravity of a wage increase at this time, and having been shown by the plain facts that the street car men's wages were not out of line with those in comparable lines of work, and were among the very highest in the street railway field, its disapproval of the proposal was plainly manifested.

Of course, it is rather natural to try the metal of a new management, but there is not likely soon to occur another strike in Pittsburgh unless the position of the men is altogether more tenable than on this occasion. The men now know that while being considerate and sympathetic of their views, the present management can also be firm and final when it says that an increase in wages is not financially possible.

Transportation vs. Paving

THE petition of Gen. Lincoln C. Andrews, receiver for the New York & Queens County Railway, requesting permission of the New York Supreme Court to cease operation and surrender the railway's franchise brings into bold relief the inequitableness of requiring a railway to pay for paving in the track zone. Here is a company whose gross revenue for the current year will be about $650,000, and it is now ordered by the Hylan Administration of New York City to assume a paving expense in 1924 of $340,000. The company is in receivership and is located in a territory poor from a transportation point of view. While serving 40,000 passengers a day, the 5-cent fare imposed by the dictates of the same city government, and the conditions of the traffic are such that it would only be by the most careful management and removal of all unnecessary obligations that the railway could possibly be made to pay its way.

As a matter of fact, since the present receiver took charge, a little over a year ago, an operating deficit of some $30,000 a year has been turned into an apparent net of about the same amount. This $60,000 increase, nearly 10 per cent of the gross revenue, under conditions existing on the property, is an achievement worthy of praise, as it has been due to the progressiveness of the management and the introduction of sensible economies. The improved financial condition has made it possible to continue giving trolley service in a section where no other transportation facilities are available.

But all the recognition the city has given for this effort is as noted—a proposed paving assessment of $340,000, or over 50 per cent of the year's gross. The impossibility of paying such a charge is evident. If the company continues operation and the work is started the cost will become a lien against the property and will wipe out the remaining equity of the bondholders. Under the circumstances General Andrews had no other course than to apply to the courts to shut down in order to protect the bondholders' equity as far as possible. Incidentally this petition may serve so to arouse the community that measures of relief may be demanded of the city administration so that transportation can be continued.

But regardless of the outcome, this case is an object lesson—perhaps to railway managements as well as to city officials. It warns managements that no stone should be left unturned to make impossible a cessation of service for a reason such as this. The old franchises that contain clauses permitting city officials to continue imposing heavy paving burdens can be corrected if the people of the community are sufficiently enlightened as to the facts. A good many companies have succeeded in getting relief from the paving burden in the last two years. As to the lesson for city officials, if the Queens line is forced to shut down the incident should serve to show that it is impossible to get blood out of a turnip—that the traction corporation is really unable to pay for anything except in so far as the revenue from riders makes such payments possible.

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Lubricating Practice for Electric Cars

An Analysis of the Quantity of Lubricant Used, the Period of Oiling, and Methods of Applying the Lubricants as Found from a Study Covering 57 Electric Railway Properties

MANY things contribute to faulty lubrication besides the amount and quality of the oil used. Bearings differ in material and clearances; wear throws the axles out of alignment; temperature influences the rate of flow of the lubricant; bad track conditions produce hammer blows that affect the efficiency of the bearings; dirt becomes mixed with the lubricant and stops its flow; the waste used for packing becomes glazed, falls away from the axle, or fails to conduct the required quantity of oil, and there are a score of other conditions that could be enumerated which result in overheating of bearings and damage to the equipment.

The lubrication problem is thus not confined to a choice of oil and grease and to the best methods of applying them, but if a serious study of operating conditions is made and an efficient organization is used for handling and applying the lubricant, much will be accomplished in keeping bearing troubles down.

In order to obtain information which would show the various lubrication methods employed, the inspection period and quantity of lubricant used and the results obtained, the editors of this paper have gathered information during the past 12 months from 57 electric railways varying in size from a road operating 18 cars to one operating 3,592 cars. The total cars reported on was 31,543. This information has been analyzed and the results are given herewith. Additional information has been obtained from lubricating engineers as to conditions which they have found on various electric railway properties and improvements that have produced beneficial results.

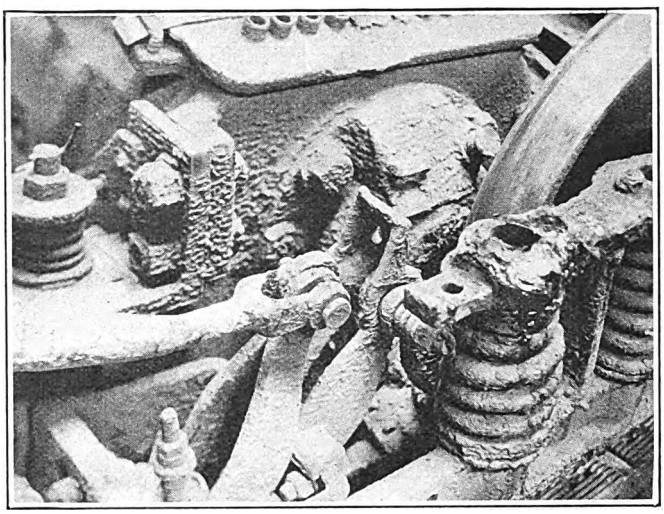
Length of the Oiling Period

The parts which determine the shortest inspection period are the armature, axle and journal bearings. Information was obtained as to the different bases used for inspection and oiling. Of the 57 replies received, 31 companies use the mileage basis for the majority of their lubrication; 24 companies use a time basis, and two companies use a car-hour basis. On many of the railways a combination of both mileage and time basis is used. In this case a definite basis, either mileage or time, is established for the important parts of the equipment, and the other parts are lubricated on a basis which works in conveniently with this.

In recent years, several railways have been inspecting and oiling cars on a kilowatt-hour basis, but as it happens, none of the 57 roads covered in this survey had taken up this latest basis.

The basis for oiling armature and axle bearings is the same on nearly all railways, and where a mileage basis is used, the most common unit is every 1,000 miles. Table I, on page 764, shows the units used for inspection and oiling and the number of railways which reported using each plan. Of the 31 railways which reported using a mileage basis, sixteen inspect their equipment every 1,000 miles. The next highest number using a definite mileage was three companies which inspect every 1,200 miles.

Where the time basis is used, inspection periods of one week are the most common. Of the 24 companies reporting as using the time basis, seven companies inspect every seven days, four every 14 days, and three reported using periods of 10 and 30 days. The two companies which reported using a car-hour basis inspect every 110 car-hours and every 200 car-hours respectively.



Motor Housings Are Exposed to Wheel-Wash and with Covers Encased in Mud It Is Almost Impossible to Keep Grit Out of Oil Chambers

Aside from armature and axle bearings, the other parts which are lubricated have a much larger variation in the lubricating basis used. Thus, from the replies received it is evident that the truck journal bearings require less attention than the armature and axle bearings, and where a time basis is used, a number of railways give attention to such journal bearings only on every other inspection period. Thus, where a weekly inspection basis is used, the journal bearings are given attention only every two weeks, and where the two-week inspection period is used, only once a month.

An analysis of the period used for oiling other parts shows that after the shortest unit for the inspection period has been determined, the most common practice is to use some multiple of this for lubricating other parts. In checking over the information gathered, it appears that journal bearings, motorman's valves, controller fingers and trolley wheels are most frequently oiled on the same basis as armature and axle bearings. The parts which are most frequently lubricated at every other inspection period are gears, compressors and side bearings. At approximately every fifth inspection period attention is given to controller cylinders and door

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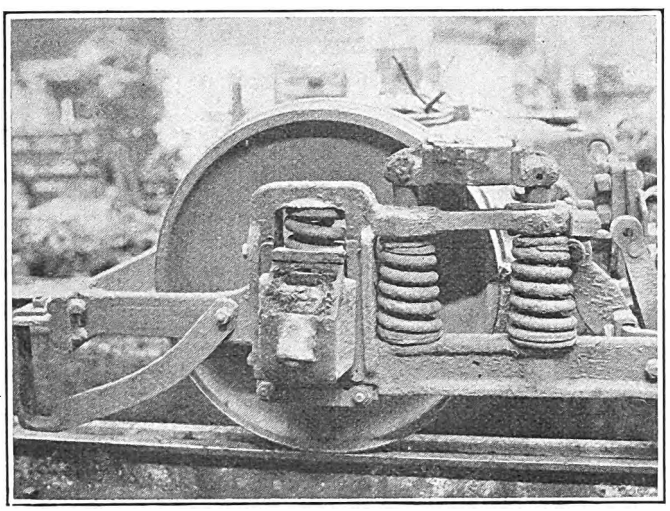
engines, while parts that require the least lubricating attention, such as center plates and brake cylinders of cars, are given attention every tenth inspection period.

Quantity of Oil Used

Of course, the amount of oil added to each individual bearing at each inspection depends on the length of time or mileage between the oiling periods and also upon service conditions, the size of equipment and number of motors, the location of bearings, such as at the pinion or commutator end of armature or axle. Many railways maintain a definite height limit of oil in the various housing chambers and sufficient oil is added to bring this height to its maximum level. Under these conditions the amount added at a time will vary. Where definite amounts are specified for armature bearings oiled on a 1,000-mile basis, from ½ gill to 1 gill is the normal requirement. These quantities also apply to armature bearings oiled on a time basis where the



Lost Covers for Journal Boxes Do Not Protect Packing and Journals from Dirt

interval is approximately one week, and on the two-week basis the quantities are doubled.

For axle bearings the quantities used are less than for armature bearings, but the average for the 1,000-mile basis is still between ½ and 1 gill, and on a weekly basis, ½ gill is found to be used most frequently.

Many railways have very complete lubricating schedules, in which the various types of equipment are divided into classes and the amount of lubricant, together with the inspection period, is given for each class. A few details taken from three answers show average practice and the variations that must necessarily result. These three railways were selected because they represent a small, an average and a large system, operating under different climatic conditions. Thus, one is in the extreme north, one in the central and the other in the southern section.

The Northern Ohio Traction & Light Company, Akron, Ohio, which operates approximately 402 passenger cars, nearly all of which have four motors each, stated that armature bearings for the Westinghouse 101-B2, 307 and 307-V and General Electric 204 motors are oiled every seven days. The armature bearings of Westinghouse 532-A are oiled every 15 days, using 8 gills of oil per car. The armature bearings of General Electric 240 and Westinghouse 333-V2 motors are oiled every 1,500 miles and 12 gills of oil are used per car.

TABLE I—INSPECTION AND OILING PERIODS FOR ARMATURE AND AXLE BEARINGS

Mileage Basis		Time Basis	
Miles	Number Railways	Period in Days	Number Railways
500	1	3	1
500 to 600	1	3 to 7	1
500 to 1,000	2	4 to 7	1
500 to 2,000	1	5	1
700 to 2,000	1	5 to 15	1
800	1	7	7
1,000	16	10	3
1,000 to 1,200	1	14	4
1,000 to 2,500	1	15	2
1,200	3	30	3
1,400 to 2,000	1	Total	24
3,000	2	Car-Hour Basis	
Total	31	110 car-hours	1
		200 car-hours	1
		Total	2

Axle bearings on old-type motors are oiled every seven days, while the later type motors are oiled every 15 days, using 4 gills of oil per car.

The journal bearings are oiled every 30 days and are entirely repacked once a year. Gears are lubricated every 30 days, when an average of 1 lb. of grease per gear is added. Compressors are given attention at every third inspection and the average quantity of compressor oil used per car per month is ½ gal. Side bearings, motorman's valves, controller fingers and controller cylinders are inspected and greased every three days. Brake cylinders are inspected every three days and are lubricated twice per year and door engines are inspected every three days and repacked once a year with hard grease. Center plates are lubricated once a month.

On the Montreal Tramways, which operates 1,246 passenger cars, armature and axle bearings are oiled weekly for regular cars and monthly for types of cars which perform less than 500 miles per month. Regular cars average ⅛ gal. per inspection and extras about $\frac{1}{15}$ gal. per inspection. The routine inspection of journal bearings is carried out each spring and fall. An average of 1.4 gal. of oil per car per year is used. This includes new oil used when wheels are changed. Gears are given attention weekly, but the lubrication requires but one egg-cupful every fourth inspection. Compressors are inspected weekly and an average of $\frac{1}{10}$ gal. per car is used. Motorman's valves are lubricated weekly with solidified oil. Controller fingers and cylinders and trolley wheels are inspected weekly, and controller fingers are again inspected the fourth night after.

Side bearings are inspected for clearance weekly, but they are lubricated only four times per year, using ¼ pint of oil per car. Old-style center plates are lubricated with heavy grease on each inspection. Brake cylinders are lubricated at the general overhaul periods, about once in 18 months.

The Memphis Street Railway Company, which operates about 275 passenger cars, lubricates armature and axle bearings of G. E. types 57 and 67 motors every 500 miles, using about ½ gill per bearing. G. E. 80 and 201 motors are lubricated on a 1,000-mile basis, using 1 gill per bearing. Truck journal bearings are repacked every 10,000 miles. Gears are given attention weekly, using about ¼ lb. of grease per gear, and compressors are given attention every 15 days, when an average of ½ pint of oil is added. Trolley wheels are given attention daily, a few drops of compressor oil being added for lubrication. Side bearings are oiled weekly with track oil. Brake cylinders are lubricated every 10,000

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miles with brake cylinder compound. Motorman's valves receive weekly inspection, about ⅛ gill of oil being used. Controller fingers are lubricated with vaseline, and the cylinders are oiled weekly with about ⅛ gill of compressor oil. Trolley wheels receive a few drops of compressor oil daily.

THREE PRINCIPAL CLASSES OF RAILWAY LUBRICANTS

The three principal types of lubricants used by electric railways are car oil, compressor oil and gear grease. Information in regard to the quantities of these three classes used by the 57 railways is shown in Table II. This table also shows the quantities used per car owned by the various railways and also contains information in regard to the number of pull-ins per month that occurred on these railways during the last six months of 1923 for hot bearings.

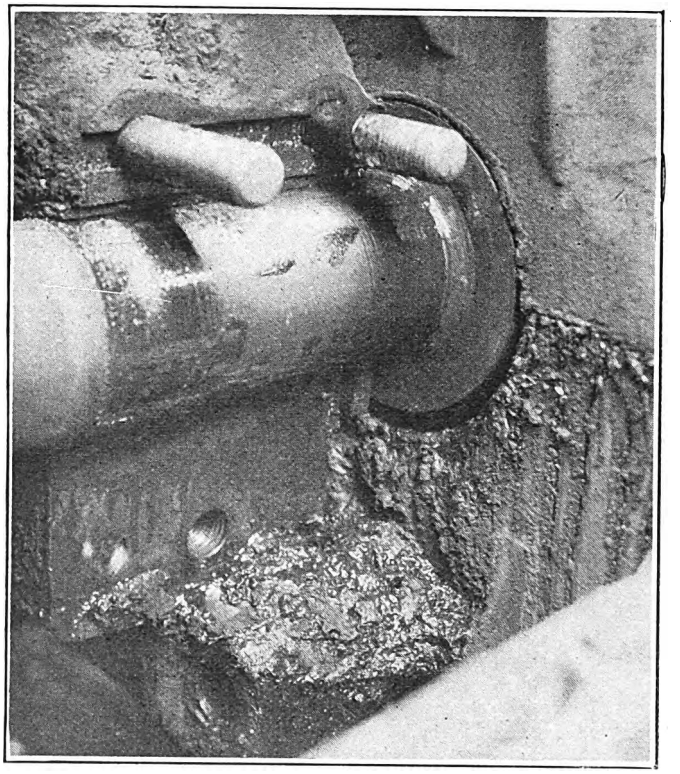
An analysis of this table shows a wide variation in the quantities of lubricants used, and in some cases it is evident that the figures do not indicate the exact condition. Where blank spaces occur in the table information was not available, so that definite conclusions could not be reached.

The number of gallons of car oil per car per year varies from a minimum of 3.4 gal. to a maximum of 62.3 gal. A total of 502,776 gal. of car oil was used for 29,674 cars. This is an average of 16.9 gal. of car oil per car per year. Even though the variation is very great, it appears that the average results should indicate very closely the quantities required under average conditions. Ordinarily it is not possible to compare the lubrication of two independent properties on a car basis, as the amount of lubricants used for bearings and gears is in reality a function of the number of motors used, the severity of service and type of oil used. Some roads use two-motor equipments entirely, while others may have a majority of four-motor equipments. Also the age of the equipment has much to do with the amount of lubricant needed. Some of the older type motors are still arranged for grease lubrication, and due to worn parts more lubricant is required than would be necessary for modern up-to-date motors. The mechanical condition of the equipment undoubtedly has a very important bearing on the amount of lubricant used, and certainly service conditions affect it. And a road with few cars operating a large mileage per day will certainly require more oil than one with a greater number of cars operating less miles per day.

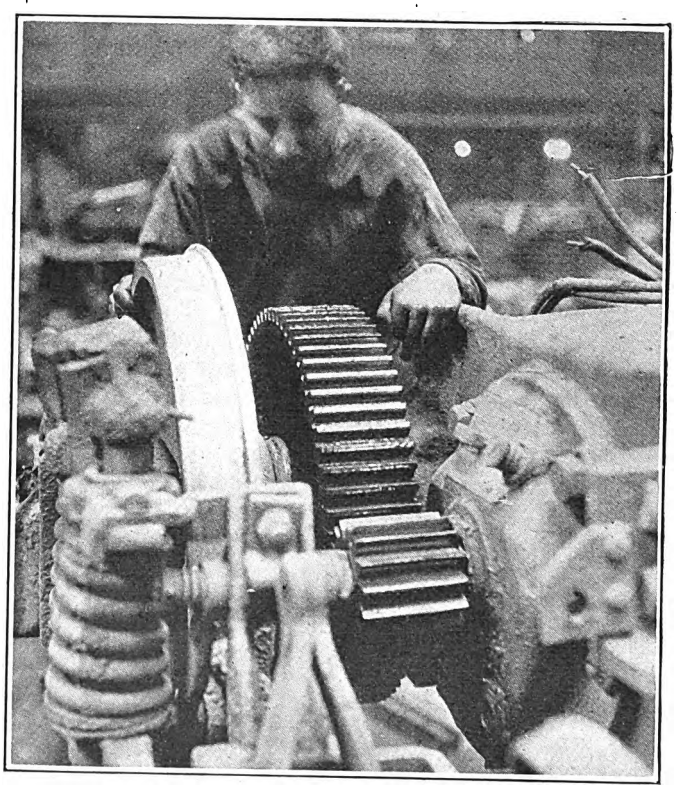
Considering the amount of compressor oil used the table shows a total of 72,357 gal. for 28,286 cars. This is an average of 2½ gal. of compressor oil per car per year. Here again the car basis of comparison is not strictly accurate, since the amount of compressor oil used will vary with the number of compressors in active service.

The amount of gear grease used also shows a wide variation and it is evident that many of the roads have given total amounts of gear grease purchased, including that used for other purposes than the lubrication of gears. The tabulation shows a total of 519,193 lb. as used for 28,685 cars. This is an average of 18.1 lb. of gear grease per car per year.

The average figures should give a very accurate idea of the total amount of these three classes of lubricants used by the electric railway industry. The statistics published in the Jan. 5, 1924, issue of ELECTRIC RAILWAY JOURNAL show a total of 105,000 cars used by electric railways in the United States. Taking the average amount of the three classes of lubricants as shown in Table II, there is indicated a total annual consumption of 1,774,500 gal. of car oil, 262,500 gal. of compressor oil and 1,900,500 lb. of gear grease by the electric railways for lubrication of rolling stock.



The Rapidly Rotating Gears Are Sure to Throw Grease to Any Crack or Opening in the Gear Case Where It Oozes Out and Falls to the Street



A Satisfactory Gear Lubricant Must Stick to the Teeth of the Gears and Pinions

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TABLE II—QUANTITIES OF CAR LUBRICANTS USED, AND PULL-IN RECORDS FOR HOT BEARINGS AS SHOWN BY DATA FROM 57 ELECTRIC RAILWAYS

Cars Owned by Company		Gal. Car Oil Used per Year		Gallons Compressor Oil Used per Year		Pounds Gear Grease Used per Year		Pull-In Record for Hot Bearings Last Six Months of 1923	
Total	Passenger	Total	Per Car	Total	Per Car	Total	Per Car	Average Cars Pulled in per Month	Per Cent of Passenger Cars Pulled in per Month
18	16	440	24.4	165	9.2	.....	....	0.0	0
29	24	275	9.2	.....	...	2,000	68.9	0.5	2.1
36	30	115	3.8	20	0.6	.....	....	0.1	0.3
36	24	.....	...	.....	...	.....	....	3.0	10.0
60	45	1,650	26.7	.....	...	.....	....	0.0	0
79	39	300	3.8	100	1.3	950	12.0	3.0	7.7
93	87	.....	....	.....	...	.....	....	0.0	0
103	85	1,200	11.6	360	3.5	1,900	18.4	0.3	0.4
118	60	1,100	9.3	275	2.3	1,600	13.6	.....	...
122	91	1,800	14.8	120	0.9	1,800	14.8	0.5	0.5
130	84	1,540	11.9	660	5.1	6,600	50.8	4.1	4.9
138	53	.....	....	.....	...	.....	....	0.2	0.4
151	126	4,350	28.7	1,100	7.3	5,000	33.1	2.7	2.1
166	114	2,385	14.3	495	3.0	6,342	38.2	0.7	0.6
172	152	4,200	24.4	.....	...	7,000	40.7	4.3	2.2
177	146	4,400	24.8	.....	...	7,200	40.7	3.0	2.0
180	144	2,566	14.2	450	2.5	.....	....	6.0	4.2
180	151	6,500	36.1	675	3.7	6,000	33.3	0.0	0
183	164	2,200	12.0	660	3.6	.....	....	2.0	1.2
205	191	7,088	34.5	1,568	7.6	5,788	28.2	0.0	0
209	149	4,675	31.4	660	3.1	.....	....	3.6	2.4
210	80	5,000	23.8	.....	...	.....	....	0.2	0.3
212	187	2,000	9.5	.....	...	2,500	11.8	3.6	1.9
214	209	4,180	19.5	.....	...	8,800	41.1	0.7	0.3
221	100	2,590	11.7	276	1.3	3,292	14.9	4.3	4.3
221	175	4,012	18.1	.....	...	7,880	35.2	1.4	0.8
223	200	2,700	12.2	1,100	5.0	7,300	32.8	2.0	1.0
234	220	800	3.4	113	0.5	1,500	6.4	0.0	0
253	175	4,510	17.8	369	1.5	1,917	7.6	7.0	4.0
254	242	2,200	8.7	770	3.0	10,700	42.1	10.5	4.4
266	249	4,959	18.7	2,969	11.1	2,528	9.5	1.0	0.4
288	230	3,946	13.7	311	1.1	7,133	24.8	8.0	3.4
326	231	.....	....	.....	...	.....	....	4.4	1.9
327	140	10,308	31.5	750	2.3	6,071	18.5	1.0	0.7
350	274	7,194	11.9	595	1.7	9,384	26.8	1.5	0.5
358	214	8,000	22.3	1,800	5.0	1,200	3.4	3.3	1.5
360	325	9,500	26.4	252	0.7	22,500	62.5	0.0	0
384	178	2,716	7.1	395	1.0	3,350	9.6	4.8	2.7
409	229	.....	....	.....	...	.....	....	1.0	0.4
436	223	10,772	48.3	1,659	3.8	9,192	21.1	8.1	3.6
464	407	8,500	18.3	1,400	3.0	18,959	40.8	8.6	2.1
510	400	7,994	15.7	3,540	6.9	16,847	33.0	7.0	1.7
547	414	12,340	22.5	1,460	2.7	660	15.8	7.0	1.6
847	785	7,486	8.8	515	0.6	12,480	14.7	12.0	1.5
879	755	18,000	20.5	3,500	4.0	20,000	22.7	5.8	0.8
930	738	15,000	16.1	2,280	2.4	5,900	6.3	9.0	1.4
960	664	.....	....	.....	...	.....	....	.....	...
1,077	872	27,000	25.0	3,800	3.5	4,800	4.5	38.0	4.4
1,145	837	16,680	14.6	1,680	1.4	56,700	49.5	10.0	1.2
1,150	415	71,700	62.3	575	0.5	5,130	4.5	10.5	2.6
1,469	1,246	11,000	7.5	1,100	0.7	26,000	17.7	14.0	1.1
1,789	763	64,465	36.0	4,690	2.6	73,437	41.0	12.3	1.6
1,825	1,435	25,000	13.7	9,000	4.9	28,000	15.3	14.7	1.0
1,843	1,466	21,227	11.5	4,178	2.2	26,803	14.6	5.0	0.3
1,850	1,709	8,400	4.6	2,573	1.4	16,190	8.7	2.0	0.1
2,535	1,918	40,000	15.8	9,000	3.5	25,600	10.1	6.7	0.4
3,592	3,106	18,813	5.2	5,399	1.5	16,261	4.5	17.5	0.5
31,543	23,786	502,776 gal. for 29,674 cars	16.9	72,357 gal. for 28,286 cars	2.5	519,193 lb. for 28,685 cars	18.1	277.2 pull-ins per month for 23,062 cars	1.2

An effort has also been made in this survey to obtain information as to the number of cars pulled in during a period of six months for hot bearings. This information is also shown in Table II. The number of passenger cars removed from service per month for hot bearings varied from zero to 10 per cent of the total. Eliminating two small roads, the percentage of passenger cars per month removed from service for hot bearings varies up to a maximum of 4.9 per cent. A total of 277.2 pull-ins, average per month, for hot bearings is shown for 23,062 cars, or 1.2 per cent of the total passenger cars operated.

This information has also been analyzed by comparing the number of hot bearings with the quantities of oil used. There were seven companies owning a total of 1,150 cars, of which 1,035 were passenger cars that reported no pull-ins during a period of six months for hot bearings. The amount of car oil used per year on these seven properties was 25,978 gal., or an average of 24.6 gal. per car. There were also six roads which gave the percentage of passenger cars per month removed from service for hot bearings as from 4.0 to 4.9 per cent. These six companies operated 2,115 passenger cars, and used a total of 40,406 gal. of car oil, or an average of 19.1 gal. per car per year. The railways with the best records show an average consumption of 5.5 gal. per year more than the six companies with high records of hot bearings. This would seem to indicate that the quantity of car oil used is at least one factor affecting the number of hot bearings.

Both Mileage and Gallonage Basis Used for Purchasing Lubricants

Car lubricants are purchased either on a mileage or a gallonage basis and the two methods are about equally followed. Of the 57 railways, 26 use the mileage basis and 31 the gallonage basis. By far the greatest number of railways purchase their lubricant on contract. Forty-seven companies purchase this way as against six which purchase in the open market, and four which purchase part of their lubricants on contract and part in the open market.

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Overcoming Current-Collection Troubles on Steel Wire

Investigations Made at Fort Worth, Where Much of the Overhead Construction Is of This Material, Demonstrated the Superiority of Trolley Shoes Under Those Conditions —Methods of Lubricating the Trolley Wire Are Described

By H. M. Robinson
Mechanical Engineer Northern Texas Traction Company, Fort Worth, Tex.

THE necessity of replacing trolley wheels after they had run only 500 or 1,000 miles caused the Northern Texas Traction Company, Fort Worth, to make a careful study some time ago to determine the cause of such excessive wear. At that time the trolley wheels were arcing badly because of the irregular shape which they acquired soon after being installed.

As the first step, special efforts were made to insure all trolley wheels being properly assembled, but this did not help matters. As the next step, the tension on the trolley bases was gradually increased until it became as high as 50 lb. on some cars. This also failed to check arcing to any considerable extent. As a result of the increased tension, however, trolley wire breaks increased until they reached an average of 45 per month.

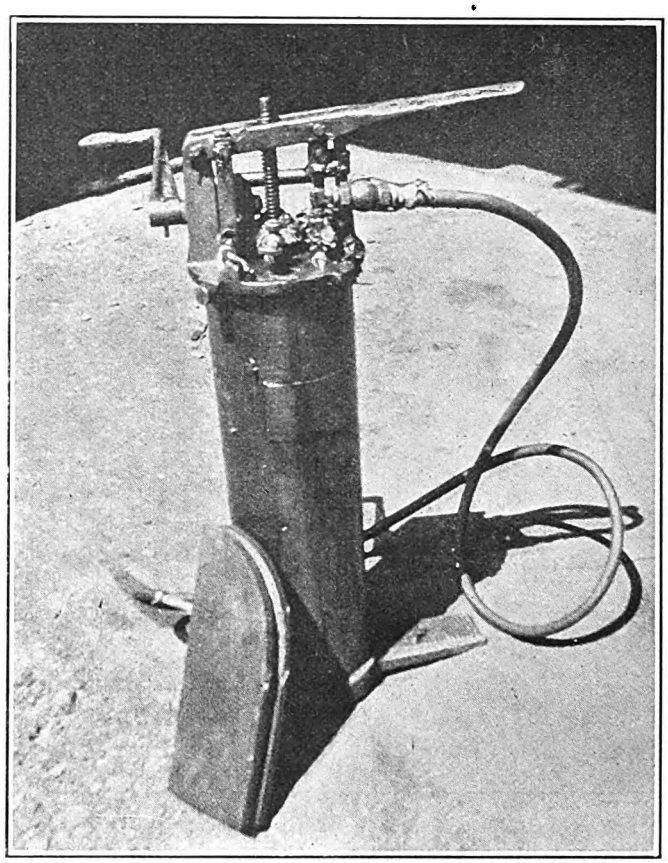
A careful examination of trolley wheels on all cars showed that about 75 per cent had high and low places, or flat spots over the entire surface of the wheel throat. It was assumed that the wheels were faulty in some respects, and in order to determine exactly the nature of the trouble 12 cars on various lines were equipped with new trolley wheels, and the condition of these wheels noted at frequent intervals. The first day or two that the new wheels were in service there was no trouble with any of them. After that, however, it was observed that the wheels were arcing on cars operated on two lines, and the longer the cars ran the worse the arcing. Upon examination the trolley wheels were found to have many flat spots.

SLIDE PERFORMANCE BY LINES

Line	Type Cars Operated	Number of Cars	Per Cent Kinds Trolley Wire: Copper Alloy	Per Cent Kinds Trolley Wire: Steel	Per Cent Kinds Trolley Wire: Copper	Number Slides	Average Mileage	Cost per 1,000 Car-Miles, Cents
St. Louis Ave.....	Birney	3	43	..	57	15	8,832	0.20
So. Main.....	Birney	8	31	..	69	41	7,694	0.23
University.....	Birney	4	58	..	42	20	10,679	0.166
Henderson.....	Birney	4	48	..	52	16	11,798	0.155
Hend. Uni. and Hemphill.....	Birney	7	43	..	57	36	8,523	0.207
Summit Ave.....	Birney	5	39	8	53	29	8,903	0.199
Forest Park.....	Birney	3	34	11	55	21	7,935	0.223
Arlington Hts....	Birney	4	19	44	37	88	3,529	0.537
Polytechnic.....	Birney	8	79	..	21	53	9,035	0.196
Third Ward.....	Birney	2	36	1	63	10	7,093	0.253
Samuels.....	Conv. Sfty.	4	51	9	40	10	9,959	0.178
First Street.....	Conv. Sfty.	1	..	..	100	2	6,688	0.265
Exchange Ave....	Conv. Sfty.	1	5	4	91	4	7,645	0.232
Central Ave.....	Conv. Sfty.	1	20	5	75	6	5,287	0.335
Fostepco Hts.....	Conv. Sfty.	1	..	..	100	4	5,958	0.297
Stock Yards and Lakeview.....	Dbl.-Trk.	10	66	2	32	61	7,935	0.223
Rosen Hts.....	.....	..	..	..	...	..	.....	.....
Evans Ave.....	Dbl.-Trk.	11	52	2	46	75	8,535	0.204
Extra.....	Birney	17	..	..	...	61	7,558	0.234
Extra.....	Conv. Sfty.	2	..	..	...	5	5,978	0.297
Extra.....	Dbl. Trk.	1	..	..	...	2	5,989	0.296

Total number of slides used during test..... 59
Average car-miles per slide..... 7,618
Average cost per 1,000 car-miles, cents..... 0.232

Note:—The heading above "No. Cars" indicates the largest number of cars equipped with slides operated regularly on that particular line.



Grease Gun and Spreader Used by the Northern Texas Traction Company for Lubricating Trolley Wire

On the other lines, however, the new wheels did not show the same tendency to become rough. With the assumption still in mind that trolley wheels were faulty, the railway purchased 50 more of another type and tested them in the same way as the first wheels had been tested. The results of the second test showed up exactly the same as the earlier one.

It was thought, however, that the fact that the overhead wire was of steel on the lines where the arcing was worst might be significant. During the war when copper was scarce the Northern Texas Traction Company installed on its city lines in Fort Worth about 1 mile each of steel and copper alloy trolley wire. New installations had been made from time to time until

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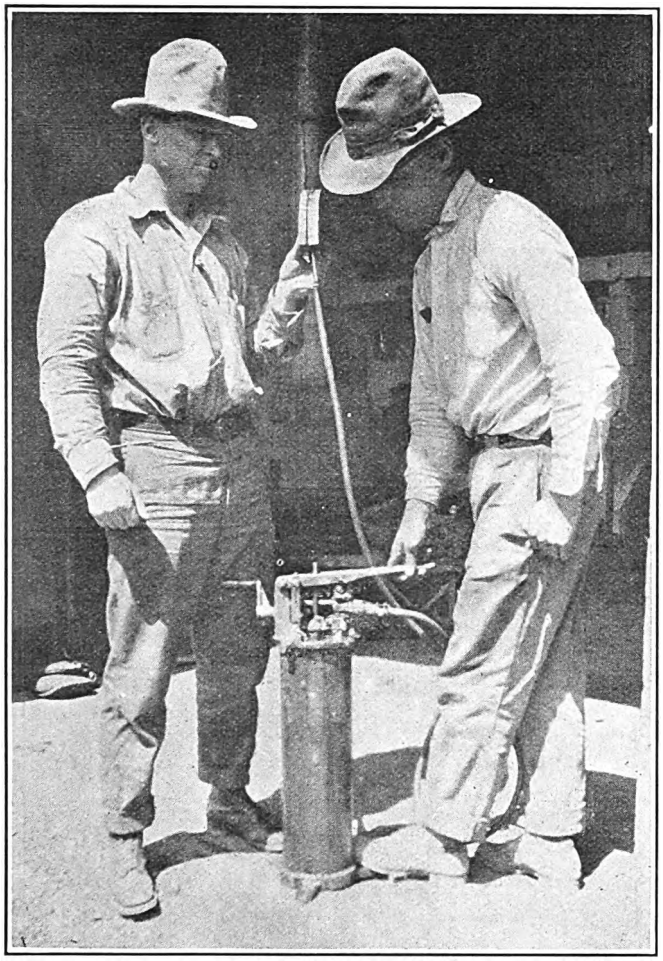
several miles of such wire was in service on different routes at the time these experiments were made.

A new theory of the trouble was then tried and it was assumed that the wheels were all right while the trolley wire was faulty. Several cars on each line were equipped with new trolley wheels and they were thereafter confined for the period of the test to the lines on which they were first placed. The trolley wheels on cars which ran on lines with hard-drawn copper trolley wire remained in almost perfect condition, did not arc and



Showing How the Spreader Is Held and the Method of Operating the Gun

covered on the average 8,000 miles before replacement was necessary.

In contrast to this, the wheels performed poorly on lines where the major portion of the wire was of steel or copper alloy. After the first day or two these wheels "showed high and low spots" around the surface of the wheel throat. The trolley wheels on cars running principally under the steel wire made mileages varying from only 480 to 950 before it was necessary to replace them because of excessive vibration and arcing.

In order to make absolutely certain that the wheels were not faulty, the company took four cars equipped with test wheels which had been running exclusively under hard-drawn copper wire and ran them on a line where the greater part of the trolley wire was steel. These trolley wheels were in good condition before the change and had made in excess of 7,000 miles under copper wire. But after running for about four hours under the steel and copper alloy overhead, the wheels on these cars became rough and arced. This convinced the railway that either the steel wire or the copper alloy wire, or both, caused the flat spots to develop on the wheels, and that the wheels themselves were not at fault.

Similar conditions were noted in tests conducted on other lines where the cars operated under a good deal of steel and copper alloy wire. The conclusion was reached that the steel and copper alloy trolley wire is slippery and hard, and that the street car in starting "gets out from under" the trolley wheel. In other words, the coefficient of friction between the trolley wheel and either the steel or the copper alloy wire is not sufficient to make the wheel roll rapidly enough to keep from sliding. The hard-drawn copper wire, being softer and having a rougher surface than the steel or the copper alloy wire, offers more friction between the wheel and the wire, thus causing the trolley wheel to rotate rather than slide.

Due to the fact that many of the lines in Fort Worth have both steel and copper alloy wire, as shown in the accompanying table, it was impossible to conduct any tests to find out which of these two was causing the more trouble.

As before mentioned, the trolley wire breaks had increased to an average of 45 per month, largely on account of the fact that the flat spots on the wheels were damaging the wire and causing it to crystallize just inside the ears. This was a serious state of affairs and it was felt that prompt remedial measures were necessary. As a possible solution, it was decided to substitute Miller trolley shoes on the city and interurban cars in place of the trolley wheels. After this change the company kept an accurate record of mileage and performance. It was found that the shoes gave excellent contact with few dewirements, although only 15 lb. tension was used in the trolley base instead of 25 to 35 lb. tension required when using trolley wheels.

It was observed that these shoes made the hard-drawn copper wire very rough and scaled it considerably.

COMPARISON OF REPLACEMENT COSTS FOR COLLECTION EQUIPMENT FOR THE YEARS 1920 AND 1922

Year 1920	Used	Cost
Trolley poles 10 ft. 8 in.	128	$363.52
Trolley poles 12 ft. 6 in.	95	351.50
Fixtures:		
Bearings	738	287.82
Renewable washers	1,561	93.66
Contact rings	1,476	291.88
Contact springs	1,669	216.97
Trolley harps, type "C"	200	480.00
Trolley rope	1,850	1,377.60
Trolley wheels	1,932	3,272.32
Total replacement costs for year 1920		$6,735.27
Year 1922		
Trolley poles 10 ft. 6 in.	44	$161.04
Trolley poles 12 ft. 6 in.	63	285.39
Fixtures:		
Bearings	60	23.40
Renewable washers	128	3.34
Contact rings	96	13.24
Contact springs	110	14.30
Trolley harps type "C"	0	
Trolley rope	1,399	798.16
Trolley wheels, 6 in.	621	838.35
Miller trolley shoes	159	802.95
Miller contacts	1,343	2,377.11
Miller shunts	86	57.68
Miller lockwashers	6	.29
Miller bolts and nuts	469	15.01
Miller center pins	32	18.24
Total replacement costs for year 1922		$5,408.50
Difference in total costs for the two years in favor of the year 1922		$1,326.77
Cost per M.C.M. for collection equipment, 1920, cent		0.751
Cost per M.C.M. for collection equipment, 1922, cent		0.642

Note:—All cars were equipped with 6-in. trolley wheels during 1920, while during 1922 a large per cent of the cars were equipped with Miller trolley shoes.

Note:—In the above comparative costs the cost of trolley bases and repairs are not considered.

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After careful study of this situation it was decided to grease the trolley wire. As a result of experiments the use of a mixture of No. 2 cup grease and graphite was selected as the trolley wire lubricant. By the use of apparatus, mounted on the line car on the interurban, and the line truck in the city, the company now greases the entire overhead about once every three months. An "Alemite" H-15 compressor gun is used. This has a capacity of 15 lb. of grease, or enough to lubricate 12 miles of trolley wire. The grease is forced up through a tube from the gun to the spreader, which is a wooden block 9 in. x 5 in. grooved to fit the wire. A hole through the block connects the tube and the groove. Three men compose the greasing gang, one to operate the vehicle, one to work the grease gun and one to hold the spreader on the wire.

Greasing Trolley Wire from the Tower of the Line Truck at Fort Worth

Greasing the trolley wire, amounting to about 77 miles of city track and 100 miles of interurban track, puts an additional cost of about $100 every three months on the line department. The trolley wire greasing is not very popular with the linemen for the reason that it is a rather dirty job. However, no serious trouble with the linemen has been experienced on this account. The increased cost to the line department on account of the use of Miller shoes has been more than offset by the saving to the mechanical department.

The greasing of the trolley wire has caused it to wear very smoothly and take a high polish. Since the railway commenced this practice the wear on the wire has been measured by a micrometer and it has been found to be much less than when the trolley wheels were used. Due to the fact that the Miller trolley shoe does not cause any vibration of the trolley wire, the breaks have decreased to an average of two per month. From present appearances the number of breaks will decrease even more than that in the future. The Miller trolley shoes in city service average more than 7,500 miles per shoe, and in interurban service they average better than 3,000 miles per shoe.

Although the difficulty of backing up with the Miller trolley shoe without tearing down the overhead is a disadvantage, the advantages in favor of it are sufficient to cause the railway to adopt it for its entire system, in both the city and interurban service. The advantages may be summarized as follows: A smooth running contact which causes hardly any noise in the car as compared to a trolley wheel contact; a great deal more contacting surface with the trolley wire than that offered by a wheel; lower trolley tension; very few dewirements as compared to a wheel contact; a decrease in the number of trolley breaks; a small saving to the company over the use of trolley wheels and a large gain to the company in public good will because of fewer trolley breaks, less noise within the car and no trolley arcing.

Traveling Workshop for Welding Crew Saves Time

Special Car for Use with Thermit Process Facilitates Transporting Materials and Equipment to the Job—Time Is Saved in Making Molds and Work Is Possible Regardless of Weather

WHEN doing welding with the thermit process it is necessary to transport a considerable amount of material as well as tools and special equipment. The employees of the welding department of the Milwaukee Electric Railway & Light Company have equipped a double-truck car for the purpose of carrying this to the job and providing a workshop that has facilitated the work and made it possible to operate under conditions which would otherwise have prevented work.

The former practice of the thermit welding crew was to sack the sand and fire clay and transport it by truck to the job along with the preheaters, thermit portions, mold boxes, crucibles and all other necessary equipment. There it was unloaded alongside the curb. A box was used for a molding bench and the molds were rammed by hand.

If the job was of more than one day's duration, the material and equipment were stacked together, covered with a canvas and left at the close of a day's work. If the work was of a nature requiring several days' welding a small tool house on wheels was made use of, but most of the time the canvas cover was the only protection from the elements.

It was always difficult to arrange for trucks at the right time to move the crews and supplies. Much time had to be spent by the men in loading, unloading and transporting their equipment. There was no shelter on most of the jobs where they could even find a place to eat their lunch in cold and rainy weather.

Delays always were considerable while waiting for the trucks and for material. Delays also were caused by weather conditions or by loss or wrecking of equipment by persons outside of the organization. The wind would blow away some of the fire clay, and when placed on rough and dirty streets some of it was lost because it could not be used to the bottom of the pile. Rain would make the sand too wet, and in cold weather the molds were frozen and had to be thawed out before they could be used.

Welders' Car Has Complete Equipment

In order to increase the efficiency of the work, a car was turned over to the welders and equipped under the direction of their foreman, Hilbert Stieglitz, as a combined storage and workroom.

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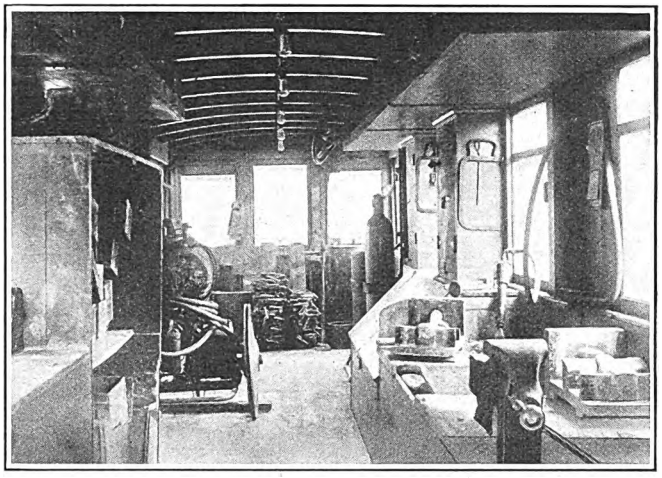
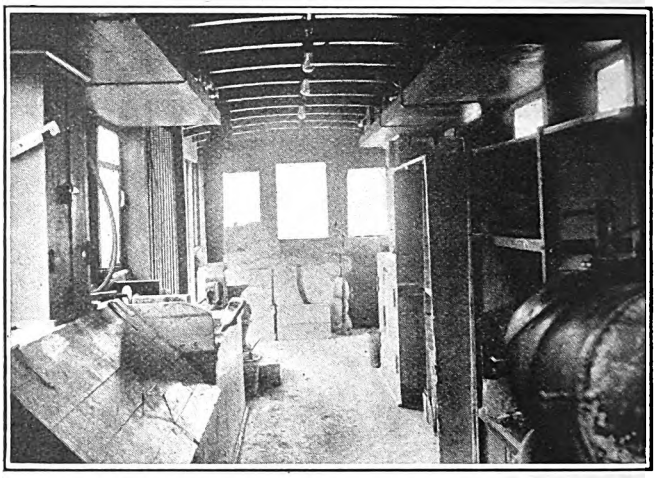
On one side of the car is a work bench, equipped with a vise. This was installed in such a manner that it could be removed and a stove erected in its place to keep the car warm for winter work. Alongside it is a molding bench with an opening in the center to store the mixture of sand and fire clay. The car is equipped with air, and a pneumatic sand rammer is used for making molds. Any excess material falls back into the bin, so that there is practically no loss. Next to the molding bench is a large tool box for sledges, lining bars, shovels, etc., with two cupboards above for the small tools. The balance of the car is left for the storage of preheaters.

On the other side are lockers for the men, a cupboard for oil cans beneath a desk for the foreman, a frame for mold boxes and an asbestos lined rack providing space for eight crucibles, which suffices for a day and a night crew, leaving a space for preheaters between this rack and the door.





The Interior Views of the Milwaukee Welders' Car Show the Arrangement of the Benches and Storage Compartments

In the front at one end are a rack with compartments for inserts and two vertical square posts to carry the mold clamps. At the other end of the car the space is utilized for the storage of boxes of welding portions and bags of fire clay and sand. In addition there is space for fifteen bags beneath the molding bench.

Under the roof on either side are suspended shelves for about twelve sets of patterns. Equipment such as mold boxes, clamps, patterns, inserts and tools are all placed in racks or in cupboards so that they are not subjected to the misuse to which they were put by former methods.

Besides one two-burner and two single-burner preheaters, a small truck with acetylene and oxygen tanks, together with the necessary gages, regulator and cutting torch, constitutes a part of the regular equipment.

The car is more satisfactory to the men, for they have a locker for their clothes, they have a place to get dry in rainy weather and warm in cold weather. Previously it was almost impossible for the night crew to find a place in which to eat their lunch.

In the wintertime, when the car is equipped with a stove, the molding sand is kept dry and warm. Molds can be made in the car and taken directly to the rail joint to be welded, thus making it possible to weld the year around, except in extremely cold weather. Formerly these molds were made in the material yard, and an endeavor was made to get them by truck to the welding job before they were frozen, but invariably they had to be thawed out before using, which made the thermit welding rather risky.

Real Savings Made with the Car

Numerous savings are made by the use of this car. Less molding sand and fire clay are used, and there is no loss of molds in freezing and rainy weather. The time in loading and transporting material is less, and no time is wasted in piling material up on the street, where some of it was bound to be lost or stolen. There is a saving of coke burned in salamanders, used for thawing out molding materials. More joints can be made by the same number of men, because the materials for day and night shift are loaded into the car by the night crew between 9 o'clock, when they report for duty, and midnight, when the track is turned over to them for welding.

The wear and tear on the preheaters in loading them on trucks and unloading them was one thing which gave much concern. All three of the preheaters are carried in the car and unloaded from the car on plank runways designed for that purpose.

Members of the welding crew are broken in as motormen so that there is no additional expense for the operation of the car.

This car permitted an increase in the number of joints made with the regular crews to such an extent that it is stated there is no other street railway in the United States obtaining equal output. Much of the success obtained is due to the welding car.

From a safety standpoint, this car has been valuable, as tools and equipment are in better condition, hot crucibles are placed in a fireproof rack and there is no danger of burning up canvas covers or costly materials. Both materials and equipment are kept dry, which eliminates the great hazard of running the hot molten metal against damp molds or crucibles.

Keep Brush Pressure Uniform

CARBON brushes in the same brush holder should have equal pressure, otherwise the one with greater pressure will take more than its share of current and will heat to a point that may cause damage to the brush, the brush holder or commutator. Excessive pressure will also shorten the life of both brush and commutator.

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Changing Gage on Railroad Grade Crossings

Work of Cutting Down Standard Gage Manganese Steel Intersections to Narrow Gage was Done in the Field with Oxygen-Hydrogen Torch, Interrupting Traffic Only Briefly

By W. L. Whitlock
The Denver Tramway Company

IN THE summer of 1922 it became necessary to change a double-track line from standard gage to a gage of 3 ft. 6 in. to conform to the track gage as the rest of our system. This line was approximately 3 miles in length, double-tracked, and this brought up numerous problems, including car service during the period and other details incident to the field work, but the biggest nut to crack was the matter of eight railroad crossings, four of solid cast manganese construction and four of bolted construction, all conforming to the standard 100-lb. A.S.C.E. rail section.

These crossings were all in excellent condition, having been in service since January, 1914. All were in paved streets. The way department was convinced that these could be changed in the field and the expense of new railroad crossings saved, but the engineers of the railroads had many doubts, as to do the job by means of the cutting torch and air drills was a radical departure from their standard practices. The work on the manganese crossings looked unusually difficult in view of the known peculiarities of manganese steel. However, a number of experiments were carried on in the material yard and at the factory of the Colorado Compressed Gas Company, through the courtesy of P. D. Gleason, the manager, using scrap manganese special trackwork, and these experiments convinced us that it could be done.

The Oxy-Hydrogen Process Was Adopted for Cutting Rails

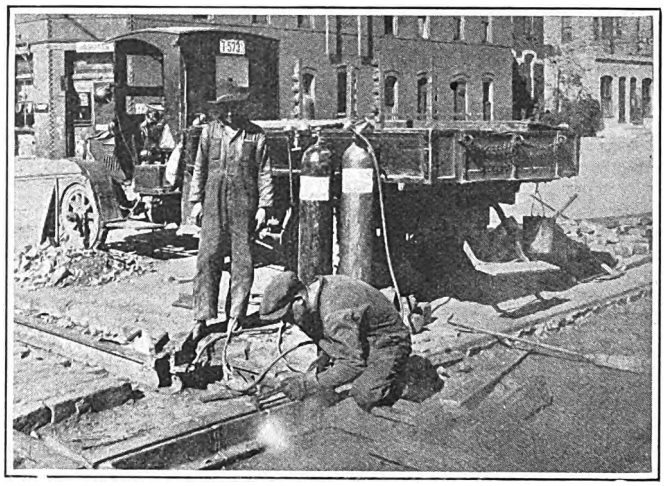
Both oxygen-acetylene and oxygen-hydrogen cutting torches and equipment were used in the experiments and the oxygen-hydrogen process was adopted, as the experiments showed less carbonization of the metal and a quicker and longer cutting flame with this equipment. Also, it has a lower flame temperature.

The first manganese crossing to be worked over was a 90-deg. square railroad crossing of standard gage track over standard gage track, constructed by the Ajax Forge Company, and was of the "U" section conforming to 100-lb. A.S.C.E. rail section at the ends. The narrow gaging of the street car portion of the crossing necessitated the removal of 14½ in. of each rail of the railroad track portion, pulling the crossing to the new gage and making a new joint. This was accomplished in the following manner:

The street paving of stone blocks was removed entirely from the crossing. All spikes were pulled and the connecting joints at all ends were removed. This crossing was cast in two sections on being manufactured. Measurements were made from gage lines and the rails lightly marked with a chisel for cutting points. As the street car traffic had been rerouted and was on the opposite track and the railroad traffic stopped for four hours, the crossing was cut loose and raised slightly by means of steel wedges in order to permit the flow of molten metal on the underside of the base of the crossing during the cutting period.

The cuts were made successfully in a very few minutes and the new bolt holes were also made with the cutting torch. A piece of ¾-in. x 4½-in. x 22-in. guard rail steel was used for a splice on the inside of the crossing and a standard 100-lb. angle bar used on the outside of the crossing. These were held in place by 1-in. machine bolts. Due to the width of the "U" section, it was necessary to use machine bolts. The steel wedges were withdrawn and the crossing let down on the ties and respiked and paved in and new pieces of rail cut in between the two street railway tracks and on the adjoining railroad track to make up for the difference between the old standard gage crossing and the new narrow gage crossing.

After eighteen months of service these crossings are



Cutting Manganese Steel Intersection in the Field to Change Track Gage

apparently in as good condition as before. There are no indications of any kind that show that this cutting has in any manner affected the manganese material in these crossings.

The accompanying picture shows the field operation with the first piece of removed crossing at the right foot of the man standing. In the foreground is shown the first half of the crossing in place to the new gage. The two cuts, one being made at the time the picture was taken, show the amount of rail removed, while the piece already removed shows a good cross section of the manganese crossing construction. The tangent rail at the left of the picture has already been pulled over to the 3-ft. 6-in. track gage. The Packard truck is one of the way department trucks used on minor track maintenance work and emergency trackwork.

How Gage Was Changed on Ordinary Trackwork

The plain bolted 100-lb. O.H. railroad crossings were handled in a different manner from the manganese crossings. These were planked with oak instead of being paved with stone blocks. The oak planking was removed and the crossing spikes pulled and joints unbolted. These crossings were handled one at a time and the crossing being worked over was raised on steel wedges in a similar manner to the manganese crossings. The crossing was then unbolted and all knee irons, helper rails and guard rails between the rails of the street railway portion were removed. It so hap-

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pened that the through rails of these crossings were on the street railway portion and not the railroad, and this fact was a large factor in our favor. The two short pieces of rail were removed and one end only of each portion was cut off the required amount and the ends shaped in the field by cutting torch to provide the new flangeway and the end connections to fit up against the through rail. Due to the fact that the filler block between the running rail and guard rail was of cast steel, this could not be cut in place successfully with the torch for the bolt holes, so an Ingersoll-Rand electric-driven tie tamper, air compressor and a standard air drill were used to drill the new holes for the angle and knee irons. The crossing was then rebolted and respiked in place and the adjoining rails between the double track and also on the railroad track were changed out to fit the new crossing.

Cleveland Builds Three-Door Trail Car

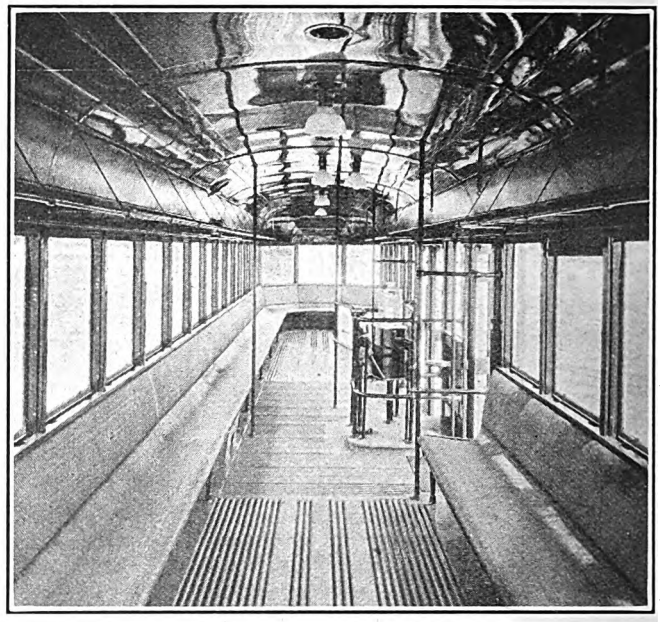
It Is Purely for Trial—The Center Door Will Be Used for Exit or Entrance, Depending on the Direction of Travel

FOR experimental purposes only, the Cleveland Railway will shortly put in service a three-door trailer, which has just been rebuilt from a two-door trailer at the railway company's Harvard shops.

The Cleveland Railway has long been an extensive user of trail cars. Its standard trailer has two center doors, with the conductor stationed between them, on the pay-pass principle. The standard motor car with which this trailer is used is a Peter Witt design. In the trail car all seats are longitudinal, while in the motor car the front of the car has longitudinal seats and the rear has cross seats.

The principal structural change required when the car was rebuilt for three doors was that the side sill girder on the right hand side of the car had to be bent down for a longer distance, to accommodate three doors instead of two. Actually the side sill was cut and spliced to gain this distance. No change was required in the left-hand side sill, because the car is single-ended.

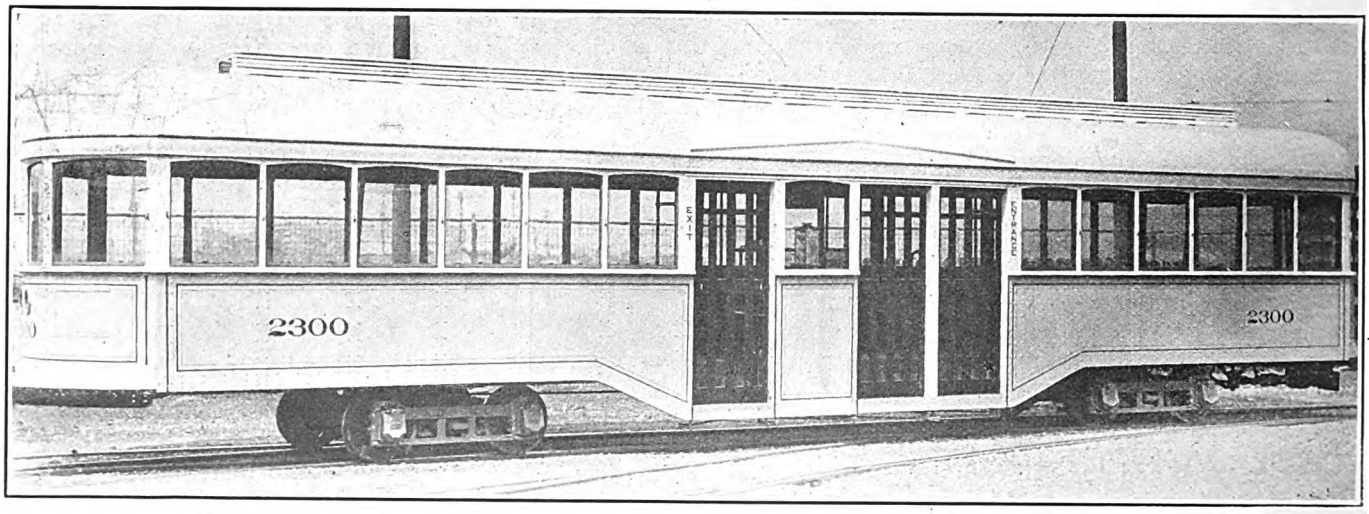
Each of the three doors is double, each half being



A Reversible Partition Is Adjusted to Guide Passengers Entering or Leaving Through Middle Door

in two parts and arranged to fold outward when the door is opened. The opening between door posts is 30 in., but as the doors are 1 in. thick and double back on each side, the opening in the clear for each door is 26 in. The length of the car over all is 49 ft., and the width over all is 8 ft. 4 in.

The three doors will be used like the three doors of the Toronto three-door trailer, described in the ELECTRIC RAILWAY JOURNAL for June 23, 1923, page 1033. The door nearest the front will always be used for entrance, that nearest the rear for exit and the middle door for exit inbound and entrance outbound. To aid the passenger in understanding this varied use of the center door there is a swinging barrier within the car, as in Toronto, which indicates whether the center door shall be used as an entrance or an exit. This barrier is operated mechanically in the Cleveland car, the conductor changing it from one position to the other through a pedal, mounted in the pedestal of his fare box, whereas in Toronto a hand lever is used. The three doors are also opened and closed mechanically in Cleveland instead of by air as in Toronto, the doors in Cleveland being operated by crank levers.



The New Cleveland Trailer Has Three Doors, the Middle One Being Used for Entrance or Exit

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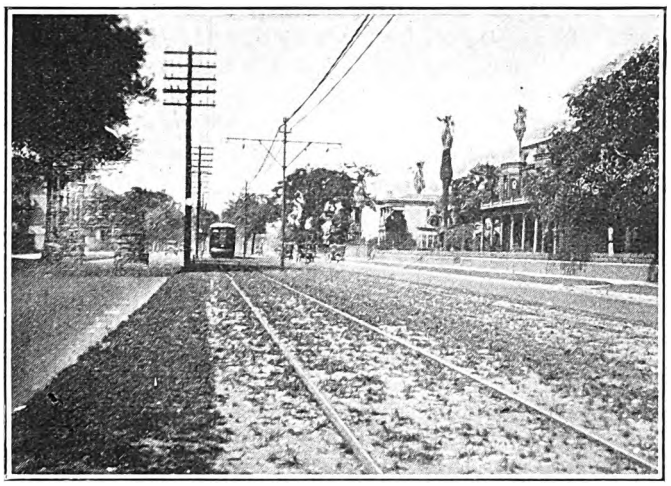
How New Orleans Is Rebuilding Track

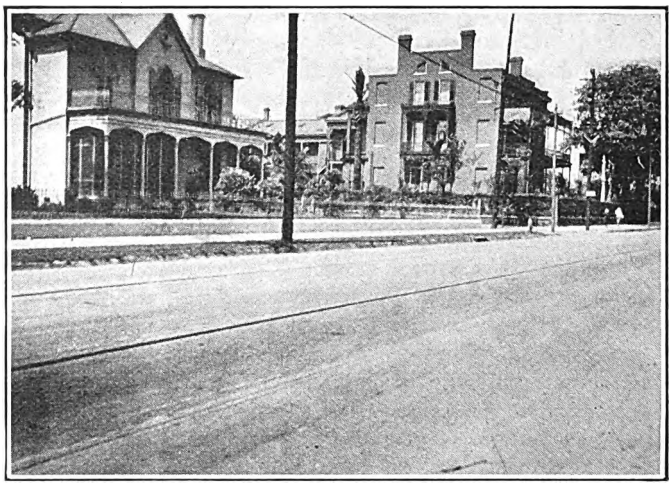
The Aim Has Been a Substantial Structure that Will Last Well in Spite of Poor Drainage and Unfavorable Climatic Conditions—Special Effort Has Been Made to Give Mobility to the Track Machinery

TWO factors make the track reconstruction practices of the New Orleans Public Service, Inc., of unusual interest to electric railway men. In the first place, drainage and climatic conditions in New Orleans are such that the design of a lasting track structure is a difficult problem. In the second place, an extensive reconstruction program is under way and much thought has been devoted to the selection of methods and equipment to perform this work in the most efficient manner.

The equivalent of approximately 9 miles of single track is at present under construction in New Orleans. Seven miles of this is reconstruction of existing trackage and 2 miles extensions. More men are now employed in the track department of the company than ever before. Much modern equipment and labor-saving machinery are in use on the various jobs.



Much of the Track in New Orleans Is Laid in "Neutral Ground," Where T-Rail and Open Construction Are Used



Prytania Street, Where Heavy Vehicular Traffic Necessitates the Use of a Substantial Track Structure

The natural ground surface of the entire city lies considerably below the level of the Mississippi River and Lake Pontchartrain. This seriously complicates the drainage problem and necessitates the continuous operation of pumping stations to lift the run-off water up to the lake level for disposal. Some of the streets have underground drainage systems, but many of the older streets rely entirely on surface drainage. The run-off water eventually reaches one of the various canals, of which the city has a considerable number, and follows that route to a pumping station. As might be expected under these circumstances, the subsoil is damp and somewhat unstable, although the continuous drainage has improved conditions materially in the last few years. The greatest care must be exercised in the design of a track structure if it is to withstand heavy traffic.

Three general types of construction are used in New Orleans. The most substantial of these is a standard concrete construction used in paved streets where the track can be taken out of service during the progress of the work. Where the track must remain continuously in service, a combination concrete and slag ballast track construction is used. In the so-called "neutral ground" or reservation in the center of many of the streets an entirely different type of structure is used, employing only slag ballast and using T-rail.

Ties Spaced to Give Extra Joint Support

Where the work can be done without interruption by traffic, the design calls for 7-in., 122-lb. grooved girder rail, 66 ft. long, creosoted wood ties and a monolithic concrete base. Joints are staggered 33 ft. apart. An interesting spacing of ties is used with this type of construction. On each side of the joint a tie is placed 9 in. from the end of the rail, making an 18-in. spacing. The next tie is 26 in. away, the third 32 in., the fourth 36 in. and the remaining five ties are spaced on 38-in. centers, when the spaces are reduced in reverse order approaching the next joint. Flat tie plates are used immediately under the joint, but the second tie on each side has a combination plate. On the four ties immediately opposite the joint, combination tie and brace plates ½ in. x 7 in. x 11 in. are used. Elsewhere along the length of the rail flat plates and combination tie and brace plates are alternated.

After the excavation has been made the finished sub-grade is thoroughly rolled with a 5-ton roller. In case any low or soft spots are revealed they are filled with earth and rolled again until thoroughly compacted. The trench is made 6 in. deeper under the ties than elsewhere, a diagonal cut being made from the general level of the bottom of the trench to the bottom of this deeper excavation, as shown in an accompanying drawing. There is, therefore, a minimum of 6 in. of concrete everywhere underneath the tie.

Creosoted wood ties, 6 in. x 8 in. x 8 ft., are used. The rails are fastened to the ties through each tie plate, whether flat or combination, by two spikes, stag-

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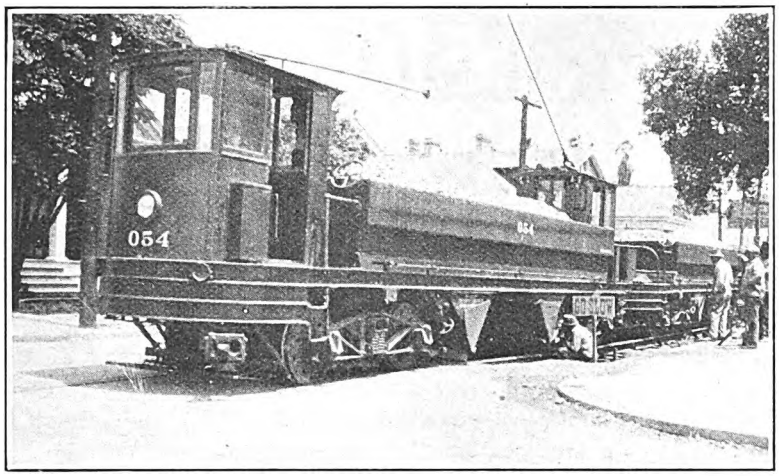
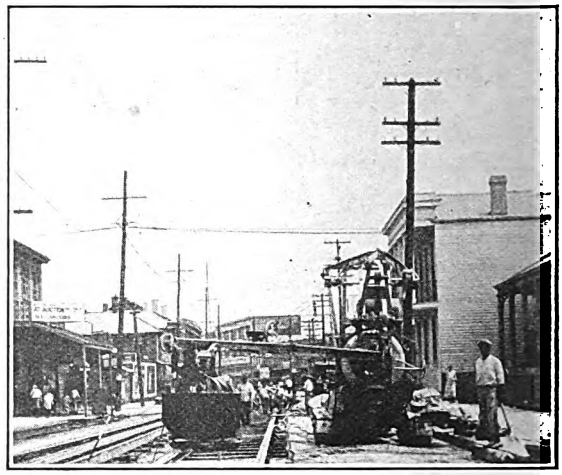


Slag Ballast Being Unloaded Into the Trench from a Differential Dump Train



A Concrete Mixer on a Tractor Mounting Moves Alongside Track as Work Progresses

gered. Spikes are driven vertically, rather than in a slanting direction, the last blow forcing the head toward the rail base. Foremen are especially cautioned to see that spikes are driven thoroughly home.

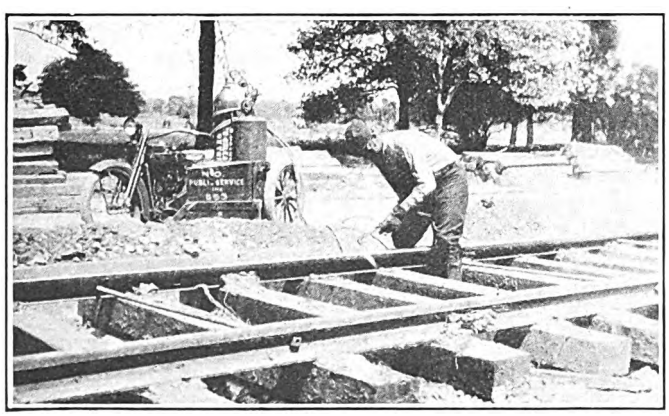
All joints are full bolted, using special 26-in. machine-cut joint plates 1¼ in. thick, made by the Bethlehem Steel Company. Six bolts are used, spaced 2½ in., 4 in., 4 in. An unusual feature of the company's joint practice is that with grooved girder rail the heads of the bolts are on the outside and nuts are on the inside of the rail. The advantage of having the nut on the inside is that there is more room under the lip of the rail than under the head and the nut does not interfere with the granite paving blocks. A lock washer is used under each nut. This arrangement of bolts and nuts is shown in an accompanying illustration.

After the joints have been bolted and tightened up they are seam-welded. For this work the company has a number of Rail Welding & Bonding machines. These are mounted on Dodge trucks, the bodies having been built by the railway and equipped with convenient tool chests and lockers for the men. Compromise joints are bonded with steel terminal bonds electrically welded. All track is cross-bonded at 300-ft. intervals with 300,000 circ.mil cable and at each end of the job with 600,000 circ.mil cable. Welding and bonding are done just in advance of the concrete mixers. The top seam weld is then ground down.

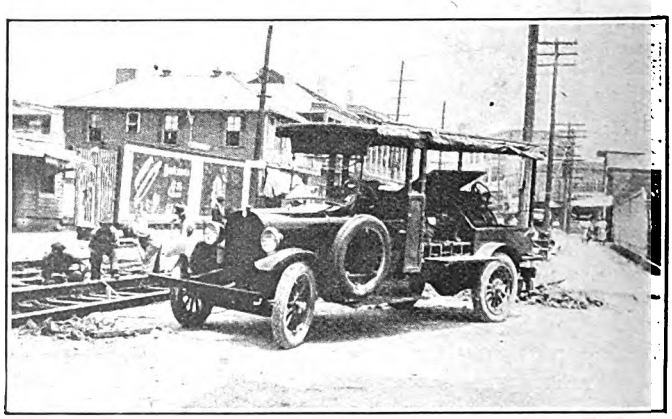
Before pouring the concrete the track is carefully lined up and set to grade. Concrete is mixed in the proportions of 1-2-4. In practice the method is to use one sack of cement, one wheelbarrow of sand and two wheelbarrows of gravel. Foremen see that these proportions are strictly adhered to. The material is thoroughly mixed in a Koehring mixer for a period of not less than one minute, after which it is immediately emptied from the mixer and placed in the trench. Concrete is poured in a monolithic mass and carried to a level 5 in. below the lip of the rail. Just sufficient water to form a stiff paste is employed in the mixture. For this work a portable concrete mixer is used and is moved along the track as the work progresses. After the concrete has set it is kept wet for a period of at least ten days.

The paving on heavy traffic streets consists of granite blocks, laid on a cushion of 1 to 3 cement and sand mixed dry. The blocks are laid on this cushion with a hammer, thoroughly tamped and wet down in order to set the cement in the paving cushion. After the water has evaporated, a coat of 1½:2½ asphalt and sand is applied. Asphalt (40-45) heated to 365 deg. F. is mixed with sand heated to 400 deg. F. and squeegeed thoroughly into all the seams. The granite blocks are then tamped lightly and the surface is sprinkled with a coat of hot sand.

This method produces the so-called mastic pavement, described in detail in ELECTRIC RAILWAY JOURNAL, March 17, 1923, page 481. Results with this type of pavement in New Orleans have been very satisfactory. Under traffic the mastic seems to harden and gives a smooth, quiet and durable surface. An example of mastic pavement that has been in use about two years



Acetylene Welding Outfits Have Been Mounted on Motorcycle Side Cars to Facilitate Movement from Place to Place



Welding Joints with a Rail Welding & Bonding Machine Carried on a Dodge Truck

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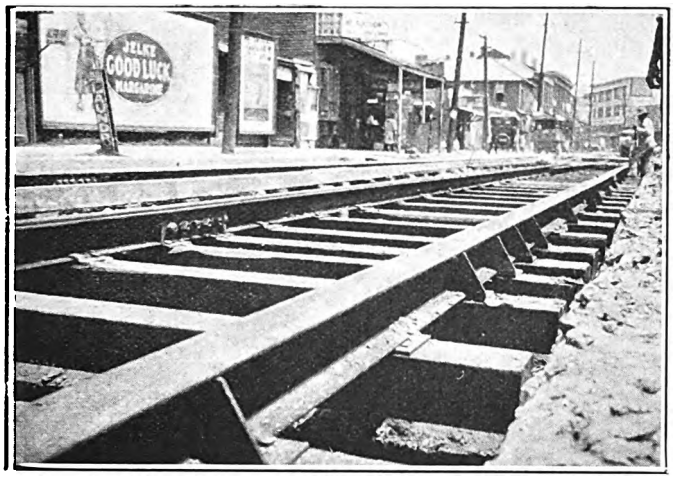
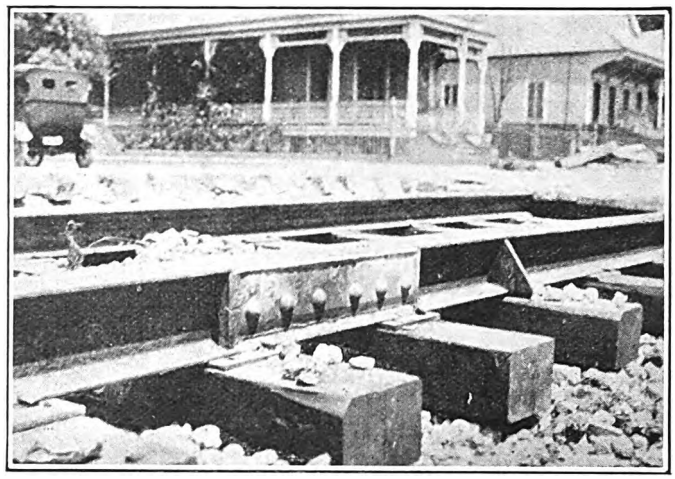


The Rail Opposite the Joint Is Held in Position by Four Brace Plates



Bolt Heads Are Placed on the Outside and Nuts on the Inside Where Grooved Girder Rail Is Used

on Prytania Street is shown in an accompanying picture. This street parallels the famous St. Charles Avenue, one block away, and since the exclusion of heavy trucking from that thoroughfare, it has been subjected to severe traffic. The mastic pavement, however, remains in excellent condition.

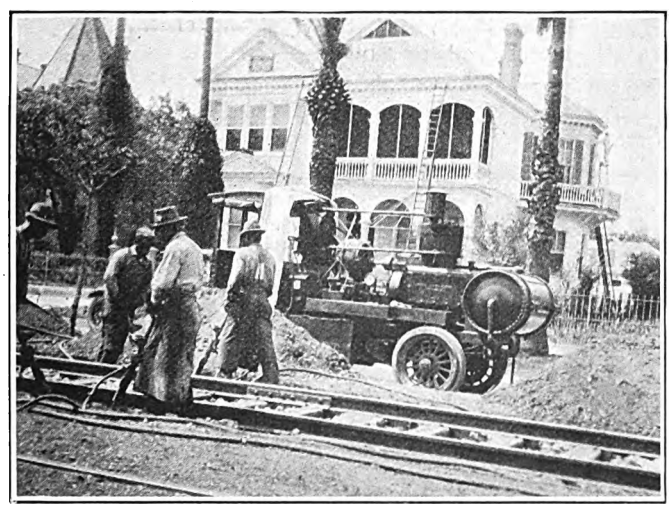
Granite blocks used by the railway in paving work are recut, at a cost of 4 cents apiece, in the company's stone yard. Much granite in large sizes is available from old pavements that have been taken up. These are the original blocks that were brought over from France in the early days of the city. This is taken to the railway yard, where two stonecutters recut it to standard size. In an eight-hour day a man can cut 180 blocks. Wages are 90 cents per hour.

Construction Under Traffic

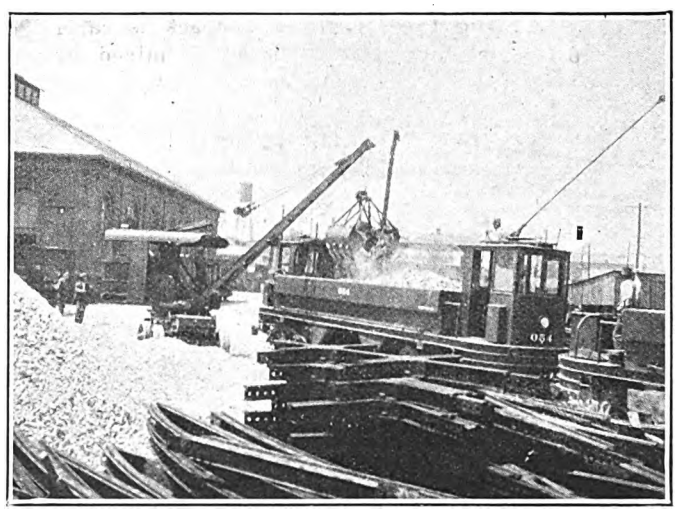
Where it is necessary to construct track without interruption to traffic a somewhat different method is followed. Instead of using monolithic concrete structure, slag ballast is employed on a concrete foundation. Underneath the ballast is an 8-in. concrete slab. This is mixed and poured in the way already described for construction not under traffic. To keep the track in running order, the rails are spiked to the ties and then the track is lifted and supported from the adjacent structure by old rails laid crosswise. Then the concrete is poured and allowed to set for a period of 10 days.

The slag is obtained cheaply from the steel mills at Birmingham, Ala., and its handling is an interesting phase of the work of the track department at New Orleans. It is loaded from the pile in the storage yard into work trains for transportation to the job. The loading is done by means of a Universal crane mounted on a four-wheel drive Commercial electric truck. The ballast is carried by trains of Differential center dump cars directly to the place where the work is in progress. A train runs slowly over the new rails, dropping the ballast into position as it moves along. Under each tie is placed 4 in. of slag, which is tamped with Ingersoll-Rand pneumatic tampers. The total depth of ballast is 6 in., giving it a 2-in. exposure above the tie.

A somewhat different spacing of ties is here used, although the same 7-in., 122-lb. grooved girder rail is the standard for this kind of construction. The joints are staggered 33 ft. apart, and in this case also the first two ties at the joint are spaced 18 in. between centers. The intervals then run one of 24-in., four of 25-in., five of 26-in. centers, and then a reduction again as the next joint is approached. All ties are placed with the heart down. Combination tie and brace plates are used on the four ties at the joints, as in the other construction, and elsewhere the tie plates and brace plates are alternated.



A Westinghouse Compressor on an Electric Truck Supplies Air to the Ingersoll-Rand Tie Tampers



Universal Crane Loading Ballast at the Storage Yard of the Track Department

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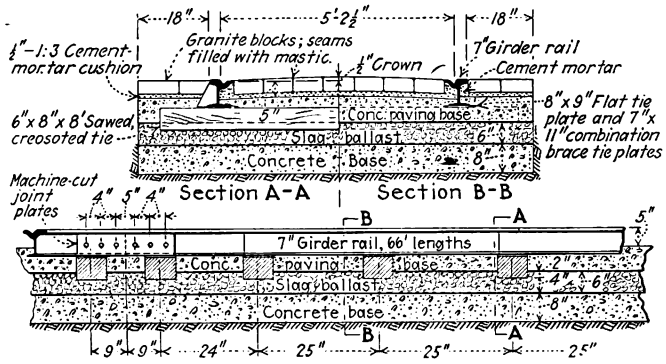
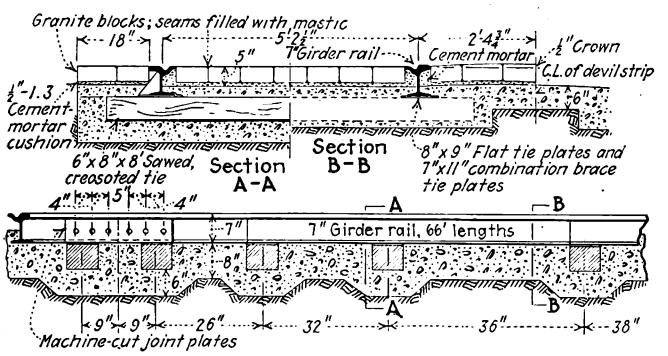


Type of Track Structure, Using Slag Ballast, Which Is Built Under Traffic



Monolithic Construction, Used When Track Can Be Taken Out of Service During the Work

Welding and bonding are done in the same way as with the monolithic concrete structure. A paving base of 1-2-4 concrete, 6 in. thick, is poured on top of the ballast after the latter has been thoroughly tamped. On this base the granite block mastic pavement is then laid.

In the neutral ground, of which there are many miles in New Orleans, standard open track construction is employed. Creosoted ties and T-rail are used on slag ballast. This construction is cheap and it is easily maintained.

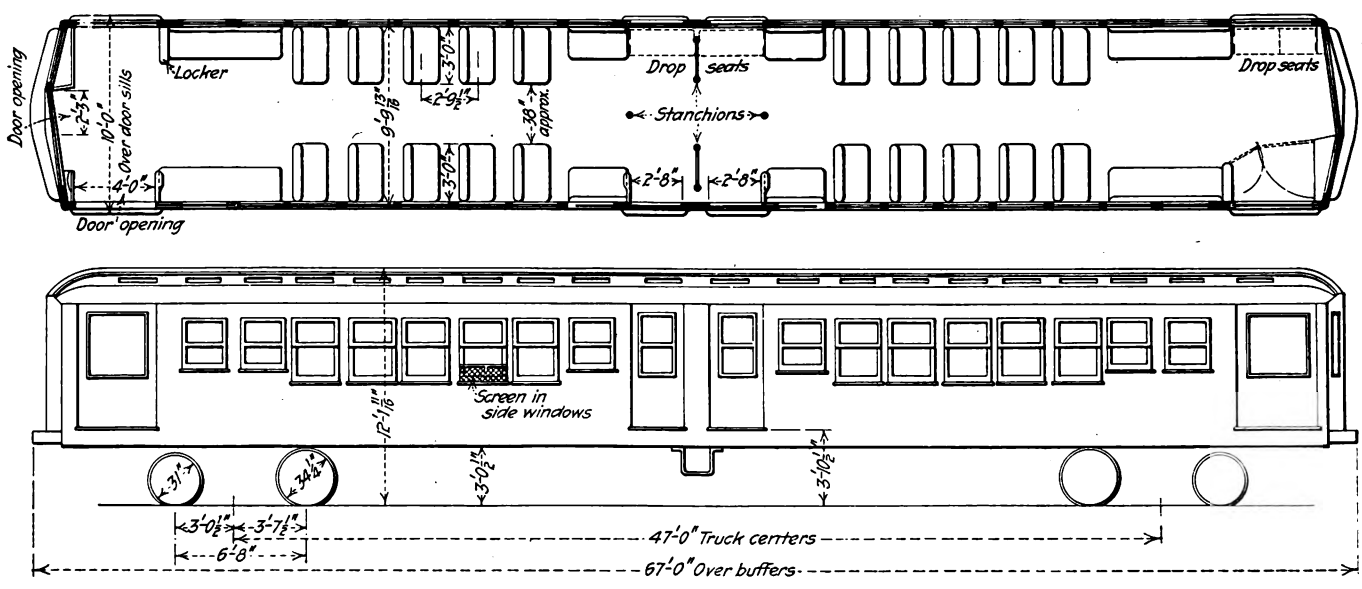
Problems are presented, however, by the intersections of cross streets and the neutral ground. The track grade is considerably higher in the neutral ground than the grade of any of the cross streets, and must, therefore, be brought down somewhat at an intersection. At the same time the grade at the cross street is raised to meet that of the tracks. This part of the track structure is subject, therefore, to particularly heavy wear and a concrete foundation is placed under the entire intersection to support the track structure and the adjacent paving.

In all phases of the work of the track department much use is made of labor-saving machinery and equipment. Besides the use of the Universal crane with Differential dump trains already described, a Marion excavating shovel in the storage yard has been equipped with a boom and bucket, enabling it to perform similar work when it is not needed elsewhere for excavating. A Brownhoist is now being mounted on an electric flat car for the use of the track department. The Universal crane is used also on the street to load waste material into work trains for disposal. Ingersoll-Rand pneumatic pavement cutters and tie tampers are employed, the compressed air being furnished by a Westinghouse compressor of 110 cu.ft. capacity mounted on an electric truck. This equipment has been arranged for easy movement from place to place. Old rails are cut by an acetylene torch, the tanks being mounted on a motorcycle side car of special design, as shown in an accompanying illustration. Electric welding outfits have been mounted on motor cars to facilitate their movement from one job to another. Tractor mounting is used with concrete mixers. It has been found that a considerable saving of time and money results from the use of this equipment, and that the efficiency of the work is promoted by thus giving mobility to the machinery.

Staten Island Line to Electrify

Multiple-Unit Trains Will Be Operated on 600-Volt Third Rail—Details of the Contact Line and Cars Are Given

PLANS are well under way for the electrification of the Staten Island Rapid Transit Railway, St. George, Staten Island. This railroad now furnishes rapid transit steam railroad service over a system covering the shore lines of Staten Island, which constitutes the Borough of Richmond, New York City. The portion to be electrified at the present time comprises about 40



The Proposed Staten Island Multiple-Unit Cars Seat 71 and Will Be Operated in Trains of Six or Seven

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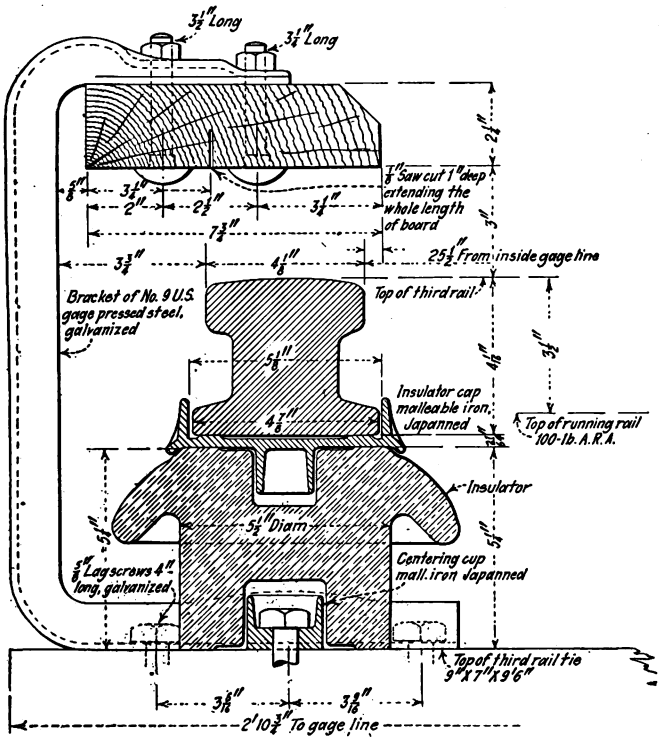
miles of track and includes the passenger service on the East Shore Division and the Perth Amboy Division, consisting of lines between St. George, South Beach and Tottenville.

The direct-current third rail system will be employed, at a nominal working pressure of 600 volts. The preliminary plans, which received the approval of the Public Service Commission, State of New York, May 1, call for the over-running protected type of third rail, with a special high-conductivity 150-lb. section, similar to that in use on other rapid transit lines in New York City. The location of the third rail and the arrangement of the protection are shown in one of the accompanying drawings. Standard glazed porcelain insulators with japanned malleable iron caps will be used to support the rail, which is so heavy that it does not



Section of Third Rail, Insulator and Protection Board for Staten Island Electrification

require additional anchoring. The insulators will be held in position by japanned malleable iron centering cups, held to the ties by lag screws.

The third rail ties are 9 in. x 7 in. x 9 ft. 6 in. long and project 2 ft. 10¾ in. from the gage line of the track rail. The center line of the insulator will be 3 in. from the left edge of the tie, in order to leave room for the bracket supporting the protection board, the center of which will be 3½ in. from the line of the insulator. This bracket will be of pressed steel and will be held to the tie with two lag screws.

Previous to the electrification the present 75-lb. and 80-lb. track rails will be replaced by 100-lb. A.R.A. standard T-rails, and the section between Prince's Bay and Pleasant Plains, which now is single track, will be double tracked and grade crossings will be eliminated.

The type of car which probably will be adopted is shown in another illustration. It is a multiple-unit car of all-steel construction, approximately 67 ft. long and 10 ft. wide over the door sills. The width at the eaves will be 9 ft. 11 in., and over the monitor deck 5 ft. 9¼ in. It will seat 71 passengers. There will be double doors at the center and a wide side door at either end of the car. These doors will be electro-pneumatically operated. In addition there will be doors in the ends of the cars to permit passing between the cars. Each car will be equipped with two motors. A novel feature in multiple-unit construction is the use of a form of maximum-traction truck, there being a pair of driving wheels of 34¼-in. diameter and a pair of trailer wheels of 31-in. diameter on each truck. The truck bolster will be offset 3½ in. from the center line, as shown in the drawing. Multiple-unit control will be installed to permit operation of trains of from one to ten cars, and initially the longest trains will be of six or seven cars.

While the source of electric power has not been definitely decided on, it is probable that energy will be purchased from the Staten Island Edison Corporation. The tentative plans cover a 33,000-volt, three-phase, 60-cycle power supply, to be delivered to substations erected by the railway, where the high-tension current will be stepped down and converted to direct current at 600 volts. Several of the substations will be of the automatic or remote control type, and the proposed substation layout is designed to provide power facilities for a considerable increase over present requirements.

The change to electric operation will necessitate the installation of practically an entire new signal system, the present direct-current signals being replaced by a modern alternating-current signal system.

The electrification will result in a substantial increase in schedule speed of the trains as compared with the present steam service and will afford a high-class rapid transit service to the rapidly growing residential districts of the island.

The Staten Island Rapid Transit Railway is owned by the Baltimore & Ohio Railroad and the electrification is being handled under the direction of J. H. Davis, electrical engineer of that company.

One Year Tests of Ciment Fondu

FIGURES announced by the Boston Elevated Railway for tensile tests of Ciment Fondu mortar made in the proportions of 1 to 3 show an average strength of 454 lb. per square inch at the end of one year. This is slightly less than at the end of nine months but somewhat greater than at the end of six months. From these laboratory tests it would appear that the tensile strength is holding up fairly well. Experience with Ciment Fondu grout used in paving, however, has not been entirely satisfactory, as told in the ELECTRIC RAILWAY JOURNAL, April 19, 1924. Tests made to date average as follows:

Length of Time	Tensile Strength per Square Inch	Length of Time	Tensile Strength per Square Inch
1 day	357 lb.	28 days	434 lb.
2 days	385 lb.	3 months	459 lb.
4 days	461 lb.	6 months	444 lb.
7 days	486 lb.	9 months	475 lb.
14 days	503 lb.	1 year	454 lb.

Keeping Babbitt Mandrels from Sticking

IT IS common practice to allow a slight taper on mandrels used in babbitting bearings to facilitate removal. Some roads dip the bearings in a thin batter of fire clay about every fourth time they are used to prevent sticking and also to prevent any tendency toward blow holes. Another method used by some railways to prevent babbitt from sticking is to oil the mandrels every morning before starting to babbitt the bearings.

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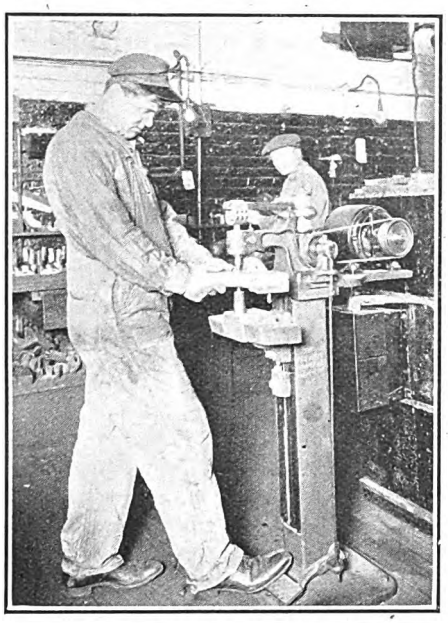
Equipment Maintenance Notes

Machine Drives Five Rivets to One by Hand

BY O. H. JORGENSEN
Chief Draftsman, Equipment Department, Chicago Surface Lines

FOR the manufacture and repair of brush-holder yokes, gear cases, trolley harps, fenders and many other jobs requiring a number of small rivets to be driven, a high-speed riveting machine of the type shown in the accompanying illustration, taken in the West shops of the



High-Speed Riveting Hammer Which Saves Time in the West Shops of the Chicago Surface Lines on a Large Variety of Work

Chicago Surface Lines, has been found to make very substantial savings in time.

In making up brush-holder yokes of the type shown in the illustration, four $\frac{5}{16}$-in. diameter rivets are driven cold in 1½ minutes as compared with 8 minutes taken to drive the same number by hand. These figures were derived from actual time studies of the operations.

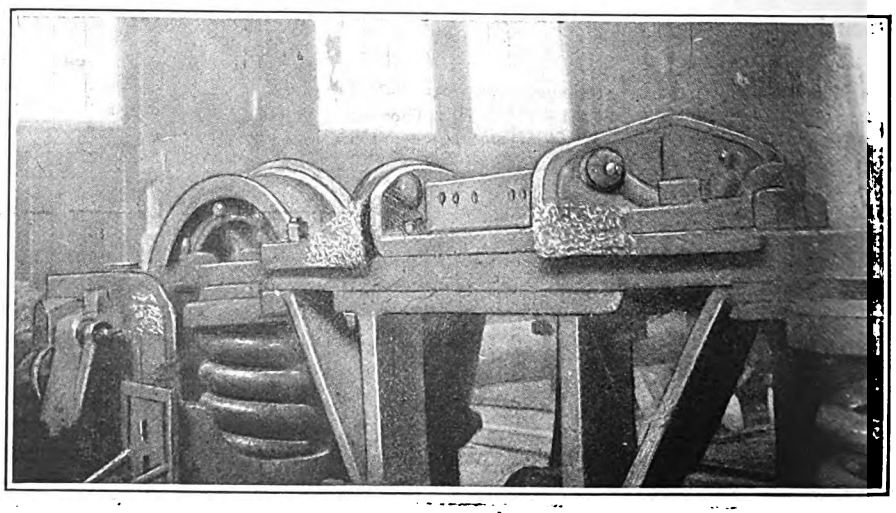
The machine used is a size 2-AHD hammer manufactured by the High Speed Hammer Company of Rochester, N. Y. It is used to drive rivets up to $\frac{5}{8}$ in. diameter cold and is designed for the purpose of reproducing the flexible blow of a hammer driven by the human arm. A hickory helve with interposed rubber cushions is used to produce this result.

Power is furnished by an individual ½-hp. motor, running at 1,800 r.p.m. on 500 volts, and is transmitted through a belt and pulley from the motor to a crankshaft, and thence through a connecting rod and heavy rubber cushions to one end of the hickory helve. The other end of the helve carries the peen. The speed and intensity of the blows are controlled from a pedal so that a number of light blows may be delivered at slow speed, or a series of sharp blows may be struck at high speed. The peen may be shaped to form any shape of rivet head desired. While the rivet is being formed, the peen revolves so as to impart a finished surface to the heads.

Welding Truck Transom Bars

SOME of the truck transom bars have broken on St. Louis type 60-1 trucks in service on the lines of the Philadelphia & Western Railway, Norristown, Pa. These transom bars consist of forged steel, bent at the ends to follow along the top of the truck side bars. The breaking takes place just at this bend.

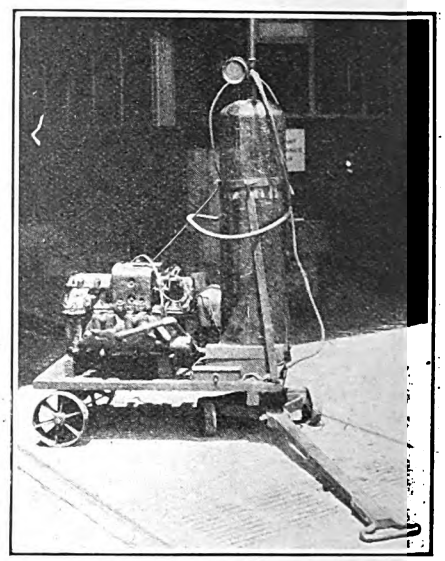
In repairing these the break is grooved out with an acetylene torch so as to provide space for adding metal. This groove is then filled in by welding, and additional metal is also deposited so as to give a larger cross-section than that of the original bars. The time necessary for making repairs to a pair of truck transom bars is about five hours.



Truck Transom Bars Repaired by Welding

Portable Compressor Outfit to Clean Cars

A HANDY apparatus for blowing the dust out of controllers, switches, etc., has been constructed by the Knoxville Power & Light Company, Knoxville, Tenn., from old



Portable Compressor Outfit Used in Knoxville for Blowing Out Controllers, Etc.

equipment on condemned cars. The apparatus consists of an AA1, 550-volt, motor-driven Christenson compressor, an Allis-Chalmers governor and a compressed air tank equipped with a pressure gage.

These have all been mounted on a

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Dick Prescott Meets the Boss

And so does Mullaney

UPON swinging around in his chair, after his telephone conversation with Thomas Mullaney, Steve White recognized Mr. Milburn, the new general manager of the Consolidated Railway & Light Company, as he had seen a photograph of him in the daily paper. In spite of repeated differences with Mullaney, Steve was intensely loyal to his immediate superior, and he flushed profusely as he realized that his statements had undoubtedly been heard by the G.M.

Mr. Milburn was the first to speak and cleared the situation for the moment by appearing to ignore the remarks he had just heard.

"Will you kindly direct me to Mr. Mullaney's office?"

By this time Steve had succeeded in getting to his feet and this seemed to bring back the power of speech.

"Oh—Why—Yes!—Mr. Milburn—Sure!—"

Steve was trying hard to collect himself. He had a powerful desire to get out of the presence of the "boss" until he could get a moment to think, and he therefore turned suddenly to Dick, who had remained standing respectfully silent.

"Dick, take Mr. Milburn right over to Mr. Mullaney's office."

The general manager stepped back from the door and Dick quickly joined him, saying as they moved off from the carpenter shop office, "Mr. Mullaney's office is over on the other side of the shop, Mr. Milburn, and we'll have to go through this way" (motioning to the large door leading out of the carpenter shop building).

As they walked off, the general manager seemed in no particular hurry. He paused frequently and seemed interested in observing the manner in which certain types of repair work were performed. He stopped and from a little distance watched two men who were attempting to trim the edge of a piece of dash iron by holding it on a rail at the edge of a pit, and using a cold chisel and hammer. As they moved along through the shop, he noted the lack of heat and the bundled appearance of the men as they awkwardly went about their tasks. Neither did the gloomy appearance and the accumulated dust of years on the skylights and walls of the building escape his apparently casual glance.

In the wood mill he noted the piles of shavings on the splintered wood floor. In the machine shop he saw a workman carefully calipering a broken armature shaft in order to obtain the dimensions for the piece which he was turning in a lathe. No drawing of any kind was in sight. In the paint shop he watched a workman laboriously coating the irregular surfaces of a truck with a hand brush.

Dick walked along at the general manager's side and replied as fully as he was able to several questions put to him regarding some of these operations. He explained that he had only recently been forced to leave his engineering studies and accept employment as a carpenter's helper, and was therefore not very familiar with the practices in the shop. As Dick replied to questions, however, the general manager turned several times and observed him keenly.

They finally reached the outer office where Dick had received some of his first impressions of the Consolidated shop. Approaching the door marked "General Foreman," Dick knocked, and in answer to the gruff "Come in," he opened the door, and stepped in after the general manager.

"Mr. Milburn, this is Mr. Mullaney. If that is all you wanted, I'll leave you here."

"Yes, that's all; thank you very much."

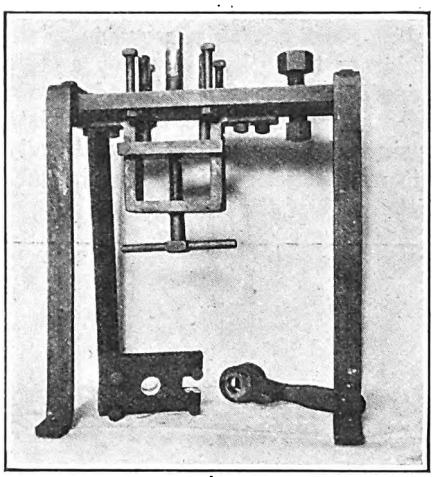
Dick Prescott withdrew, and closed the door as he came out.

small four-wheel truck, as shown in the accompanying illustration. A long pole with a fuse hooks over the trolley wire to furnish the current. Ground connection is furnished by an iron plate which is placed on the rail and is connected to the apparatus by a long, flexible cable. Because the parts were all taken from cars about to be scrapped, the apparatus was constructed at small cost. It is comparatively light in weight and can be moved easily anywhere in the shop.

Babbitting Air Brake Handles

MANY methods for repairing air brake handles where they fit the broached portions of the brake valve stems are used by various electric railways. When the fit becomes worn, the Eighth Avenue Railroad, New York, N. Y., is babbitting its air brake handles and is finding this a very satisfactory method. The accompanying illustration shows the type of babbitting jig used.

A plate with four strap iron legs is used to support a standard brake valve stem and the necessary attachment for accurately locating the air brake handle and providing for its



Jig for Babbitting Air Brake Handles. The Movable Plate for Removing Handles Is in the Raised Position

removal after babbitting. A removable plate fits over the round portion of the brake valve stem and rests on top of the base plate of the jig. This smaller plate is notched out to correspond to the top of the brake valve, so that a handle placed in position will be accurately lined up and the distance from its center to the interlocking lug of the brake valve will be exactly determined. With the air brake handle in posi-

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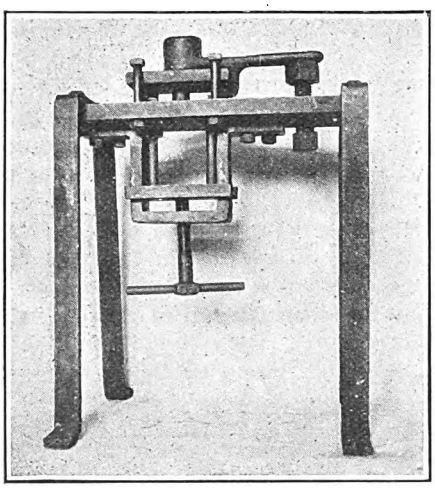


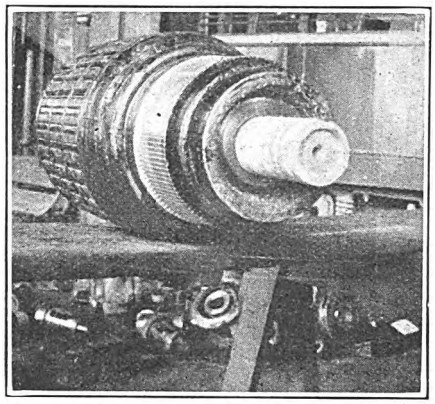
Air Brake Handle in Position on Jig Ready for Babbitting

tion, it is lined up horizontally by means of a set screw with an adjustable nut. This is used to level up the handle and insure that it is held accurately during the babbitting operation. Babbitt is then poured in at the top of the handle until an accurate fit is obtained and the entire space is filled.

In order to remove the handle after babbitting, an attachment is provided on the underside of the jig. This consists of a movable plate with two pins which project through the face plate of the jig and when raised press against the movable plate on top. The latter supports the brake valve handle. This movable plate underneath works in guides and is raised by means of a hand screw. By turning this, the movable plate pushes the brake handle vertically without danger of distorting the babbitt lining of the handle.

Armature Shafts Built Up with Sleeves

IT IS the practice of the Nashville Railway & Light Company, Nashville, Tenn., to build up a worn armature shaft by shrinking a steel sleeve on the shaft. The sleeve is slipped on hot and allowed to cool in place, and is then turned down in a lathe to the desired size. This procedure has supplanted the welding process which was the method formerly used to build up worn armature shafts. The new method is preferred, not



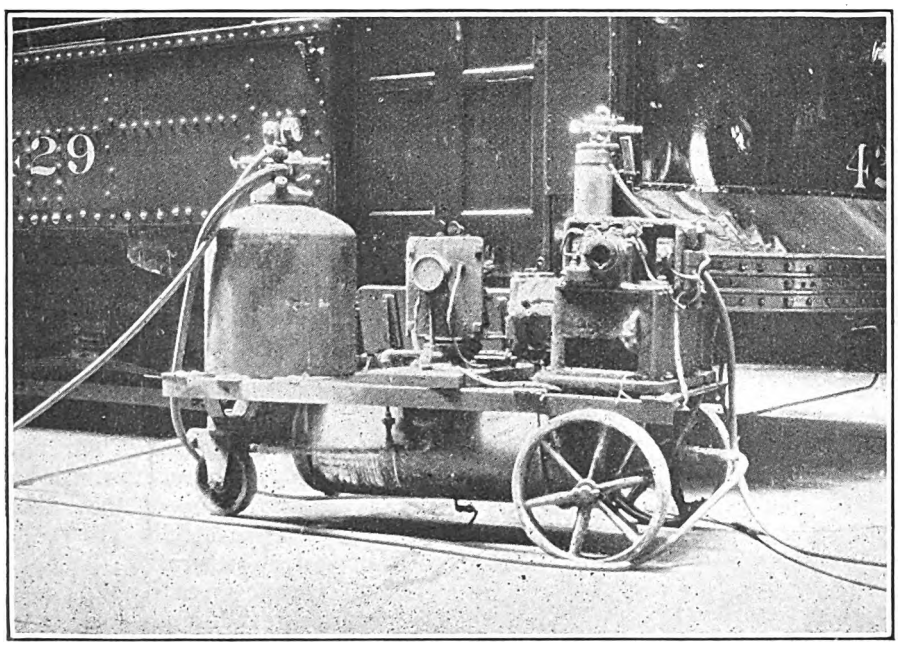
Worn Armature Shaft Restored by Shrinking on a Steel Sleeve

only because it is more economical, but also because the danger of crystallization of shaft during welding is eliminated.

Spray Painting Practice in Atlanta

A SPRAY painting outfit which is used by the Georgia Railway & Power Company, Atlanta, not only for car painting in the shop, but also at times for doing large outdoor painting jobs, has been mounted on a small truck to give it mobility. The apparatus used is the DeVilbis spray painting machine, with an old railway compressor and governor.

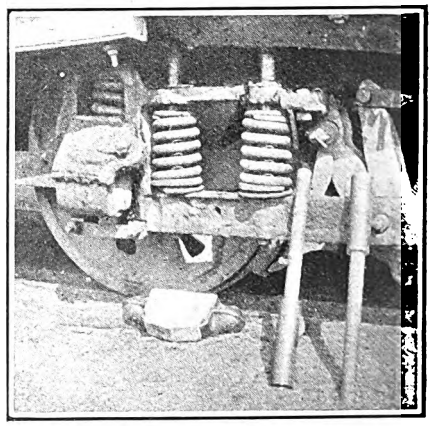
When car painting is being done, the 10-gal. paint tank is used simply as an air chamber, the paint itself being placed in a smaller container. The practice of this company is to use spray painting below the belt rail, including the trucks, and hand painting above that line. Shields of various kinds to protect the windows and sash and permit spray painting of the entire exterior have been tried but have not proved very satisfactory. Further experiments along this line are contemplated, but for the present the use of this apparatus is confined to the lower portion of the car body and trucks. Experience shows that the work formerly done in one man-day can now be done by spray painting in two man-hours.



Spray Painting Outfit Used by the Georgia Railway & Power Company Has Been Mounted on a Small Truck to Give It Mobility

Economical Construction for Body Spring Posts

THE body spring posts for the Brill No. 22 truck consist of a top portion of 2 in. diameter, while the diameter of the bottom part of the post is but 1¼ in. Where these are made out of solid steel rods, it is necessary to turn off ⅜ in. from the



Two Body Spring Posts and a Side Bearing Ready for Installation on a No. 22 Truck

bottom part. The Long Island Electric Railway, Jamaica, N. Y., experienced trouble from the breaking of these body spring posts just at the shoulder. As a washer fits against the enlarged portion and on top of the springs, a fillet could not be provided at this point. The difficulty has been overcome, however, by using a 2-in. steel tube with ⅜-in. wall for the enlarged end. This is forced on to a 1¼-in. steel rod as in-

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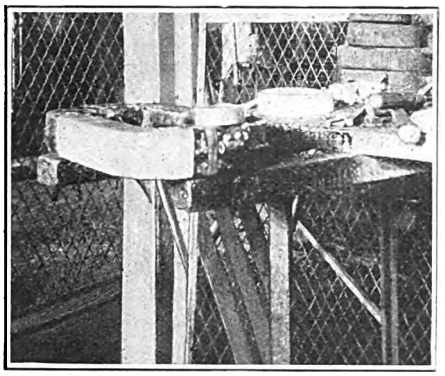
dicated in the accompanying illustration. This construction has not only overcome the breakage of the posts, but also is a more economical method than turning down the posts.

Special Bench Rest for Taping Coils

IN ORDER that the tape may be passed inside and around a field coil while it is lying flat, a bench in the electrical repair department of the Eighth Avenue Railroad, New York, has been provided with two



Extension Arms on Workbench Provide Convenient Means for Taping Field Coils

extension arms. The field coil to be taped is placed on these for support. The work of taping can then be carried out without any obstacle and without the necessity for part of the coil to extend over the edge of the bench unsupported. The work of taping can also be done much better with the coil flat than if on edge.

Chains Hold Safety Car Motors in Place

A SIMPLE method to hold a safety car motor in place in case of breaking of the suspension bolt, some trouble from which has been experienced in the past, has been devised by the Nashville Railway & Light Company, Nashville, Tenn. After the bolt has broken the motor is free to move up or down to a certain extent. This movement has in some cases resulted in cutting the motor leads and crippling the car. To prevent this and save the necessity of pulling cars in from the road, the company has equipped all of its safety cars with chains running from the bale on the motor case to the truck frame. These chains have enough slack to allow free movement of the springs but are tight enough to prevent the motor hitting the car floor if the suspension bolt breaks.

New Equipment Available

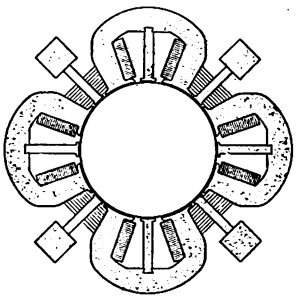
A Lighter Portable Welder

BY J. C. LINCOLN
Liteweld Company, Cleveland, Ohio

A DEVELOPMENT of welding and bonding equipment has recently been made by the Liteweld Company in the form of a dynamotor type welder. This type was used as it is light and efficient, and improvements in design have further increased the effectiveness of the active material while still retaining simplicity, efficiency and ruggedness.

The chief modification is in the field system, which is of the "divided pole" design. In the Liteweld machine the poles are divided into three magnetically isolated parts instead of being of the usual one-piece construction. Each pole piece is made up of sections of laminations on the outside with a central section formed from a steel bar. Slots are provided in the laminations for inserting interpoles if necessary. The three sections of the pole are securely bound together by a cast non-magnetic metal of high tensile and compressive strength located between the central steel bar and the laminations on either side.

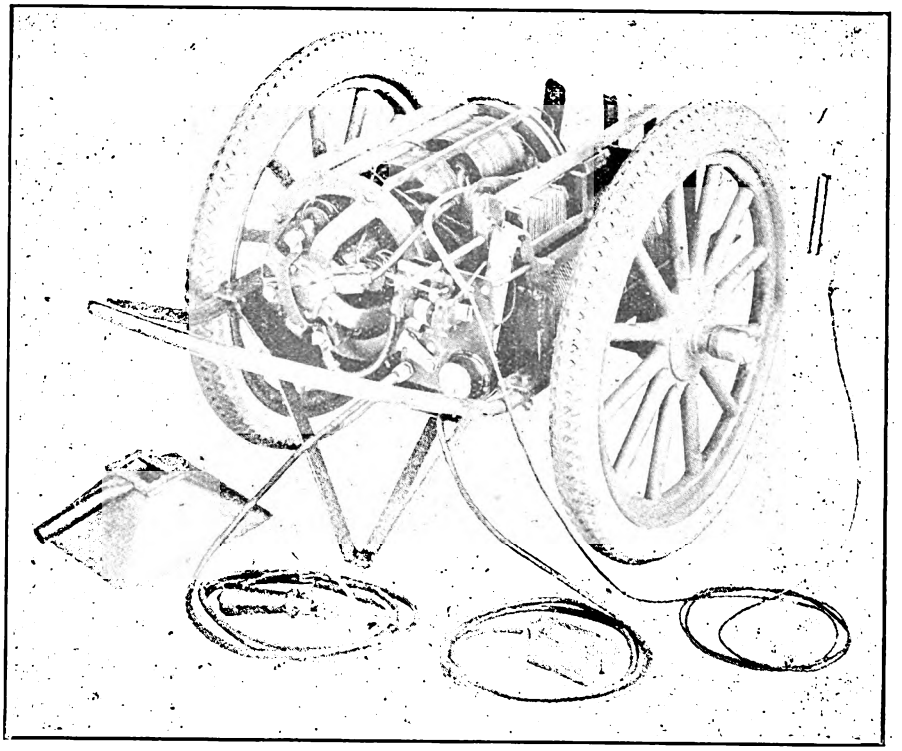
The effect of this divided pole system is best illustrated by considering the limitations of a welding dynamotor, the principal one of which is sparking. The magnetic flux in any electric motor or generator consists of two component parts, the useful flux in the pole and the armature reaction flux which tends partly to neutralize the useful flux and partly



Cross-Section of the Divided Pole Construction Used in the Magnetic Circuit

The small stippled areas are the iron cores; the dark areas are the field coils; the large stippled areas are the non-magnetic cast material which binds the parts of the divided poles together and assists in overcoming the armature reaction flux.

to cause destructive sparking at the brushes by shifting the proper commutating position of the armature current. In ordinary motor design this reaction flux is reduced by increasing the size of the air gap between the armature and the pole, thus making it more difficult for the reaction flux to reach the pole.



Pneumatic Tire Mounting Is Provided for New "Liteweld" Welding Set

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This requires a greater magnetizing force in the poles and greater power to overcome this loss and to prevent sparking. This is of particular importance in a welding machine because of the sudden surges of current.

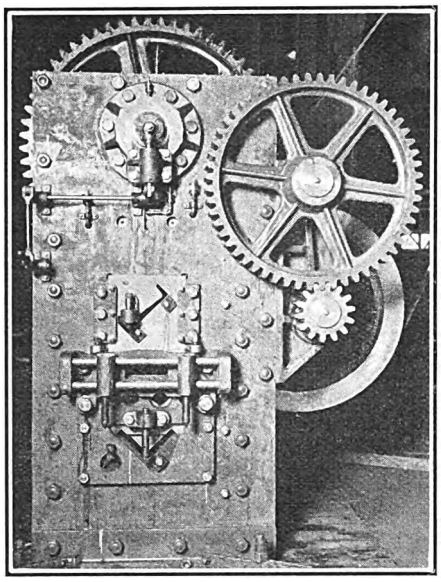
It will be seen from the accompanying diagram of the Liteweld machine that the useful flux has but a short path to travel, which is almost entirely of iron. The reaction flux has a much more difficult path to follow, as in addition to crossing the air gap twice it must pass across the non-magnetic alloy which separates the laminations from the central bar, through the central bar itself, across the section of non-magnetic alloy on the other side of the pole into the laminations adjacent to it and thence back to the armature. As its path is largely through non-magnetic material, the armature reaction flux is practically eliminated.

With this construction the air gap can be made much smaller than is the usual practice, and since nearly 80 per cent of the total magnetizing force is needed to force the flux through the non-magnetic part of the circuit, a comparatively small reduction at this point greatly reduces the number of ampere turns per field coil. This results in a smaller machine without loss of power, efficiency or reliability.

Improved Bar Cutters

FEATURES which will appeal to the railway shop repairman as well as to those engaged in structural work have been incorporated in a new series of special bar-cutter machines manufactured by the Buffalo Forge Company, Buffalo, N. Y. A universal bar-cutter arrangement with a special section for cutting channels and I-beams, improved placement of the plunger counterbalancing springs, and a newly designed driveshaft bearing for the main shaft are common to all machines of the series. In addition, a more positive method for effecting plunger engagement is used on the smaller sized bar cutters. The larger machines have a new type of cam adjustment for the jaw-type clutch.

The bar-cutter machines range in size from a No. 5 to a No. 11. In sizes 5 to 9 engagement and disengagement of the plunger is made through a new block and ram, controlled by a counterweighted lever. This counterweight assures positive



Bar Cutter with Special Sections for Cutting Channels and I-Beams

holding of the ram in either position. The new cam adjustment for the larger bar cutters, Nos. 10 and 11, is by means of a spring which controls the engagement of the clutch. This adjustable feature assures maximum speed and ease in operation.

The lower half of the bar-cutter working section can be used for cutting rounds, squares, angles, flats and tees without changing knives. The upper half of this section contains the knives for cutting channels, I-beams and other rolled sections. A special knife is required for each size channel and I-beam used. The over-all height of the machines is reduced by changing the position of the two large plunger counterbalancing springs from the top to a position inside the frame. With the new driveshaft bearing, either the flywheel or the shaft itself can be easily and removed when necessary.

All working parts of the bar cutters are accurately machined. The plunger and gears are steel castings, while the pinions are of chrome-nickel steel. The shafts are of hammered steel and run in bronze-lined bearings, while the driveshaft bearings are ring oiled. The frame is built of two armor plates securely bolted and doweled together and rigidly reinforced. The drive may be either by pulley or motor.

The cutting capacity of rounds ranges from 1 in. for the No. 5 machine to 4 in. for the No. 11 machine. Squares can be cut from ⅞ in. with the smaller machine to 3½ in. with the largest. All capacities for these machines are based on mild steel with a tensile strength of 60,000 lb. per square inch.

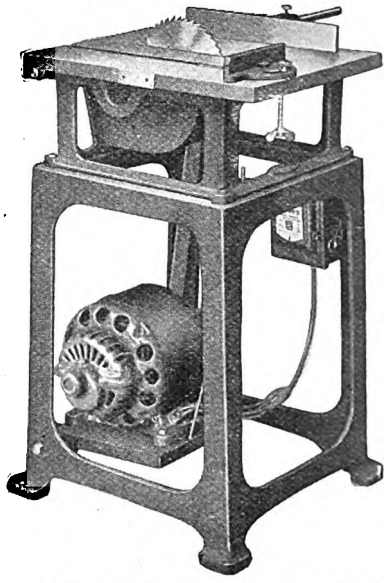
Accurately Ground Steel Parallels

A RECENT addition to its line of precision tools has been made by the L. S. Starrett Company, Athol, Mass. This consists of sets of parallels made from a special grade of tool steel, and ground. They may be used to advantage in setting up work to be drilled, planed or milled accurately. A complete set consists of eight pairs of parallels. These may be purchased in individual pairs or combinations, as desired, for use in the tool room or machine shop. They are all 6 in. long.

Utility Saw Cuts Either Wood or Metal

A HEAVY duty general utility saw is being marketed by William B. & John E. Boice, Toledo, Ohio. This is arranged to swing saws as large as 8 in. diameter and will cut 2½-in. stock. The table is 16 x 20 in., and elevates for grooving. Attachments are provided for boring with an adjustable boring table, and for sanding, grinding, etc. The saw arbor is arranged to take standard wood machine bits with ½-in. straight shank or regular drill chucks. The machine is equipped with large bronze bearings and the shaft is ground accurately.

The motor required is from ⅓ to ¾ hp., depending on the diameter of saw used. The height of the machine complete as illustrated is 33 in., but the operating part is sold separately for bench mounting without base or motor. The height of the upper section is 8½ in.



Utility Saw with Attachments for Boring and Grinding

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Association News & Discussions

Improvements in Arc-Welded Rail Joints*

Recent Developments in the Method of Welding Joint Plates by Means of the Carbon Arc Process, and Tests on Several Types of Joints, Are Described

BY R. B. FEHR
Development Engineer Rail Welding & Bonding Company, Cleveland, Ohio

DURING the past two years an intensive investigation of the seam-welded rail joint has been made along the following lines: (1) Study of the functions of seam-welded joints and the stresses to which they are subjected; (2) improvements in the joint structure and welding processes; (3) development of a practical method for making accelerated tests on seam-welded joints; (4) comparative tests on seam-welded joints in which variations have been made in either the mechanical structure or the welding process.

This investigation has now reached the point where definite improvements have been made in the durability of the joint and in the method of installation. A report of this work will be found in the January, 1924, *Journal* of the American Welding Society. In the present paper will be discussed briefly some important matters that have not received the proper amount of attention in the past. Observations of seam-welded joints, some of which have been in excellent condition for a period of seven years, indicated that probably the chief cause of joint failures was the repeated impact caused by cupping, which in turn was principally due to faulty mechanical preparation of the joint. Our efforts were directed toward obtaining the most practical means of setting up joints, increased strength of the joint structure and improvements in the welding procedure so as to obtain not only heavier, stronger and better positioned seams, but an easier condition for welding and greater reliability of the process.

Careful analysis of joint failures has indicated that the primary cause is chiefly what is termed fatigue of the seam welds, brought about by repeated stresses due to the combination of impact, flexural and tensile stresses. Fatigue failure of metals is due to alternating or repeated stresses below the ultimate strength, or even below the elastic limit. Recent exhaustive researches conducted by Dr. D. J. McAdam, Jr., at the U. S. Naval Engineering Experiment Station and by Prof. H. F. Moore at the University of Illinois have shown that steels have an endurance limit, which is that unit stress below which the metal can withstand an indefinitely large number of reversals or repetitions of stress without failure. Evidently the rail joint should withstand not only the stresses due to flexure, temperature decrease, welding, etc., but also the repetitions of stress due to impact, and, therefore, the unit stresses in the fish-plates and seam welds should be below the endurance limit.

*Abstract of paper before the Southwestern Public Service Association, New Orleans, April 22-25, 1924.

IMPROVEMENTS IN JOINT STRUCTURE

The joint is primarily dependent upon its mechanical structure and preparation. The best results can only be obtained when the fish-plates are ample in length and cross-section (that is, with the proper section modulus) and when the joint is assembled so as to have good fishing areas and a complete elimination of the gap between rails, since this begins the cupping that produces impact. The ends of the rail heads should be milled and brought together under compression, and to insure compression of the rail heads it is important that the end of the rail be under-cut slightly below the bottom of the head. Immediately after the seams are welded, the joint should be ground to the contour of the rail to avoid the impact that would be caused by the passing of car wheels over irregularities in the running surface or gage line.

If the rail ends cannot have a good area of contact when abutted, medium hard steel inserts must be used to take care of irregularities in the ends of the rail and to fill the gap completely, with moderate compression.

In a 6-in. 100-lb. T-rail joint with fish-plates 1 in. thick and with the rail heads not properly abutted a simple calculation will show that the section modulus of the joint at the gap is only 5.0 as compared with 17.8 for the rail itself. It is, therefore, evident that a rather large unit stress can be expected in the seam welds because of the comparatively weak mechanical structure of the joint. The section modulus of rail joints can be increased by (1) elimination of gap; (2) heavier fish-plates; (3) base-plates welded to base of rail.

By the use of heavier fish-plates having economical distribution of material (that is, I or channel sections), it is reasonable to suppose that the strength and life of the joint under repetitive impact will be very greatly increased. Base-plates welded to the base of the rail acting as tension members can also be expected to increase greatly the strength and life of the joint, because the section modulus of the joint at its middle section has thus been greatly increased. In order that the life of the base-plate seams may be a maximum, it is necessary that the base-plates be installed so as to have good contact with the bottom of the rail. The seam welds will then be subjected to longitudinal stresses only, rather than to additional vertical shearing stresses caused by downward pressure from the rail.

IMPROVEMENTS IN WELDING PROCESS

During the past year and a half a great amount of effort has been expended on the development of a welding process which had for its main object the strengthening of the seam welds. Increasing the strength by adding a larger quantity and better quality of seam metal has been accomplished by what may be called the "hand-feeding process," which will be referred to as Process B, as distinguished from the present Process A, in which the filler rod is laid in position.

In the hand-feeding process the filler rod is added by hand at the discretion of the operator. After striking the carbon arc and forming a crater between fish-plate and rail, a filler rod is slowly fed in on the side of the crater toward which the arc advances. At no time is the rod advanced in front of the arc, thus obstructing the crater and interfering with the proper deposition of metal. The idea is to maintain a clean crater of slight depth, and by a sweeping action of the arc to deposit arc-fused metal in thin layers on the receding side of the crater, while the slag and other impurities are being floated off.

It has been proved by means of shop tests (wedging off fish-plates, etc.), chemical and metallographic analyses, cross-bending tests and repeated impact tests that a combined groove and ledge preparation of the fish-plate for the head seams gives a marked increase in the strength and life of the joint.

Some very remarkable results have been obtained by preheating (by the carbon arc), double welding and post-heating (by the carbon arc) in connection with Process B. The advantages

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October 6, 7, 8, 9, 10

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resulting from pre-heating, double welding and post-heating are found to be: (1) The shrinkage stresses in the first seam weld are largely relieved by the annealing effect produced by re-tracing or double welding; (2) the grain structure of the first layer of seam metal is refined because this seam metal has been reheated to its critical temperature; (3) there is assurance that the seam welds are tapered; that is, heavy at the middle portion of the joint where the greatest stresses occur, and light at the ends of the fish-plates.

Furthermore, a coated filler welding rod has been developed which gives a superior quality of seam metal. As a consequence, the "Una" welding process has been evolved.

Briefly summarized, the improvements effected by this welding process are: (1) The arc is more easily controlled; (2) the seam metal is more easily placed in the proper position; (3) initial seam cracks are practically unknown; (4) heavier, stronger, more ductile and more homogeneous seam welds are obtained; (5) the seam welds have a much longer life under repetitive impact stresses.

It is important to pay attention to the relief of stresses due to expansion, contraction and shrinkage of seam metal which are set up in all kinds of welding operations. The carbon arc enables the welder to reduce, if not entirely eliminate, the localized stresses. This is readily accomplished by pre-heating and post-heating the ends of all seams and the adjacent portions of the rail and fish plates, by means of a long flaring arc. Recent investigation has shown that if the entire seam is re-traced by the carbon arc, the seam welds have a greatly increased life under repeated impact. This result is undoubtedly due to the annealing of the seam metal and the consequent relief of stresses.

Shrinkage of the weld metal during its solidification and subsequent cooling causes vertical tensile stresses to be set up in the fish-plates. A simple and effective means of minimizing these stresses is to bolt up the fish-plates very tightly in the first place, so that a considerable initial vertical compressive stress can be set up by means of the wedging action. Then vertical tensile stresses in the fish-plates due to shrinkage of the seams will first have to balance the vertical compressive stresses before they can cause residual tensile stresses in the fish-plates.

Staggering the seams, top, bottom, and sides, should be followed as far as practicable, so that no two seams end in the same vertical plane, thus producing a fillet effect when the joint acts as a beam. The head seams should not extend as far longitudinally as the base seams, and it is recommended that when new fish-plates are ordered, they be staggered about 2 in. longitudinally with respect to each other. When base-plates are used the seams should also be staggered with respect to each other.

The order of welding the seams should be governed by the principle that the finished joint, when cold, will tend to be concave toward the side (or top or bottom) on which the seams were welded first. The aim should be to have the welded joint slightly high at the middle, so that by the time it has been carefully ground it will be flat. Consequently, it will generally be found best to weld the base seams first only where the gap between the rail heads is not as tightly closed as it should be, so that the welded joint will be slightly high instead of low at the gap. When the gap is properly eliminated the head seams should be welded first, thereby increasing the compression and area of contact between the rail heads. In some cases it may be desirable to weld one head seam first, then the opposite base seam, then the other head seam, and finally the other base seam. In all cases a 2-ft. straight edge should be the guide in determining the best order of welding, for if it is found that the finished joint is usually slightly concave on top, the initial preparation of the joint and the order of welding must be so altered as to produce a slight convexity of the joint on the running surface after welding and before grinding.

Accelerated Joint Tests

Chemical and metallographic analyses of the seam welds, wedging off fish-plates, cross-bending tests of welded joints and compression-shear tests of seam welds gave strong evidence of the advantages of Process B for welding joints, but none of those tests gave results as regards failures which were anything like those known to occur in service. On account of the delay that would have been caused by the building of a testing machine, it was decided to utilize only the repeated impact method of testing. Accordingly, a No. 2 automatic drop press of the Standard Machinery Company, Auburn, R. I., was adapted to use as a repetitive impact rail joint testing machine. This has a hammer weighing 250 lb. with a maximum drop of 36 in. The drop actually used in all tests was 10 in., and the hammer was allowed to fall at the rate of sixty blows per minute. The energy of the blow is approximately 200 ft.-lb. and its point of application 2 in. from the gap. This machine produced failures in joints which were similar to those observed in actual service, and the seam failures occurred within a comparatively short time. Thus the machine provided a means not only for making accelerated comparative tests, but for making accelerated progress in the development of seam welded joints.

During the past year a large number of welded rail joints have been tested by means of the repeated impact testing machine. The test conditions and a summary of the detailed data obtained appeared in the article in the January *Journal* of the American Welding Society. These tests have proved that the seam-welded joint has been very much improved and that it is safe to assume that joints installed in accordance with the present recommended practice will have an even longer life.

Table I gives a summary of the most important results. In the T-rail joints, without base-plates, welding with Process B defers very greatly the time at which the seams begin to fail by fatigue, and the total length of seam cracks at 50,000 and 100,000 blows is much less than in the case of Process A joints. Further, the use of base-plates with 100-lb. T-rail, while not decreasing the number of seam cracks at a given number of blows, served to increase greatly the fatigue life of the fish-plates. Figures in the column marked "Maximum Blows" give a rough measure of the relative number of blows at which the joints were so badly deteriorated that they had to be removed from the testing machine.

The data obtained on the 7-in. 122-lb. groove rail joints show what can be expected when proper attention is given to the mechanical structure and preparation of the joint and to the best welding practice.

All the joints tested can be classified roughly into two groups: In one, the fish-plates had the shorter life; in the other, the seam welds had the shorter life. Process B characterizes the former group and Process A the latter. The welding process has been improved until the life of the joints is dependent upon the life of the fish-plates, rather than upon the life of the seam welds, as was formerly the case, and by relieving the stresses and increasing the section modulus of the joint at the middle its life as a whole has been greatly prolonged. For example, practically all of the Process B joints had to be removed from the hammer, not because of any excessive cracking of the seam welds, but because the fish-plates finally gave way on account of fatigue at the middle sections.

TABLE I—SUMMARY OF REPEATED IMPACT TEST DATA—HAMMER 250 LB., DROP 10 IN

Description of Joint	Seam Cracks at 50,000 Blows	Seam Cracks at 100,000 Blows	Seam Cracks at 200,00 Blows	Number of Blows: Seam Cracks Started	Number of Blows: Fish-plate Cracks Started	Number of Blows: Maximum	Number of Joints in Average
6-in., 100-lb., T-rail							
Process A, 24-in. x 1-in. plates	29	38	..	13,500	.....	100,000	6
Process B, grooved plates	1	5	..	55,000	93,500	130,000	9
Process B, base-plates	2	8	28	46,500	213,000	247,000	2
7-in., 122-lb. Grooved Rail							
Process A, 24-in. x 1-in. plates	14	(19)	..	20,000	95,500	76,600	4
Una process, 24-in. x 1¼-in. plates	0	0	0	(300,500)	117,000	300,500	2

Table II gives some interesting data on the improvements made in both the welding process and filler rod. In order to minimize the many variables involved in joint welding a series of 6-in., 100-lb. T-rail joints were set up with a $\frac{1}{16}$-in. gap and with only the head seams welded, the bolts, of course, having been removed after welding.

Principles Summarized

As a result of this investigation the following principles can be definitely laid down as underlying the best known practice:

1. The gap between rail heads must be eliminated by bringing carefully pre-

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TABLE II—REPEATED IMPACT TEST DATA—FILLER ROD USED FOR JOINT WELDING HAMMER 250 LB., DROP 10 IN.

6-in., 100-lb. T-rail joints, $\frac{1}{16}$-in. gap, 24-in. x 1-in. fish-plates. Only head seams welded, no bolts. 2 in. of $\frac{1}{2}$-in. diameter rod per inch of seam weld.

Description of Joint	Seam Cracks Started at	Seam Cracks at 25,000 Blows	Seam Cracks at 50,000 Blows	Maximum Blows	Number of Joints in Average
Process A, ordinary low carbon rod	3,100	31	..	19,400	4
Process A, grade 10 rod	11,600	18	..	38,400	6
Process B, grade 10 rod	28,900	9	15	70,600	5
Process B, Una joint rod 200	35,400	2	11	101,000	8

pared rail ends together under compression.

2. The strength of the joint as a beam must be adequate, that is, its section modulus at its middle section must be of the same order of magnitude as that of the rail.

3. Fish-plates must have ample, well-fitting fishing surfaces, and also the proper shape and size of groove for the welding of the head seams.

4. The carbon content of the fish-plates ought to be about 0.25 per cent.

5. Fish-plates should be drawn up tightly by means of bolts.

6. The welding of the seams is best carried out by means of the Una process, involving pre-heating and post-heating, single welding and double welding, and Una joint rod,

7. The copper defining bar is absolutely essential for obtaining the best head seam welds in the easiest and most reliable manner.

8. Pre-heating all seams by means of a long carbon arc prevents excessive chilling of the weld metal and the formation of hard, brittle constituents.

9. Post-heating all seams by means of a long arc tends to relieve welding stresses.

10. Interrupting the base seams at the middle of the joint increases materially the fatigue life of the fish-plates.

11. Staggering and tapering seams toward the ends of fish-plates is effective in producing a fillet effect at the ends of the joint.

12. Staggering the fish-plates likewise is effective in producing a fillet effect.

13. The order of welding seams should be such that the welded joint after cooling is slightly high rather than flat or concave. In general, the welded joint after cooling tends to be concave toward that side, or top, or bottom, on which the seams were welded first.

14. Immediately after welding, the joint should be carefully ground to the contour of the running surface of the rail.

New England Club Activities

THE May meeting of the New England Street Railway Club will be held at the Copley-Plaza Hotel, Boston, Mass., May 22. There will be a session on "Safety" at 3:30 p.m. at which talks will be given by Lewis E. MacBrayne, general manager Massachusetts Safety Council, and H. K. Bennett, in charge of safety work, United Electric Railway of Providence.

Following the regular monthly dinner at 6:30 p.m., two papers will be presented. The subject of the first is "Claims," by J. J. Reynolds, Boston Elevated Railway, and the second, "Problem of Traffic Regulations as Affecting Street Railways," by H. F. Fritch, assistant general manager Eastern Massachusetts Street Railway.

The club's annual outing will be held at Norumbega Park, July 24.

A.E.S.C. Track Bolt Committee

TENTATIVE designs for standard track bolts were considered by subcommittee No. 4, of the sectional committee on standardization of bolt, nut and rivet proportions, organized under the procedure of the American Engineering Standards Committee, at a meeting in the United Engineering Societies' Building, New York, May 14. Members or alternates present were C. W. Squier, chairman, New York; Lem. Adams, Omaha, Neb.; B. G. Braine, C. B. Bronson, New York; W. C. Cushing, Philadelphia, Pa.; J. H. Edmonds, Lebanon, Pa.; John B. Emerson, Chicago, Ill.; J. J. McLoughlin, North Tonawanda, N. Y.; E. F. Schermerhorn, New York.

It was decided that the tentative standards for track bolts should include both oval and elliptic necks, but that standards for the small sizes $\frac{3}{8}$ in. to $\frac{5}{8}$ in. inclusive, should be prepared with oval necks only. Tentative dimensions for all parts of the bolts, with the exception of maximum dimension for the necks, were decided upon. Mr. Braine, of the Rail Joint Company, who has a large amount of information in regard to the sizes of holes used in angle-bars, is to make a study to determine the average size of holes most generally used and make recommendations for neck dimensions of track bolts, which would be most universally used with these plates.

It was decided to specify the length of the threaded portion of standard track bolts. For the present elliptical head bolts are not to be considered for standardization, and the subject of nuts for track bolts is to follow recommendations of the American Railway Engineering Association rail committee.

Trackless Vehicle Operation

THE statistical work being done by the committee on trackless vehicle operation of the Transportation and Traffic Association was reviewed at a meeting held May 12 in New York City. Among the subjects discussed were the tendencies in operating and maintenance methods, financial data, and a proposed set of rules and regulations for operating personnel. Present were W. J. Flickinger, chairman; B. W. Arnold, H. F. Fritch, J. B. Stewart, Jr., and V. E. Keenan.

Possibilities of Railway Electrification Discussed

ELECTRIC power is an improved tool for the use of the railroads, was the conclusion of F. E. Wynne, manager railway equipment engineering department, Westinghouse Electric & Manufacturing Company, in an address before the Railway Club of Pittsburgh on April 24.

Since the power supply is practically 100 per cent continuous, the motive power alone determines the electric system's readiness to serve, he said. Steam locomotives are available for service from 25 to 50 per cent of the time, while electric locomotives in general have 75 per cent up to 90 per cent availability. Steam locomotives average about 55 miles daily, while if electric locomotives, exclusive of switchers, average less than 80 miles per day it is because of some peculiarity of the service.

The following figures were given as to the daily mileage of electric engines on several railroads:

Railroad	Maximum Length of Runs	Average Daily Mileage
Chicago, Milwaukee & St. Paul	200–440	136
New York, New Haven & Hartford	73	135
Pennsylvania (New York terminal)	12	120

The use of electric motive power makes it possible greatly to increase the capacity of tracks. Electric locomotives can handle safely larger trains at higher speed and at closer intervals. Multiple-unit trains have more rapid acceleration, faster schedules, power proportioned to the size of train, and the great reduction in engine and train movements at terminals.

The usual method of comparing locomotive maintenance costs directly on the basis of locomotive-miles was criticised by Mr. Wynne. Logically the maintenance costs should be compared on the basis of the work done. When so compared, he said, electric locomotives show a large reduction in the expenditures for inspection, engine-house expense, repairs and replacements.

A number of advantages of electric operation were cited. Among them are the ability to hold trains on down grades by regenerative braking; elimination of smoke, gases and sparks; higher acceleration rates, and smaller number of locomotives required to perform a given service.

Electrification, further, opens up the field of improving operating methods on the railroads, which, in the opinion of the speaker, have not been embraced fully. More extended electrification will enable the railroads to realize and adopt improved operating methods contingent upon reduced delays, less wear and tear on equipment, less damage to goods and the elimination of intermediate engine terminals.

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The ability to control almost unlimited electric motive power from one point, greater speed, reduction in delays and the greater reliability of electric power, afford means of greatly reducing engine crew and train crew expense.

The reasons for electrifying have been various, but in every instance successful operation has resulted. In many instances material benefits have accrued which, at the time of installation, were unexpected by either the railroad or the proponents of electrification. Some of these cases were cited.

Beyond question electric motive power is not only capable of handling all classes of railroad service, but it can do this better than is possible with steam, said Mr. Wynne. Motive power units, ranging in continuous capacity from 400 to 4,000 hp., are in operation, and locomotives now building will develop continuously 5,950 hp. at 28 m.p.h. These locomotives will be able to exert 300,000 lb. tractive effort, or seven times the maximum permitted on the heaviest railroad equipment in Europe. It therefore appears that there are now available electric locomotives far more powerful than required or usable by the railroads generally. In other words, electricity can adequately meet the physical requirements of transportation far beyond the present general demand.

Full advantage is not taken of the possibilities of electric operation unless it is used to develop new traffic, as well as to handle the going business at the time of installation. The ease and effectiveness with which passenger service can be improved by applying multiple-unit trains is worthy of careful study. In particular, suburban service can be induced thereby to produce worth-while increases in revenue. An instance is on record where electric service increased travel 100 per cent in the first year and attracted an additional 80 per cent the second year.

Midwest Association to Meet

THE Midwest Electric Railway Association will hold its annual two-day meeting at the Fontenelle Hotel, Omaha, Neb., June 11-12. This was the plan decided upon at a meeting of the executive committee in St. Joseph, Mo., on May 9, and announced by President D. L. Fennell of Kansas City, Mo.

American Association News

Executive Committee

THE fact that a number of the members of the executive committee of the American Electric Railway Association expected to be in Cleveland last week for the Chamber of Commerce meeting suggested the selection of that city for the May meeting of the committee. President Budd was not able to be present so Vice-President J. N. Shannahan presided. Other members in attendance were: F. R. Coates, R. P. Stevens, J. P. Barnes, Harry Reid, E. F. Wickwire, C. E. Morgan, Charles L. Henry, J. J. Stanley, E. P. Waller for J. G. Barry, H. D. Shute, L. H. Palmer for C. D. Emmons, and J. W. Welsh.

The committee on publicity, through Mr. Wickwire, said that advantage had been taken of the thirty-sixth anniversary of the birthday of the electric railway, this last week, to broadcast some historical accounts of this event from a number of stations. These generally were given by men connected with the local systems and the accounts were localized. Considerable newspaper material was also sent out in connection with the anniversary. In all of this work the state committees on information were a great help. The "Traction Tom" series is being continued and subjects to be taken up shortly are jitneys, paving, and the attractiveness of the electric railway business for young men. Some companies have substituted portraits of employees for "Traction Tom." The committee has several posters on the way discussing means of relieving traffic congestion.

R. P. Stevens, reporting for the committee on company membership, said that four railway companies and one new manufacturer company have joined the association in the last month. The new members whose applications were approved are the Toledo, Fostoria & Findlay Railway, Fostoria, Ohio; Richmond-Ashland Railway, Petersburg, Va.; Beaver Valley Traction Company, New Brighton, Pa.; Mason City & Clear Lake Railroad, Mason City, Iowa; and the Brown-Lipe Gear Company, Syracuse, N. Y.

C. E. Morgan, reporting for the section and individual membership committee, said that there were four applications for affiliation with the Engineering Association. There were also twenty-two more applications, but these were not accepted because they were not properly filled out.

Mr. Welsh read an invitation from the Secretary of Commerce to Mr. Budd, asking him to appoint representatives on a national committee on street and highway safety. L. H. Palmer, reporting for the committee on mail pay, said that no decision had been handed down since the committee had submitted its brief.

The meeting concluded by the reading by Edwin J. Murphy, statistician of the association, of a further analysis of figures recently compiled by him of electric railway earnings for 1923, published in the issue of ELECTRIC RAILWAY JOURNAL of May 3 and in *Aera*.

Nominating Committee

AT THE meeting of the executive committee in Cleveland on May 7, President Budd announced the appointment of a committee of seven to make nominations for officers of the association to serve during the year 1924-1925. The members of the committee appointed are: C. D. Emmons, Baltimore, chairman; P. H. Gadsen, Philadelphia; C. V. Wood, Springfield, Mass.; J. W. Hancock, Roanoke, Va.; E. C. Faber, New York; Myles B. Lambert, Pittsburgh, and L. J. Drake, New York.

Exhibit Committee Starts Selling Space

BY FRED C. J. DELL
Director of Exhibits, American Electric Railway Association

THE complete personnel of the exhibit committee for the American Electric Railway Association Annual Convention at Atlantic City, Oct. 6 to 10, is announced with this item. Under the direction of Chairman McQuiston, the important work of negotiating contracts has already been done, and the committee now is starting its drive to sell exhibit space for another big convention.

The diagram of the exhibit space on Young's Million Dollar Pier, application blanks for space and other printed matter are now being prepared and will be ready to go into the mail to the membership on June 2. This will be sent by registered mail to the representative of each manufacturer designated to receive all association correspondence. It will be incumbent upon these representatives to see that this matter gets into the hands of the official in the company who has authority to arrange for exhibition space.

A date limit will be set for the return of space applications, June 30, and all that are received up to and including June 30 will receive equal consideration from the exhibit committee, which will meet early in July to make the official assignment.

If you have not already done so, now is the time to begin to plan your display. Reports indicate that there will be an exceptionally large exhibit again this year, as considerable interest has been manifested by the manufacturers ever since the announcement of the convention location. So, plan now to be in Atlantic City next October for what will, without doubt, be the largest and best convention the association has ever had.

The personnel of the exhibit committee follows: Chairman, J. C. McQuiston, manager department of publicity Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.; vice-chairman, C. E. Morgan, vice-president and general manager Brooklyn City Railroad Company, 168 Montague Street, Brooklyn; James W. Welsh, executive secretary American Electric Railway Association; Fred C. J. Dell, director of exhibits American Electric Railway Association, 8 West Fortieth Street, New York; Joseph H. Alexander, Cleveland; Edward J. Blair, Chicago; C. P. Billings, Pittsburgh; Edward Dana, Boston; B. W. Frauenthal, St. Louis; George Keegan, New York; A. J. Purinton, Atlantic City; F. H. Gale, Schenectady; L. E. Gould, Chicago; Cornell S. Hawley, Albany; E. B. Meissner, St. Louis; A. L. Price, Mansfield, Ohio; A. M. Robinson, Philadelphia, and L. W. Shugg, Schenectady.

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The News of the Industry

Peace in Pittsburgh

Strike Terminated When Trainmen Accept Present Wage Scale for Two Years

The strike of the 3,200 motormen and conductors of the Pittsburgh Railways, Pittsburgh, Pa., in effect since May 9, was terminated on May 12 when the men decided to return to work at the present wage scale for two years. The men had sought a maximum increase of 10 cents an hour. The men voted 1,071 to 961 in favor of accepting the proposition submitted. The ballot carried the following proposition: "In consideration of an agreement arrived at by your wage committee and executive board with officials of the company in the Mayor's office, which is as follows: No cars to be operated by strike breakers pending result of mass meeting; all strike breakers to leave company property prior to operation of cars by our men. In consideration of the above, do you accept?"

The vote was yes or no. The proposition had been explained to the men during the meeting held prior to the voting.

According to the terms of settlement as explained by John L. Nelson, business agent of the local division of the Amalgamated, the following concessions were made by the company:

The railway agreed to pay one-half the cost of one uniform over the two years of the new contract. Such uniforms must be purchased before Jan. 1, 1925. There is no stipulation as to where they shall be bought. The approximate cost of a uniform is $28.50.

The company agreed to a better and different form of pass ticket for employees.

Other favorable minor working conditions determined in conferences between the company officials and the wage committee and executive board.

The decision on the vote as to whether the strike should be called off and the determination of the proposal to be presented to the men for their vote was reached shortly before 3 a.m. on May 12 at a conference at which were present Mayor Magee, labor mediators, representatives of the car company and representatives of the men. The vote was taken following the enlisting of 2,200 auxiliary workers from out of town who were escorted to carhouses under police guard on May 10. Safety work had been rushed with the Council appropriating $25,000 for police equipment and with the ordering of automobiles and riot guns for emergency. Meanwhile the company in its advertisements sought the help of the patrons in the early solution of the situation and requested their indulgence during the interval of interrupted car service while plans were being made to restore operations.

Following the announcement of the vote for a settlement on May 12, the Mayor issued this statement:

The final suggestion for a settlement of the strike, that the present wage agreement be continued for two years, came at the end of a five-hour session early this morning from the side of the carmen. I favor it as a practical conclusion of a most difficult and dangerous situation. If there was ever a time when the Pittsburgh Railways needs peace, it is now. For more than fifteen years it was in trouble with the public. For six years it had trouble with its creditors. It was discharged from the receivership only by obtaining a ten-year extension of payment of approximately $5,000,000 of obligations. Its financial credit is nil. A protracted strike would have been disastrous to the public. Another receivership might have resulted in a disintegration of the plant into a dozen separate units of operation. The settlement on the basis outlined will give the railway two years of repose, a period of time in which, with careful management and the co-operation of its employees, the credit of the company may improve, the good will of the public be cultivated, the riding habit of its patrons fostered and increased and the operation of the system be reorganized so that it will become an efficient public servant.

Conferences between the railway representatives and the men have been taking place since early in April, after the men had presented demands for a 70, 75 and 77 cent scale with a two-year agreement. The present rates of pay are 60, 65 and 67 cents an hour. This agreement expired on April 30. Following the presentation of the demands President Thompson announced in a letter to President Winters of the City Council that these demands of the men could not be met without creating a deficit in the revenues of the company. Then followed conferences, threatened walkout, still another conference and then a strike seemed inevitable. The latter was averted on May 1 by the last hour efforts of Mayor Magee, who sought deferment in order to have further parleys. But when the conference on May 8 ended in a deadlock the men took a second strike vote and ran their cars into the carhouse on May 9 at midnight.

New York State Men Accept Present Wage Scale

Employees of the New York State Railways in Rochester, Syracuse and Utica by joint vote of 647 to 457 on May 12 accepted the proposition for a new contract embracing the present wage scale and with modified working clauses, as submitted by James F. Hamilton of Rochester, president of the company. Previously the union employees had rejected an offer embracing a 2 cent-an-hour wage cut.

Under the new agreement, which becomes effective at once, the men receive 51 cents an hour for the first three months, 53 cents for the next nine months and 55 cents for all service thereafter. Changes in working conditions include a basic day of nine and one-half hours instead of nine hours, a weekly guarantee of forty-two hours for new men, 75 cents maximum for overtime for men in the employ of the company more than one year and 71 cents for those working less than year. Operators for one-man cars will receive 80 cents an hour for overtime.

The trolleymen of Utica ratified the pact 148 to 81 and the Syracuse men by 281 to 17. Rochester voted down the agreement by 359 to 218. The workers of the three cities, however, are bound by the joint vote.

The Amalgamated gains a closed shop agreement, also with the right to organize operators of buses and trackless trolleys. The utility operates buses in the three cities and a trackless trolley line in Rochester.

Court Will Decide Whether Detroit Must Arbitrate Wages

A crisis was averted on May 12 in the controversy between the Detroit Street Railway Commission and the local railway union, which demanded arbitration of the request for a 14 per cent wage increase.

Upon petition from officials of Division 26 and thirteen barn representatives of the union among the men, Circuit Judge Theodore J. Richter ordered the Street Railway Commission to show cause on May 19 why a writ of mandamus should not be issued compelling the commission to arbitrate with the platform men. Clarence E. Wilcox, claims attorney and counsel for the D. S. R., will represent the city and the Street Railway Commission at the hearing.

As matters now stand, the City Council has left the decision as to whether the Council shall be compelled to arbitrate to the Circuit Court, the petition asking the Council to order arbitration being turned over to the commission with a request for a report on it and no date set. The incident is considered closed as far as the Council is concerned.

The so-called agreement of Feb. 7, 1923, mentioned in the petition as having been violated by the commission, is according to the commission, not an agreement but simply a resolution spread on the books of the commission outlining the commission's attitude toward the men.

The commission, backed by acting Mayor Martin, has refused to consider the demands for increased wages and the subsequent demand for arbitration as made by the union on behalf of the platform employees. The city officials maintained that under the charter they were not permitted to deal with the union. The union stood firm in its demands fixing 10 a.m. on May 12 as the last hour for receipt of a reply from the commission on the demand for arbitration.

The commission and the acting mayor had stated that in event of a strike

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operators would be on hand to run the cars and that strikers would forfeit their seniority rights. Detroit merchants and manufacturers supported the commission by promising to grant leaves of absence to such employees as volunteered for service as platform men on the city cars. It is estimated that more than 6,000 former street car men are employed in Detroit, including a number of former D. S. R. and D. U. R. employees. Advertisements were run in the local papers seeking new men.

As the commission publicly outlined the situation it has no authority or right to permit outsiders or non-employees to control its departmental business plans directly or indirectly, and the management of a self-supporting city department, such as the Department of Street Railways, must at all times act in a judicial capacity as to the amount of the gross income which should properly be returned to the public in improved facilities and comfort, or decreased fare rates. The fact was also emphasized that 48 per cent of the department's income is expended in payments to labor.

The department plans to have regularly elected representatives from each city line meet with the commission once a month, in the belief that all friction and irritation will be erased once the platform men can, by this contact, be made to consider themselves responsible for the management and success of the railway.

Bus Routes Approved Between Leetsdale and Sewickley, Pa.

The Public Service Commission of Pennsylvania has approved the application of the Beaver Valley Traction Company, New Brighton, Pa., for the incorporation of the Beaver Valley Motor Coach Company. This company has been formed for the purpose of operating coaches or buses in the counties of Beaver and Allegheny, but more particularly between the boroughs of Rochester and Colona, and between Leetsdale and Sewickley. At the present time there is no transportation service between the last two mentioned boroughs. The line of the Beaver Valley Traction Company has its southern terminus at Leetsdale and the Pittsburgh Railways has its northern terminus at Sewickley. The intervening gap of 2½ miles will be bridged by the proposed bus line. This will therefore not only give local service in the communities served but also will permit passengers to make through journeys from points on the Beaver Valley lines, particularly Ambridge and Leetsdale, to Pittsburgh, by way of the bus line and the Pittsburgh Railways. Other applications for bus routes to be operated by the Beaver Valley Traction Company are at present before the commission.

Will Start Bus Line.—The Eastern Wisconsin Electric Company, Madison, Wis., will start a bus line from Madison to Sheboygan, Wis. The route will be by way of Fond du Lac, Wis., where a change of buses will be made. The distance covered is 115 miles.

Wage Agreements in East St. Louis

W. H. Sawyer, president of the East St. Louis & Suburban Railway, East St. Louis, Ill., and subsidiary lines announced April 30 that the company had reached an amicable agreement with its carmen, members of the Amalgamated, on a new wage scale effective May 1. The new contract runs for one year.

Men in the employ of the company on May 1, 1924, on the city lines of the East St. Louis Railway and the East St. Louis & Suburban Railway will receive the following pay in cents per hour:

First three months	47½
Next nine months	50½
Next six months	55½
Next three months	56½
Thereafter	57

New men employed after May 1, 1924, will receive in cents per hour:

First six months	45
Second six months	50½
Thereafter	Above rates to apply

One-man car operators, except in Belleville, 5 cents per hour additional.

The previous scale was: First three months, 45; next nine months, 48; next six months, 53; thereafter, 54.

On the interurban lines of the East St. Louis & Suburban Railway and the Alton, Granite & St. Louis Traction Company men in the employ of the company on May 1, 1924, will receive in cents per hour the following scale:

First three months	52½
Next nine months	55½
Next six months	57
Next three months	58½
Thereafter	59

Men employed after May 1, 1924, will receive:

First six months	50
Next six months	55½
Thereafter	Above scale to apply

Operators of limited trains 1 cent per hour additional.

One-man car operators on Brooklyn Division, 3 cents per hour additional.

One-man car operators on other divisions, 5 cents per hour additional.

The previous scale in cents per hour was: First three months, 50; next nine months, 53; next six months, 55; thereafter, 56.

On the Alton city lines of the Alton, Granite & St. Louis Traction Company men in the employ of the company on May 1, 1924, will receive the following wages:

First three months	47½
Next nine months	50½
Next six months	52½
Next three months	54½
Thereafter	55

Men employed after May 1, 1924, will receive:

First six months	45
Next six months	50½
Thereafter	Above scale to apply

One-man car operators 4 cents per hour additional.

The previous scale was: First three months, 45; next nine months, 48; thereafter, 52.

Commanding Mountains in Oregon

The benefits of natural resources in mechanical output are emphasized in "The Might of the Mountains," issued by the Portland Electric Power Company, Portland, Ore., describing its Oak Grove hydro-electric development. This is the largest individual industrial enterprise now under construction in the Pacfiic Northwest, "representing $20,000,000 of faith and confidence in Oregon's future." Besides some attractive views of mountains and lakes, dams and power houses, the pamphlet gives some instructive information on the customer ownership of the company, with many "Pepco" highlights.

Purchase Price the Big Question in Chicago

With the question of an operating board virtually settled, conferences between city officials and officials of the Chicago Surface Lines and the Chicago Rapid Transit Company looking toward the municipalization of the lines in Chicago are being held at least once a week.

Progress has been made with respect to the operation, with the adoption of the theory that if men of the right caliber are chosen for the "neutral" board, the lines will be operated in the best way possible, but there is virtually no change in the deadlock in the conferees with respect to the price.

The city regards the ordinance price as too high, and various items of the capital account have been under scrutiny. The lines have offered to agree to sell at reproduction prices estimated by competent evaluators, but this proposition has likewise been rejected by the city. Further conferences will be held.

Committee Declares Grade Crossings Will Be Abolished

The utility committee of the Los Angeles City Council in reviewing recent petitions of the Union Pacific System and Santa Fé Lines to cross Anaheim Road in the Los Angeles harbor district at grade has strongly opposed the granting of the permit. This was made the matter of a hearing before the California State Railroad Commission at Los Angeles on May 8. The utility committee declared that traffic had been blocked for hours at the present heavily traveled highway, which is one of the main roadways to the Harbor District, and that automobiles were often lined up for miles waiting for a chance to pass over the crossing.

The committee further declared that no further permits would be granted to railroads to cross highways at grade within the city limits of Los Angeles and that all existing crossings at grade will be ordered abolished.

It is evident that the grade crossing problem in California has reached a most serious stage, according to the report of Lester S. Ready, chief engineer of the California State Railroad Commission. He recently discussed the issue in a paper before the National Conference on grade crossings, held in Chicago.

Mr. Ready's recommendations for lessening hazardous conditions at grade crossings involved the separation of grades, installation of wigwags, removal of all obstructions to the view, public control of lands adjacent to crossings, use of red lights as stop signal and elimination of advertising signs as semaphore warnings.

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Drastic Parking Measure Proposed at Chicago

A drastic parking ordinance is under consideration by Alderman Frank J. Tomczak, chairman of the safety commission appointed by Mayor Dever of Chicago.

The proposed ordinance is now being scrutinized by the corporation counsel's office as to its legality. It is so drawn as to prohibit the parking of automobiles on all streets on which there are street-car tracks. The author of the ordinance feels that such an ordinance would do more to lessen congestion than any other it is possible to pass. He says there would be a freer movement of traffic and the danger of accidents would be much decreased.

Opposition to the proposed ordinance has been voiced by officials of the Illinois Automobile Club and the Chicago Automobile Trade Association, who contend that if the measure passed and were enforced, motorists would find their machines practically useless for business purposes.

Others opposed to the measure pointed out that streets upon which there are now car-lines are practically free from parking, and that one street, notably Monroe Street, without a car-line west of a short distance from the loop, is one of the most congested streets, due to the parking which leaves a narrow lane for traffic.

"It is a safety measure," said Alderman Tomczak, when he heard of the complaints. "It is going to inconvenience the motorist, perhaps, but it will help the thousands of street-car riders and keep the streets safer for the children, and I'm going through with it."

$2,000,000 Sought for Re-establishing Toronto Radials

Before the Toronto Board of Control Sir Adam Beck recently sought authorization for a bond issue of $2,000,000 to transform the York radial system into a paying proposition. The money will also provide for the complete rehabilitation of the system. His request has been referred to the City Treasurer and city engineers, who will report shortly on the matter. The amount of money which will be spent according to carefully prepared plans of the hydro engineers will, in Mr. Beck's opinion, entirely do away with the deficits of past operation and make the Toronto and York radials dividend-paying investments. He recommends that the amount to be spent be divided as follows: Mimico division, $750,000; Scarboro division, $150,000; Metropolitan division, $1,100,000. Total improvements for the system proposed amount to $2,076,272. There remains, however, from the previous appropriation of $600,000 some $82,241, leaving the total net requirement for the new program $1,994,030.

The Hydro Commission took over active management of these radials for the city of Toronto in November, 1922. Since then deficits have been shown by two divisions of the radial systems, the Metropolitan and the Scarboro. On the Mimico division there was a net surplus of $16,276. The deficit for the three lines for the period of operation is $205,649.

It is proposed to double-track the Mimico division, operate excursion trains of five or six cars on the Metropolitan division, operate regular two or three-car trains at certain hours, scrap old equipment and operate one-man, two-man cars on the Mimico and Scarboro divisions. On the Scarboro and Mimico divisions changes in both way and equipment will be made in order to insure more efficient operation.

Under the new plan $25,000 has been appropriated for a new freight terminal, $4,000 for a freight shed downtown and $10,000 for trucks to handle express and package freight to the city ends of the radial.

Stops Eliminated in Cleveland

In an effort to speed up and improve service in Cleveland, the Cleveland Railway has eliminated 349 car stops with the sanction and approval of City Council and of City Street Railway Commissioner C. M. Ballou. The reduction in the number of stops represents a cut of more than 20 per cent. The stops in the residential part of the city are about 750 ft. apart, while in the downtown or congested district they average about 350 ft. apart.

Ralph W. Emerson, general manager of the Cleveland Railway, said:

> The elimination of the 349 stops has meant an average saving in running time of between ten and twenty minutes during the rush hours. It is enabling us to operate on schedule during rush hours, something we have never before been able to do, and it is rapidly making it unnecessary for us to send out so-called meeting crews to pick up cars that were running from ten to twenty minutes late during the rush hours.

The schedule speed in Cleveland today is almost 10½ m.p.h.

Mr. Ballou also points out that the stop elimination may help to reduce the amount of money paid out by the company for injuries and damages. In 1923 $1,125,000 was paid out on this account.

Mr. Ballou is now working out traffic code changes that will probably include an order banning automobile parking during rush hours on streets with car tracks. He may also suggest heavy penalties for drivers of motor vehicles who unnecessarily invade car tracks.

Councilman John M. Sulzmann is also planning to have an ordinance passed by the City Council making all streets on which there are tracks right-of-way thoroughfares, so that motor vehicles when crossing these streets will have to come to a dead stop before making the crossing.

The Cleveland *Plain Dealer* says that the policy of reducing the number of car stops is a step in the direction of improvement of a public service. That paper has pointed out to its readers that the street car patron who is compelled, by the elimination of a stop, to walk an additional block is the direct beneficiary of other stops which are eliminated. The *Plain-Dealer* said:

> In fact, the entire public is benefited. To speed up service, to give Clevelanders something approaching rapid transit, to take a step toward the transportation efficiency maintained by other large cities is the aim of those who have decreased the number of car stops. The benefit is real; the inconvenience is largely imaginary.

Five-Cent Fare Wanted in Boston Tunnel and Subway

A movement has been started among the patrons of the Boston Elevated Railway, Boston, Mass., to secure a 5-cent fare for short rides in the tunnel and subway system. The East Boston people, who have just secured an improved service by the enlargement of the terminal facilities of the East Boston Tunnel and the introduction of a train service instead of the old surface car service, have petitioned the Elevated management for a 5-cent ride through the tunnel to Devonshire Street in Boston proper. This is a new principle in fare adjustments in Boston, as no part of the subway or tunnel system can be used today on a reduced fare basis. The Elevated has responded generously to the requests for reduced fares on short hauls throughout the city and its suburbs, so that a very large percentage of its traffic today is hauled on the 5-cent basis. There are numberless 5-cent zones in the district, but they are all on the surface.

James F. Jackson, chairman of the board of trustees of the Boston Elevated, says that his board may be willing to give the East Boston people a 5-cent fare between certain points in East Boston, and will not take very long to decide that question, but he does not promise to give favorable consideration at the present time to the introduction of the 5-cent rate in the tunnel. It could not, in any event, be granted until the end of the fiscal year, when it will be definitely known if the company will be able to make its yearly payment on its debt to the communities which helped the company financially in 1919 to meet its deficit.

Suit Started Against New Orleans Property Owners

The city of New Orleans, La., through its special counsel in the matter, James Wilkinson, has started its first expropriation suit against property holders whose holdings in the area of the Rampart Street-St. Claude Street cut-off must be acquired by the city to make that street an artery for heavy traffic and give it the needed width to enable the New Orleans Public Service, Inc., to lay a double system of tracks along its route from Canal Street to the lower sections of the city.

This is in keeping with another of the recommendations contained in the Beeler report. Following the announcement that the city and the New Orleans Public Service, Inc., had $400,000 with which to acquire the needed property, owners of residences in that section of the city asked from 400 to 500 per cent profit over the cost price of the property.

In his suit it will be the aim of Mr. Wilkinson to stress the principle laid down by the Supreme Court in an opinion in which it held that in suits by governmental agencies to expropriate land for public purposes the assessments of the property for taxes was admissible to prove value, and further, that the Louisiana Constitution of 1921 provides that assessed value should be made the basis of payment in all levee board cases where property was taken.

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North Shore Says It Has Elevated Rights

Officials of the Chicago, Milwaukee & North Shore Railway have offered to pay the sum of $5,350 in additional revenue for the privilege of using the right-of-way of the Northwestern Elevated Railway into Chicago. They continue, however, to deny the contention of the city that the company is operating cars illegally over the elevated and without a franchise. Members of the Council committee on transportation have not approved the offer, but instead the entire question has again been referred to the corporation counsel's office.

Patrick J. Lucey, attorney for the company, contends that the line is an intrastate road over which the City Council has no control. The offer to pay additional compensation to the Northwestern road was made with the understanding that this road would then make additional payment to the city because of the extra revenue, in accordance with the present agreement.

An ordinance providing for the payment by the Northwestern of additional compensation to the city for the privilege of allowing the North Shore trains to run over its tracks will probably be the outcome of the controversy.

The city is apparently satisfied that the operation of the North Shore trains in no way slows or hinders the regular service on the elevated road. On the floor of the City Council aldermen have pointed out that the city would gain nothing by stopping the trains, but would seriously interfere with the passengers' wishes. Negotiations between Corporation Counsel Francis X. Busch and representatives of the North Shore lines are proceeding.

Vocational Education Going Strong on Boston "L"

Several hundred employees of the Boston Elevated Railway have been engaged in systematic study during the past fall, winter and spring. On May 8 certificates were awarded to 133 men who had completed courses conducted under the auspices of the Massachusetts Division of the University Extension. Of these certificates, 106 went to students in the course in public utility economics, conducted by L. R. Nash of Stone & Webster. The remaining certificates were awarded for courses in practical electricity and dynamo-electric machinery. With the certificates the company returned the tuition fees which the men had paid for the courses.

The certificates were presented at a dinner, given by the company, at the Hotel Somerset. Before the presentation the men were addressed by James F. Jackson, chairman board of trustees, Boston Elevated Railway; Payson Smith, commissioner of education Commonwealth of Massachusetts; President Lowell of Harvard University, and the instructors who conducted the courses. General Manager Edward Dana acted as toastmaster. He stated that fifty different positions were represented among the students, and that their average term of service was sixteen years and their average age forty-one years.

Besides the University Extension students, many have been enrolled in local schools and in correspondence schools. Six are taking a co-operative course of college grade in the Massachusetts Institute of Technology, alternate terms being spent in school and on the railway property.

One-Man Cars Allowed in Dubuque

One-man car operation, on trial in Dubuque, Iowa, for the past year, was officially approved recently by the City Council, which took the first steps toward repealing the ordinance, adopted some years ago, which prohibits the operation of one-man cars. As a result of this action by the Council, one-man cars will shortly be operated on all lines of the Dubuque Electric Company in the city with the exception of the West Eighth Street line. Two men will be used on the Main Street line during rush hours only.

The repeal of the ordinance requiring that all street cars have a motorman and a conductor does not take away from the Council power to regulate the street cars, the city solicitor explained to the Council members. The franchise under which the Dubuque Electric Company operates its system gives the Council the authority at any time to regulate the type of street cars used.

T. T. Parker, general manager of the company, appeared before the Council and informed that body that the year's trial of one-man cars, authorized by the City Council, would expire soon. Mr. Parker then explained that 40 per cent of the equipment now being used is of the one-man type. Operation of the one-man car has proved very satisfactory to the company, Mr. Parker said, and he added that he believed it had proved satisfactory to the public. He then asked the Council that it repeal the two-man car ordinance so that the company might operate the one-man car on such lines and at such times as it deemed advisable.

Weekly Pass in Salt Lake City

The Utah Light & Traction Company introduced the weekly pass in Salt Lake City on May 4 for a three months trial following authorization by the Public Utilities Commission of Utah.

The cost of the pass through the one-fare zone is $1.25. A two-fare zone pass sells for $1.75, and for three-fare zones it is $2.25. The passes will not replace the 6¼-cent ticket or the 7-cent cash fare.

The passes for each week may be used from 4 a.m. Sunday of that week to 1 a.m. Sunday of the following week. Passes for each week are on sale for three days, from Saturday of the preceding week to and including Monday of the week for which the pass is usable. The passes are sold by street car operators as well as at the company's uptown ticket office. A pass may be used by any member of the family or by any one to whom it may be loaned. It is only good, however, for the transportation of one person, and no transfers are issued on passes. In introducing the new form of transportation the company advertised it extensively.

Railways in Illinois Seek Bus Permits

The Illinois Commerce Commission has taken under advisement the applications of the DeKalb-Sycamore & Interurban Traction Company and the Illinois Power & Light Company to discontinue railway service in four Illinois towns. The board is also considering the application of the Northern Illinois Public Service Company to run buses between DeKalb and Sycamore.

The Illinois Power & Light Company has asked for permission to substitute buses for cars between Galesburg and Knoxville, while the DeKalb-Sycamore Interurban Traction Company seeks to stop operating cars in and between DeKalb and Sycamore.

The commission has set June 3 as the date on which it will hear the petition of the Peoria Bus Transportation Company to operate between Peoria and Farmington. The Murphysboro & Southern Illinois Railroad has withdrawn an application for a permit to operate buses between Carbondale and Herrin. The Coal Belt Electric Railroad and the Missouri Pacific Railroad (steam) opposed this permit.

Union Backs Company's Discipline on Fares

Indorsement on the system employed by the Chicago Surface Lines in disciplining its trainmen was contained in a statement made at a recent meeting of their union by their president, William Quinlan. A report of this meeting, as printed in the union's official organ, the *Union Leader*, is contained in the following statement:

> Conductors who attempt to beat the fare register or fare box must realize that they will not be retained in the service. It is not possible to get away with it. The checking system used by the company has been investigated by the organization, and there is no indication that discrimination or hasty judgment enters into the determination of an employee's conduct. The check of a number of inspectors is studied before any conclusion is reached. All conductors are checked, and the fact that thousands of them remain in the service, with clean records, is evidence that there is no desire on the part of the company to get rid of competent conductors.
>
> President Quinlan stated that, due to an understanding reached some time ago that men would be warned of infractions of the rules and given an opportunity to correct their mistakes before being discharged, the number of men leaving the service for these causes has been reduced about one-half. He urged executive board members and the older members on the lines, particularly those who break in students, to warn the younger members of the pitfalls; to urge upon them the necessity of living up to the rules as nearly as possible; to register fares promptly and correctly, and to use caution in averting accidents.

Beaver Valley Men Continue at Last Year's Pay

Trainmen of the Beaver Valley Traction Company, New Brighton, Pa., are operating on the same wage scale which has prevailed for the past year. That schedule is 60 cents an hour maximum for operating two-man cars and 65 cents an hour for operating one-man cars. The men voted whether they would continue on their old scale with the understanding that the same differential in the rates as compared with Pittsburgh would be maintained. The vote was unanimous.

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News Notes

Will Seek Old Rate.—The experimental 5-cent fare of the Hornell Traction Company, Hornell, N. Y., is to be abandoned, it is reported, and the old 8-cent rate is to be restored as soon as the necessary permission can be obtained. Recently the owners of the road decided to abandon the property, but a reorganization was effected and in an effort to stimulate business the fares were dropped from 8 cents to 5 cents.

Will Hear Bus Application.—The United Traction Company, through its subsidiary, the Capitol Transportation Corporation, has applied to the city of Rensselaer, N. Y., to operate a bus line in that city. A public hearing has been set on the application for May 20, after which the Common Council will act on the application.

Jitney Regulations Revised. — Roanoke, Va., is to have a new deal with respect to the jitneys. The autos run for public hire in competition with the railway lines of the Roanoke Railway & Electric Company will not be entirely eliminated, but they will in the future be more closely regulated. They have been ruled off some streets entirely, and in the future only men who qualify as capable drivers will be licensed to run jitneys.

May Run One-Man Cars.—It is reported that the Danville Traction & Power Company, Danville, Va., is preparing to ask the City Council for permission to operate one-man cars on its line. The company a short time ago announced a 5-cent fare experiment for a period of ten days with the purpose of increasing its patronage. If unsuccessful, it was stated that the company would revert to the 7-cent fare.

Will Operate Line.—The Northampton Street Railway, Northampton, Mass., has voted to accept a proposal of the Northampton Chamber of Commerce to operate the line of the Connecticut Valley system between that city and Hatfield, recently discontinued. A guarantee fund has been pledged to meet expenses. It is understood that arrangements for the purchase of the line from D. P. Abercrombie, receiver for the Connecticut Valley, will soon be completed. A similar plan for operation of the line from Northampton to Amherst is deemed probable.

Buses Up to Voters.—The City Council of Duluth, Minn., by a 4 to 1 vote has decided to submit to the voters of the city on June 16 the initiative ordinance for the regulation of buses on the streets of the city. If the ordinance prevails at the special election, all buses, except taxis and those engaged in intercity or interstate traffic, will be barred from the use of all streets on which the Duluth Street Railway now maintains a double-track system. The Council received a petition, signed by a required number of voters, asking it either to pass such ordinance or submit it to the voters. The Council declined to act on the proposition and chose the alternative method of disposing of the matter. The Bus Owners' Association is already waging an active war against the passage of the ordinance, but supporters of the measure are confident that it can be passed.

Extension Association Formed.—An indication of the dependence which Chicago subdividers place upon the extension of transportation is apparent in the name of an association just formed, which is to be known as the Northwestern "L" Extension Development Association. The object of the association is to obtain co-operation in laying out the new town of Niles Center and working out plans for public improvements.

Payroll Statement Incorrect.—The combined payroll of the Springfield Street Railway and the Worcester Consolidated Street Railway is $4,005,750. In reviewing the wage hearings of these companies in the ELECTRIC RAILWAY JOURNAL, issue of May 3, it was stated that this figure was $1,832,789, which is the amount of the payroll of the Springfield company alone.

Voters to Decide Trolley Issue.—An election is to be held in Brunswick, Ga., at which the voters will decide the question of authorizing the City Commission to enter into a contract with the Brunswick & Interurban Railway for the leasing of the system with the option to the city of purchasing it. The line has been operating at a loss and was about to be junked.

Offer Free Service.—The Springfield City Council passed an order May 12 calling on the transportation board to take action to prevent further operation of jitney buses in competition with the Springfield Street Railway, Springfield, Mass. Since May 1 many of the buses formerly licensed to carry passengers have been running on the basis of offering free service. They are carrying many persons and it is said that virtually all the passengers leave coin to pay for the service they thus receive. How to stop this competition is the question before the municipal officials.

New Agreement to Go Before Ratepayers.—A revision of the proposed franchise between the city of St. Catharines, Ont., and the Niagara, St Catharines & Toronto Railway has been accepted by the City Council of St. Catharines. The new agreement will be submitted to the ratepayers of the city next month.

Resolution to Oppose Increase Suspended.—The Aldermen of Providence, R. I., have adopted a resolution suspending a resolution passed by the City Council several weeks ago and signed by Mayor Gainer directing the City Solicitor to appear before the Public Utilities Commission and oppose any increase in fares asked by the United Electric Railways. The suspension will be in effect until all Providence zones are extended to the city line, "pending an investigation of the whole subject of increase in fares and extension of fare zones by the joint special committee on United Electric Railways affairs." Under the new schedule which has been filed by the United Electric Railways with the Public Utilities Commission four city zones are not extended to the city line.

Charges Fares Are Unjust.—The city of San Bernardino has filed a complaint with the California Railroad Commission against the Pacific Electric Railway alleging that the passenger fares in the city of San Bernardino are unjust and unreasonable. It is alleged that the fare from certain portions of the outlying district of San Bernardino to the business center is 9 cents, while from that territory to the business center of Colton it is but 6 cents, although the distance traveled for the 9-cent fare is less than the distance traveled for the 6-cent fare. The city asks the commission to order a 6-cent fare in effect from a point 2,640 ft. south of Mill Street to all points in the city of San Bernardino.

Congestion Will Be Relieved.—Under an order by the New York Public Service Commission, effective May 15, 1924, the Schenectady Railway is relieved from carrying local passengers in the city of Albany, the company being permitted to extend its eastern limits from Stop 32½ to Stop 33. Arrangements have been effected between the United Traction Company and the Schenectady Railway whereby all local passengers within the city of Albany will be transported by the United Traction Company. This, it is believed, will relieve congestion in the service between Albany and Schenectady and otherwise facilitate operation of traffic in the city of Albany.

Company Denies Charges.—The city of Oakland, having filed a complaint with the California Railroad Commission against the Key System Transit Company, alleging that its local railway service is inadequate and does not properly serve the needs of the city, the defendant corporation has filed its answer with the Railroad Commission. It enters a general denial to the city's allegations, asserting that it has officially signified its desire to co-operate in every way possible with the city of Oakland and that in furtherance of this desire the company has appointed Richard Sachse, a former chief engineer of the Railroad Commission, to make a survey and to report recommendations for the improvement of the service.

Allows Operation Without Transfers.—Among the measures vetoed by Governor Smith, in what is known as the omnibus message, thirty days after adjournment, was the Russell bill authorizing the Transit Commission to extend for a period of one year the operation of the railway line of the Nassau Electric Railroad in the Borough of Brooklyn, commonly known as the Park Avenue line, without exchanging transfers with connecting lines, notwithstanding the provisions of any charter, franchise, agreement or statute. The Clayton bill extends the same provision to the Church Avenue line. Lines of this company have been exempted from issuance of transfers by special legislative permission from year to year since 1921, and the vetoing of the two bills by the Governor means that when the order of the Transit Commission issued a year ago expires these two lines will then be obligated to issue such transfers as is provided for in their charter or franchise agreements.

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Foreign News

Electrification in the Belgian Congo

The work of electrifying and extending the railway in the Belgian Congo has been undertaken by the Société des Constructions Africaines, a Belgian company. The contract is for 270 km. of single-track line, at a figure of 30,000,000 francs, the work to be completed within thirty-six months from October, 1923.

The necessity of this new trackage is made apparent by the blocking of various port terminals where there are continually 25,000 tons of merchandise from the interior piled up awaiting transport. It is expected that the new line will be able to move 500,000 tons per year. The entire electrification scheme involves the expenditure of 50,000,000 francs and with its completion an anticipated reduction of 6,000,000 francs per annum in operating expenses will be brought about. In addition it is stated by the government press that traffic conditions will enable practically unlimited tonnage to be transported in view of possible extensions and improvements which may be later required and met.

Paris Suburban Electrification Opened

Electric surburban trains were run out of the St. Lazare Station of Paris for the first time the morning of April 27 under the plan for the electrification of the suburban lines. The trains were run to Bois Colombes, in which village is the stadium where the Olympic Games are to be held during the summer. The running time to the stadium is twenty minutes, and it is estimated the trains will be able to handle 50,000 persons daily.

The trains resemble the all-steel trains on the New York subway. They are labeled as being "absolutely fireproof."

A departure from the European system is to be made by the elimination of third-class passengers. Only passengers of the first and second class will be accommodated. There is to be no smoking on the trains.

Rouen Tramways Profits

The Rouen Tramways Company, in the French city of Rouen, with 125,000 inhabitants, made a net profit of 1,224,088 francs during 1923. The gross receipts were 10,278,249 francs, practically an increase of 1,000,000 francs over the year before. This improvement is due to increased services rendered during the year, brought about by a notable increase in the traffic of the port of Rouen. The expenses of 8,067,678 francs represent an increase of 1,503,566 francs as compared with 1922, chiefly due to greater cost of imported coal.

The operating ratio which was in 1922 0.705 increased in 1923 to 0.785. The company operates under an agreement with the municipality whereby a part of the profits are turned into the city treasury. In 1923 the city's revenue therefrom amounted to 165,440 francs.

Track laying, repair costs and new equipment begun in 1922 were carried out in 1923 to the extent of 4,771,000 francs. A new loan of 10,000,000 francs was negotiated, due in 1964. Dividends on common stock were paid at 5 per cent.

Tokio May Have Subway

The first subway in Japan will be built shortly in Tokio, although it is merely an experiment, with a length of 1½ miles, and it will not serve as a connection link between the residential sections and the city's business center, which the citizens want most keenly to have. However, it will be an object lesson both to capitalists and people. If it succeeds, it will prove the beginning of a big drive for subways, and capital will begin to flow in that channel. Traffic congestion on the electric tramways in Tokio, Osaka and other large towns in Japan was already serious before the quake of last year. Only a radical change in traffic control could relieve it, in the opinion of the public. The drift of public opinion encouraged promoters in the electric traction field, and in Tokio alone several subway companies were floated. Government charters were obtained and in some cases borings were made at many places in Tokio to study the geological formation to determine the method of tunneling.

Prior to the recent quake not a single mile of subway had been built, however, and the public grew suspicious of the subway promotions.

The present plan for subway construction in Tokio is by new men, although they will carry it out by taking over one of the pre-quake subway companies. In their opinion, with the new line actually built and its usefulness demonstrated, subway enterprises will regain their standing. Baron Furuichi, Privy Councillor, is the president of the subway company, and Shosuke Nakagawa, lately Vice-Minister of Railways, is vice-president.

The section to be built is under a broad thoroughfare connecting Uyeno Park with Asakusa Park, upon which at present runs a surface railway owned and managed by the Tokio Municipal Electricity Bureau. This section being the connection link between two main pleasure resorts of the city, the traffic on the surface road is exceedingly heavy.

This section was low marshy land before the capital city sprang up 300 years ago. Some geologists doubt if it is fit for an underground road, but the promoters insist that this doubt is not well founded, although it is admitted that at one or two places the formation is loose. According to the company's original plan the tubes, which are to be reinforced concrete, are to be laid 3 ft. under the surface of the road. They are to be 22 ft. wide and the height of the rectangular tubes must not exceed 12 ft. Construction will be by the cut-and-cover method in sections of 600 to 1,200 ft.

It is proposed to run steel cars, three to six in a train. Proposed headways are two to five minutes, and their average speed between 34 and 35 m.p.h.

Ten Swedish Railways May Electrify

Following the electrification of the Swedish State Railroads between Stockholm and Gothenburg, now in progress, it is proposed to electrify at least ten of the privately-owned railroads. According to recent news dispatches, these are being studied by a special commission with a view to the adoption of electric operation.

These ten lines all run through central and southern Sweden in the most densely populated and most highly industrialized regions of the country.

Planning Culoz-Modane Electrification.—The French Minister of Public Works has reported the planning of the electrification of the Culoz-Modane Railway to make possible the electrification of the Paris-Lyons-Mediterranean Railway. The section which it is proposed to electrify is 125 km. in length. It is expected that the work will be completed by 1925.

Tramway Proposed for Hankow.—Chinese capitalists of standing, propose to raise $2,000,000 and form a company for the operation of tramway service in Hankow. The promoters will pledge one-half the capital and the other half will be raised from other sources. It is said that the development of the city, which is an important Chinese commercial port, is being hampered by the lack of transportation facilities. Local officials with authority to grant concessions have expressed themselves as favorably impressed with the scheme.

Beirut Tramways to Increase Capital.—The French company operating the tramways and light and power supply system in Beirut, Syria, announces that its capital will be increased from 200,000 francs to 10,000,000 francs and that the company will be fused with the former Société Ottomane des Tramways et d'Electricité de Beirut. The large increase in capitalization shows plainly the vast strides that French interests are making under the mandate granted France under the Versailles treaty. The company is largely controlled by Paris bankers and French contracting interests in Beirut.

Decrease in London Tramway Traffic.—During the financial year ended March 31 last the number of passengers carried by the London County Council Tramway was 689,015,086, a decrease of 44,796,281 as compared with the previous year. The aggregate receipts were £508,386. Owing largely to increasing bus competition the weekly tramway traffic receipts have shown reductions for a considerable time.

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Financial and Corporate

Drastic Cut in Capital

$51,202,823 Reduction in Outstanding Securities Arranged in Reorganization of New York Railways

A plan to reorganize the New York Railways, operating 75 miles of surface line in New York City, under preparation for several months, was approved on May 14 by Federal Judge Julius M. Mayer. It will become effective as soon as the terms receive the approval of the Transit Commission. The present capitalization of the company is approximately $91,366,000. On completion of the plan of reorganization the capitalization will not exceed $38,788,472, principal amount of bonds, and 184,830 shares of preferred stock without par value, and 90,200 shares of common stock without par value. The reduction in capitalization therefore is $51,202,823 and in annual charges $1,494,905. Fixed charges were $3,628,533 annually.

The capitalization of the new company is thus distributed:

	Principal	Annual Interest
Bonds to remain undisturbed or privileged to conversion	$14,653,000	$728,000
Bonds to be extended	600,000	34,500
New Sixth Avenue purchase bonds	300,000	15 000
New prior lien bonds.	3,800,000	190,000
Tentative total of fixed charge bonds.	$19,353,000	$967,500
New income bonds	19,435,472	1,166,128
New preferred stock, 184,830 shares (at $5)	924,150	.....
New common stock, 90,200 shares (at $5)	451,000	.....
Tentative total capitalization	$40,163 622	$2,133,628

That the new company may have sufficient capital the plan authorizes the issue of prior lien bonds not to exceed $5,000,000, these bonds to be a lien on the company's property and on all property acquired by use of the money obtained through their sale. Authority is also conferred upon the new company to create an issue of income bonds of a face value of $21,000,000, which shall be a lien junior to the prior lien bonds.

Preferred stock may also be issued of a par value to be determined later, with non-cumulative dividends payable at periods to be determined, but no dividends shall be paid on the common stock "unless and until in the same calendar year of such payment the full dividend of $7 per share shall have been paid or set aside for payment on the preferred stock." The preferred stock is limited to 184,830 shares.

The common stock may be of no par value or of such value as may be determined, and with a total issue of approximately 90,200 shares will have the sole voting power. It may be placed in a voting trust.

Judge Mayer pointed out that the plan provides for the continuance, under the control of the new company, of all the service at present operated under the receiver. The Ninth, Eighth and Fourth and the Madison Avenues lines, formerly under lease to the New York Railways were withdrawn since the present receivership because of defaults in rentals.

Judge Mayer expressed appreciation of the New York Transit Commission's co-operation in assisting the court to end transit receiverships and called attention to the fact that when this receivership is ended there will no longer be any active transit receiverships in the Federal courts of this jurisdiction. Judge Mayer said that when the receivership began in March, 1919, the property was in very bad condition and embarrassed by a seemingly insuperable load of debt and that, despite "numerous economies and the careful management under the receiver," it had been plain at all times that it was necessary substantially to reduce the outstanding capital.

It is expected that the new company, with a name to be chosen later, will be in sole control of the properties not later than July 1. In the meantime the receiver, Job E. Hedges, will continue to function.

Proposition Received on St. Louis & Suburban Property

Bondholders of the St. Louis & Suburban Railroad, part of the United Railways, St. Louis, who have been seeking a separate receiver and valuation of their property, have received a definite proposition for its purchase. While the exact terms of the offer have not been revealed, it is said to approximate $6,000,000, or within $500,000 of the total par value of the bonds.

This situation has added to the difficulties of the reorganization committee of the United Railways, which in the latest reorganization plan proposed to retire $4,500,000 of the Suburban's general mortgage bonds and renewed the $2,000,000 Suburban consolidated bonds. Suburban bondholders have stated that they wanted their money in full or the property returned to them.

City Counselor Senti has applied to the Federal court for leave to intervene in the application of the St. Louis & Suburban bondholders for a separate receivership for that system. The city is interested in preserving the railway system as a unit and in protecting the existing transfer arrangement. Judge Faris, in replying, said that he recognized that the city had a sentimental interest in the case, but that he doubted its legal right to intervene. He said he would withhold his order until he had an opportunity to go into all of the legal phases of the case. He then referred the city's petition to Special Master Fred L. Williams.

J. K. Newman of Newman, Saunders & Company and a member of the reorganization committee of the United Railways has arrived in St. Louis to start the expert work which his company will do in connection with the lifting of the receivership. He has stated publicly that he favors a service-at-cost arrangement involving a fixed return upon invested capital and a varying rate of fare sufficient to provide a profit under varying conditions.

Fifty-Mile Long Island Line Wants to Quit

Lincoln C. Andrews, the receiver of the New York & Queens County Railway, Long Island City, N. Y., filed a petition on May 9 asking the Supreme Court to permit him to cease operation of the lines of the company. The receiver was prompted to take this action because the city of New York plans to pave within the railway area during the coming summer and to charge the cost of the pavement against him. The Highway Department's estimate of this expense is $340,000. The estimated gross revenue of the company for the year 1924 is $650,000. The lien against the property resulting from a paving bill of this kind would wipe out the remaining equity of the bondholders. In order to prevent the paving charge from becoming a lien, the only resource left to the company is to abandon service and franchises prior to the beginning of the paving work.

The President of Queens has agreed to postpone the beginning of paving work for two weeks pending negotiations between the municipal authorities and the receiver. A notice has been posted in all cars in order to advise passengers of the company's side of the case. This notice is as follows:

> City paving charges and taxes will take 3 cents out of every car fare we can collect this year.
>
> That leaves us 2 cents on which to run the railroad. Impossible!
>
> That is why we have got to quit.

Justice Cropsey in Supreme Court, Queens, on May 15 granted an adjournment until May 28 of the argument on the motion for permission to abandon operation of the company's lines.

The railway operates about 50 miles of line from Long Island City to Woodside, Corona, Elmhurst, Flushing, College Point and Jamaica.

Earnings of Interurban Improve

The recent earnings of the Lake Shore Electric Railway, Cleveland, show improvement. The territory served by the company, particularly that between Cleveland and Sandusky, is building up. There is very little bus competition. About 20 per cent of the gross revenue is from power sold. The figures for March, 1923, and 1924 and for the first three months of the last two years follow:

STATEMENT OF EARNINGS OF LAKE SHORE ELECTRIC RAILWAY

	Month of March 1924	Month of March 1923	Jan. 1 to March 31 1924	Jan. 1 to March 31 1923
Gross earnings	$255,054	$242,310	$735,854	$657,360
Expenses and taxes	193,930	193,825	577,519	530,816
Net	61,124	48,485	158,335	126,544
Interest	35,319	35,578	106,078	106,638
Surplus	$25,805	$12,907	$52,257	$19,906

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Good Report from Cuba

Earnings of the Railway Division of the Havana Company Show Increase—Operates Buses

The report of the Havana Electric Railway, Light & Power Company, Havana, Cuba, for the year ended Dec. 31, 1923, shows a net profit carried to surplus account of $2,386,133. Last year the net profit was $2,235,881. In 1923 in the railway department there was a gain in gross earnings of 1.88 per cent and in net earnings of 3.37 per cent. This department contributed 43.6 per cent of the total gross earnings from operation and 29 per cent of the total net earnings.

The earnings showed only a small gain over 1922, all of which occurred during the last three months. The total operating expenses also rose slightly, but not due to any failure to continue the improved methods that effected such a notable saving in the preceding year. The increase was mostly due to the higher price of power plant fuel and damage to rolling stock caused by a heavy storm that flooded a considerable portion of the city. A considerable part of these expenses was balanced by new savings in maintenance of track, lines and equipment.

During the winter tourist season a motor bus service was operated between the Parque Central and the principal hotels in Havana and the Hotel Almendares and the Casino in Marianao. This was started by other persons in 1921, using five single-deck Renault thirty-two passenger buses, but they were not successful. In 1922 the Havana company bought the Renault buses and in addition built four double-deck buses of the Fifth Avenue, New York, type for thirty-four passengers, and since then they have been operating in half-hourly service in the tourist season while the Hotel Almendares is open, and on Saturdays and Sundays during other months, at 30 cents for the trip between Havana and the Hotel Almendares. In 1923 the gross earnings of the seven motor buses were $17,487 and the total operating expenses were $15,843.

STATISTICS OF RAILWAY SERVICE IN HAVANA

	1922	1923	—Increase over 1922—	Per Cent
Total number of passengers carried	113,011,816	114,292,880	1,281,064	1.13
Passenger car-miles	17,532,658	17,722,683	190,025	1.08
Passenger earnings	$5,650,590	$5,714,644	$64,053	1.13
Passenger earnings per car-mile	$0.3222	$0.3224	$0.0002	0.06
Total earnings from operation	$5,756,438	$5,864,904	$108,465	1.88
Total operating expenses	$3,689,592	$3,728,344	$38,752	1.05
Total operating expenses per car-mile	$0.2104	$0.2103	$0.0001*	0.05*
Operating ratio	64.10%	63.57%		
Net earnings from operation	$2,066,845	$2,136,559	$69,713	3.37

Total earnings and operating expenses include motor buses.
* Decrease.

CONDENSED PROFIT AND LOSS ACCOUNT FOR THE YEAR ENDED DEC. 31, 1923

	Railway Department	Light and Power Department	Total
Gross earnings from operations	$5,864,904	$7,593,159	$13,458,063
Operating expenses	3,728,344	2,355,390	6,083,735
	$2,136,559	$5,237,769	$7,374,328
Deduct:			
Taxes, U. S. A.	$60,531	$171,500	$232,031
Taxes, Cuba	40,000	212,200	252,200
Trigo annuities	3,373		3,373
Interest	637,188	479,977	1,117,166
	$741,093	$863,677	$1,604,771
	$1,395,465	$4,374,091	$5,769,557
Deduct:			
Reserve for depreciation	$607,175	$1,903,193	$2,510,368
Reserve for contingencies	203,168	636,831	840,000
	$810,343	$2,540,024	$3,350,368
	$585,122	$1,834,066	$2,419,188
Add:			
Interest on deposits			$193,037
Income from securities			18,282
Rents			35,278
Other miscellaneous income			149,672
			$396,270
			$2,815,458
Deduct:			
Miscellaneous accounts written off, net		$78,211	
Amortization of discount and expenses on funded debt		46,993	
Provision for sinking fund of thirty-seven-year English 5 per cent mortgage bonds of Compañia de Gas y Electricidad de la Habana		16,433	
Provision for sinking fund of consolidated mortgage 5 per cent gold bonds of Havana Electric Railway Company		137,861	
Provision for sinking fund of general mortgage 5 per cent sinking fund gold bonds of Havana Electric Railway, Light & Power Company		149,824	29,325
Net profit for the year, carried to surplus account			$2,386,133

They Serve Civilization

The National City Company, New York, is a firm believer in the future growth of public utilities. The company has endeavored to show the intimate connection between the public utilities and every phase of city and country life in "Mighty Servants of Civilization," an instructive and attractively compiled booklet with illustrations of the various utilities in service. The investment angle is no small part of this enterprise and a great deal can be learned about the financing of public utility companies after a reading of this book, as well as the reasons for utilities being good investments.

Reorganization of Second Avenue Railroad, New York, Planned

Plans for a reorganization of the Second Avenue Railroad, New York City, operating 23 miles of line, will be presented by a committee within a few weeks, and, when ratified by the several groups of bondholders, will be submitted to the courts, with a view to terminating the receivership by next fall. It is understood that a reduction of outstanding equities will be required for the company's restoration. The total bonded debt is $8,860,000.

The receiver's report for the nine months ended March 31 shows that the Second Avenue is about the only surface railway in Manhattan that in this period reported financial improvement. Passenger revenues were $714,906, an increase of $62,262 over the similar period a year ago. Operating revenue was $798,790, an increase of $49,715, while operating expenses were $658,547, a decrease of $22,044.

The total gross income applicable to corporate and leased properties was $71,195, against a deficit of $633 in the preceding period, or an improvement of $71,828. After allowing for fixed charges of $158,996, practically all of which is in interest, there was a net corporate deficit of $87,801, compared to a deficit of $145,528 a year ago. No charge for depreciation is contained in the receiver's report.

The Second Avenue Railroad was incorporated in 1853, and its line leased in 1898 to the Metropolitan Street Railway at an annual rental of 8 per cent on the stock for the first three years and 9 per cent thereafter. In September, 1908, Supreme Court Justice Bischoff appointed a receiver of the company in a suit brought by the Guaranty Trust Company to foreclose the consolidated mortgage of $5,682,000, against which there had been issued a like amount of 5 per cent consolidated gold bonds, due Feb. 1, 1948.

Tax Payment Problem in Seattle

The latest problem before the operators of the Seattle Municipal Railways, Seattle, Wash., is where the money is to be obtained to pay the city's share of the 1919 tax on the street railway, which the Supreme Court recently ruled must be paid jointly by the city and the Puget Sound Power & Light Company. The sum, with the heavy interest which has accumulated, now amounts to more than $650,000 for the city's share, which is three-fourths of the total. Two courses are said to be open, one to appropriate money from the street railway fund, which is in low financial state, and the other to obtain money from the general fund.

If money is drawn from the street railway revenue, Councilman E. L. Blaine, chairman of the city finance committee, says there is grave doubt that the department will go on a cash basis, as scheduled for May 10. He states that the department is on an excellent financial basis at this time, with complete recovery at hand from the $600,000 loss incurred when the 5-cent fare was adopted last spring, and should retire its bonded indebted-

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ness rapidly, if the proposed invasion for tax payment is not made. During March $369,975 in interest and $833,000 on principal were paid on outstanding bonds. Another big interest payment is due in September, when $348,150 must be paid on four bond issues. The last installment paid on the principal reduced the amount of interest to the extent of $41,000.

Corporation Counsel T. J. L. Kennedy has been asked to render an opinion as to how the tax money may be secured.

Elevated Sells Stock Direct

$5,000,000 Prior Preferred Issue of Successor to Chicago Elevated Being Offered at Par

Prior preferred stock of the Chicago Rapid Transit Company is being offered locally in Chicago to the amount of $5,000,000 at par. The stock-selling campaign is in charge of a central executive committee. The securities are being offered to employees first for a period of three weeks starting at once. At the end of that time the stock will then be offered to the general public through the employees as salesmen.

The employee campaign is being handled by five division managers, each representing divisions of Chicago Rapid Transit Company, namely, the Oak Park, the South Side, the Northwestern, the Metropolitan and the Loop or Central Division. Each division manager has appointed five team captains, and each of these captains will in turn have ten employee salesmen. Rivalry between teams and divisions is being maintained by bulletins and posters. All sales reports are cleared through the central campaign office daily and thence go to the Utilities Securities Company, which will handle the records and the money received on partial payments and will issue stock certificates when payment has been made in full. Many Rapid Transit Company employees who have had previous experience in the sale of other Chicago utility securities will take part in the present campaign. The sale now being conducted is regarded as significant as it and the earlier Chicago, Milwaukee & North Shore campaign represent offering of railway securities direct to the public without any of the incentive to purchase which naturally adheres to offerings of companies which include both light and power properties.

The offering of prior preferred stock is part of the program of new financing under way for the Chicago Rapid Transit Company intended to provide funds for carrying out extensive physical improvements and for refunding maturing obligations. In this connection the Illinois Commerce Commission has authorized the issuance of $7,500,000 of first and refunding mortgage bonds to retire $8,000,000 of South Side Elevated bonds maturing July 1, 1924, and $5,000,000 of 7.8 per cent prior preferred stock with dividends payable monthly at the rate of 65 cents a share. Of the proceeds from the new stock $3,000,000 will be used to pay for the work of increasing platform lengths to accommodate eight-car trains. to acquire 100 new steel cars suitable for subway as well as elevated service, and to make certain changes in existing equipment to fit it for operation in longer trains. It is estimated that the proposed changes will increase the capacity of the downtown loop structure 15 to 20 per cent.

It is also planned to use not more than $2,000,000 from the new issue of stock to refund existing interest bearing obligations. At the completion of the present financing, the company will have the following securities outstanding:

7.8 per cent prior preferred stock, series A (now offered)	$5,000,000
Preferred stock	None
Common stock	20,329,500
Adjustment debenture bonds due 1963, interest payable only if earned after dividends on prior preferred stock	18,563,000
Mortgage bonds and equipment obligations	*47,600,000
	$91,492,500

*Exclusive of $1,029,000 bonds in sinking fund and $12,292,000 bonds in escrow with the Central Union Trust Company, New York, withdrawable only against future improvements upon Northwestern Elevated main line. No interest is payable on said escrow bonds while on deposit.

In its prospectus the company points out that the valuation of its property on the basis fixed by the Illinois Public Utilities Commission in 1921 is $90,499,756, which leaves an asset equity of $23,336,756 to cover the new prior preferred stock, after deducting $66,163,000 for outstanding mortgage bonds, equipment obligations and adjustment debenture bonds and without allowing for improvements to be made from the proceeds of the new stock.

The company's income statement for the year ended Dec. 31, 1923, follows:

Gross earnings	$18,146,305
Operating expenses, taxes, rentals and depreciation or retirement reserve of $483,813	14,809,176
Net earnings	$3,337,129
Interest charges (after eliminating interest on the floating debt retired in the consolidation on Jan. 9, 1924)	2,184,549
Net income (available for prior preferred dividends)	$1,152,580

Winona Interurban to Be Sold May 29

Judge W. B. Hile of the Superior Court at Elkhart, Ind., has granted the petition of Clarence J. Minton, receiver, for permission to sell the property of the Winona Interurban Railway. The order directs that the property shall be offered at public sale at the Court House in Elkhart on May 29 for not less than $150,000 for the Goshen division and a similar amount for the Peru division.

As noted briefly in the ELECTRIC RAILWAY JOURNAL for April 5, page 561, practically all the bonds of both divisions of the road were purchased recently by Harry Reid and James P. Goodrich in anticipation of foreclosure. It is their intention to tie in the road under an operating agreement with the lines of the Interstate Public Service Company for through operation of trains from Louisville through Indianapolis to South Bend and Chicago.

Extra Dividend Declared.—An extra dividend of 75 cents a share in 6 per cent cumulative preferred stock has been declared on the common stock of the Federal Light & Traction Company, New York, N. Y. This is in addition to a quarterly cash dividend of $1 a share, both payable July 1 to holders of record June 14. Similar amounts were paid April 1, 1924. From April, 1923, to January, 1924, inclusive 75 cents in cash and 75 cents in 6 per cent preferred stock were paid quarterly on the common shares.

$1,250,000 Issue Extended and Sold.—Dillon, Read & Company, New York, announce the sale at 100 and interest of $1,250,000 of extended consolidated mortgage 5½ per cent gold bonds of the Hestonville, Mantua & Fairmont Passenger Railway, included in the system of the Philadelphia Rapid Transit Company. The issue consisted originally of 3½s and 5s due May 1, 1924. The extended bonds now constitute a first mortgage.

Auction Sales in New York.—At the public auction rooms of A. H. Muller & Sons there were sold this week $5,000 Interborough-Metropolitan Company 4½ per cent collateral trust gold bonds, due April, 1956; April, 1921, coupons on, stamped; 2½.

Reproduction Cost Established.—Reproduction cost of the St. Paul City Railway as of 1922 has been put at $13,581,353 by A. L. Drum, consulting engineer for the company, at the hearing before the Minnesota Railroad & Warehouse Commission in St. Paul to obtain a permanent rate of fare. The original cost was as purchased $12,407,731.

Deficit Increased Over 1921.—For the three months ended March 31, 1924, the operating revenue of the International Railway, Buffalo, N. Y., was $2,599,338, against $2,725,159 for the same months in 1921. Operation and taxes decreased from $2,497,489 in 1921 to $2,412,380 in the current year. The net income was a deficit of $196,720 for the period of January-March, 1924. For the same period in 1921 the deficit was $140,314. The company explains that because of the strike in 1922 and its effect on the revenue and operating costs of the year 1923 the calendar year 1921 is used for comparative purposes.

Reports Loss.—The Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa, is being operated at a loss, according to a report compiled at the general headquarters in Waterloo. The report for March, 1924, shows a loss of $11,779 as compared with $12,155 loss during the similar period a year ago. In 1923 the gross revenue was $16,925, while last March the total was $15,425. The operating expense was also greater in 1923 than in 1924. The report shows a profit in actual operation exclusive of taxes and interest requirements.

Seeks Appointment of Receiver.—Alleging default of payments of interest on a $1,200,000 bond issue, the Irving Bank-Columbia Trust Company of New York applied to the Federal Court in Columbus, Ohio, on May 9 for the appointment of a receiver for the Columbus, Newark & Zanesville Electric Railway. The petition also asks foreclosure on a mortgage covering $1,200,000 in bonds, a lien on all earnings of the company and the appointment of a receiver by the Federal District Court. The Girard Trust Company, trustee for the bondholders, is named party defendant in the action.

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Personal Items

William M. Holland Resigns

William M. Holland has tendered his resignation as president of the Dallas Railway, Dallas, Tex. It is announced at the offices of other officials of the company that the vacancy will not be filled for some time. Mr. Holland, who is a former Mayor of Dallas, was elected president of the utility company ten months after the death of the late J. F. Strickland, who, with C. W. Hobson, secured the present franchise under which the railway company is authorized to earn 7 per cent on its invested capital.

In announcing the resignation of Mr. Holland, C. W. Hobson, chairman of the board of directors, said he would continue to act as head of the utility until a successor to Mr. Holland was elected, which may not be for several months. Richard Meriwether will continue to serve as vice-president and general manager. Mr. Holland stated that he would devote all his time to his law practice.

H. E. Vordermark and H. Bucher Advanced in Fort Wayne

Reorganization of the executive staff of the Indiana Service Corporation, Fort Wayne, Ind., made necessary by the recent resignation of S. W. Greenland, vice-president and general manager, was completed on May 9. In the general operating staff H. E. Vordermark, who has been secretary and treasurer of the company since the reorganization in 1920, becomes vice-president and treasurer in charge of finances and purchasing. Henry Bucher, connected with the local organization for the past eight months, assumes charge of the railway management of all lines under the service corporation system. R. L. Fitzgerald takes over the management of the light and power department. The changes, according to Robert M. Feustel, president of the company, will put the operating problems of the Indiana Service Corporation in the hands of two experienced engineering executives and the financial affairs under the direction of Mr. Vordermark, who has had thirty years' experience in such work locally.

The new vice-president and treasurer has been in the employ of the company since July, 1893, starting in as private secretary to Stanley Robinson, who was then vice-president and general manager of the old Fort Wayne Electric Railway, later changed to the Fort Wayne & Northern Indiana Traction Company. In 1898 he was appointed auditor and retained this position when the company was consolidated with the Fort Wayne & Wabash Valley Traction Company. The Fort Wayne & Northern Indiana Traction Company later acquired this property and Mr. Vordermark was made auditor and secretary. Later he was elected vice-president and treasurer of the company. He is the oldest executive in the corporation service and knows the properties and their possibilities better than any other man in the company. He was born and reared in Fort Wayne.

H. E. Vordermark

Henry Bucher, who assumes the title of manager of railways is a railway engineer who has been in Fort Wayne handling special railway operating problems for the past eight months. He has a wide engineering experience, having been engaged in construction and utility operating work in various parts of the United States and Canada. Following a service of two years in United States Government construction work in the Southwest, he became assistant engineer of the Railroad Commission of Wisconsin, leaving that work in 1913. Later he was engaged in valuation work, special traffic and operating problems on the Bay State Street Railway, Boston, and on Pittsburgh and Philadelphia railway properties, the Nashville railway and lighting properties and a number of other smaller properties. The Fort Wayne Company operates 199 miles of electric railway, 139 of which are interurban and 60 of which are city. It does a general power and lighting business.

Henry Bucher

Mr. Pharo to Enter Business for Himself

H. A. Pharo has resigned as superintendent of lines of the Pittsburgh Railways to enter business for himself on June 1 in Pittsburgh. He has organized the Pharo Engineering Company, with offices at 517 Park Building, and has secured a broad charter under Pennsylvania laws permitting the company to engage in many correlated activities, including selling. Mr. Pharo is convinced there is a good field in the Pittsburgh district for a manufacturers' representative company to handle certain lines heretofore marketed only through the medium of a factory sales organization. Mr. Pharo has long been connected with the Pittsburgh Railways. He is a member of the committee on power transmission and distribution of the American Electric Railway Engineering Association.

George L. Lucas, who has been acting chief executive officer of the New York Transit Commission since the resignation of General Lincoln C. Andrews last year, will naturally go with the new city board of transportation when the transfer of the construction work from the commission to the new board is made on July 1. The appointment of Major Phillip Mathews to the position of chief executive officer, as noted in this paper last week, was a step in the reorganization attendant upon this transfer. Mr. Lucas has been a member of the rapid transit engineering staff for more than twenty years and during most of that time he has been in charge of the important work of material inspection. The appointment of Major Mathews has been made now so that he might have reasonable opportunity to familiarize himself with the work before the division of functions of July 1 and while Mr. Lucas remained an employee of the transit commission.

Carl H. Allen has been appointed superintendent of the Illinois Traction, Inc., with headquarters at Ottawa, Ill. This position has recently been created. All department heads will report to Mr. Allen except the head of the traffic department, who will continue as before to report to the general manager of the company.

Baxton Blasser has been appointed chief electrical engineer of the Kansas City Railways, Kansas City, Mo., to succeed R. L. Weber, who has become connected with Stone & Webster.

J. C. Schade, who for several years has been general manager of the Winona Interurban Railway, Warsaw, Ind., has accepted a position with the Wisconsin Public Service Corporation as manager of railways. He left May 12 for Green Bay, Wis. After foreclosure the Winona Interurban will pass to interests represented by Harry Reid and J. P. Goodrich, as noted elsewhere in this issue. For many years Mr. Schade has been active in the welfare of both Warsaw and Winona. It was in 1910 that he was placed in charge of the Winona Electric Light & Water Company and still later was placed in

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charge of the finances of the Winona Interurban Railway with the title of assistant treasurer. Mr. Schade remained in this capacity until the receivership in 1916 and was then appointed comptroller by the receiver, serving in that position until 1917, when he was appointed general manager in direct charge of the property. It is probably a reflection of his managership that a comparison of the seven and a half years' operating record of the Winona company with other interurban lines shows that the Winona Interurban has been operated from 2 to 5 cents less cost per car-mile.

G. W. Fry was elected president of the Southwestern Public Service Association at its recent convention in New Orleans. Mr. Fry is general manager of the Abilene Traction Company, Abilene, Tex., and other properties of the American Public Service Company.

Obituary

Fred R. Cooper, general sales manager of the Gold Car Heating & Lighting Company, Brooklyn, N. Y., died at his home in Washington, D. C., on May 10, after a short illness.

Henry Haven Windsor, editor and publisher of *Popular Mechanics*, died on May 12 at the age of sixty-five in Evanston, Ill. He is survived by his wife and one son, H. H. Windsor, Jr., now president of the magazine company. Mr. Windsor entered the service of the Chicago City Railway (South Side lines) in 1883 as secretary. Before this he had been private secretary to an official of the Northern Pacific Railway, St. Paul. While with the Chicago company he founded, edited and became president of the *Street Railway Review*. In 1.01 he sold out his interest in that publication to Fred S. Kenfield, with whom he had been associated. The *Street Railway Review* was again sold in 1906 to Hugh M. Wilson, who changed the name to *Electric Railway Review* and made the paper a weekly instead of a monthly. He in turn sold it, in 1908, to James H. McGraw, who combined it with his *Street Railway Journal*, forming the present ELECTRIC RAILWAY JOURNAL. Following Mr. Windsor's association with the *Street Railway Review* he founded *Popular Mechanics*, of which he had been editor and publisher since 1901. Mr. Windsor was born in Mitchell, Iowa, in 1859, the son of a clergyman. He had two years training at Grinnell College, followed by a city editorship of the *Times-Republican* of Marshalltown, Iowa.

Warren Young Soper, president of Ahearn & Soper, Ltd., Ottawa, Ont., electrical engineers and contractors, died on May 13 at Ottawa. Mr. Soper was one of the electric railway pioneers of Canada. He was connected for many years with a large number of Canadian corporations. He had been a director of the Ottawa Car Company, vice-president of the Ottawa Street Railway and at times was connected as an officer or director of many other public service and manufacturing companies operating in the Dominion.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

More Cars to Be Purchased for Detroit

Detroit is on the eve of awarding another order for street cars. Bids will be opened on the morning of May 20. Later the same day the Detroit Street Railway Commission will meet to go over the bids. It appears likely that an order for new equipment will be placed at once. This includes a probable order for ten additional articulated units. The present articulated train has proved to be popular with both railway officials and public. It is being run regularly in the rush hours on Woodward Avenue.

This latest talk in regard to cars for Detroit has focused attention directly on this whole matter. For months now, in fact ever since the local road was taken over by the city, there have been rumors and still more rumors regarding the probable purchase of cars for Detroit. It hasn't all been talk either. There have been some nice orders for equipment. In fact, Detroit's appetite for cars has appeared to be insatiable. The end is apparently nowhere in sight. In 1922 Detroit ordered 200 cars and in 1923, not including some special type equipment, the city ordered 150 cars. So far this year contracts have been let for seventy-five cars. In addition the city is building twenty-six trailers in its own shops. Unofficial figures place the value of the new equipment purchased by the city at about $4,000,000.

Despite all this the Department of Street Railways is short of cars. In fact, the department is still renting a few cars from the Detroit United Railway, though most of the equipment originally taken over under the leasing arrangement has been returned to that company. As for the future, there is a larger number of old cars destined for the scrap heap than has gone that way in the past, but these cars are being kept in service until new rolling stock is available.

Metal, Coal and Material Prices

Metals—New York	May 13, 1924
Copper, electrolytic, cents per lb.	13.175
Copper wire base, cents per lb.	15.625
Lead, cents per lb.	7.40
Zinc, cents per lb.	6.225
Tin, Straits, cents per lb.	46.125
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.425
Somerset mine run, Boston, net tons	2.125
Pittsburgh mine run, Pittsburgh, net tons	1.875
Franklin, Ill., screenings, Chicago, net tons	2.175
Central, Ill., screenings, Chicago, net tons	1.90
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.50
Weatherproof wire base, N.Y., cents per lb.	17.50
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N.Y., per gal.	$0.97
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	12.25
Turpentine (bbl. lots), N. Y., per gal.	$0 91

Railways Interested in Purchase of Traffic Signals

Electric railways all over the country are manifesting considerable interest in traffic signals. The installation and use of such signals is primarily a city function, but the extension of their use is a matter directly affecting the railways because of the ever-increasing demands being made upon street space by the growing number of vehicles seeking accommodation on the highways. Perhaps the case of the Cleveland Railway, operated under service-at-cost, is a little different from that of most other companies in that the city has a direct interest in the welfare of the company, but be that as it may, the Cleveland Railway is buying a number of traffic signals after having tried some home-made ones. The city of Cleveland will operate the new devices. Among those so far specified by the company are two from Crouse-Hinds, seven from Essco at Peoria and two from Nichols-Lintern.

While all these installations are primarily up to the city authorities, the railways will have a good deal to say about them. The Cleveland Railway is also pioneering in safety zone protection. It has ordered an installation with collapsible posts, made by the Griswold Safety Signal Company, Minneapolis. It is understood that the order of the railway for equipment of this type is for five of these safety zones. Five others will be protected by flood light.

Chicago Surface Lines Orders 100 New Cars

As a result of contracts awarded last week 100 new cars costing approximately $15,000 apiece will be added to the rolling stock of the Chicago Surface Lines. Of this number fifty are to be built in the company's West shops and fifty will be built by the Lightweight Noiseless Electric Street Car Company, Minneapolis, organized by A. L. Drum. The latter cars will be built in the shops of the Twin City Rapid Transit Company, Minneapolis. Deliveries will be made beginning Aug. 15 and completed by Oct. 15 next.

All these cars will be built according to the specifications of the Chicago Surface Lines and will not embody any of the features of the so-called "noiseless construction" which has been tried at Minneapolis. The use of band brakes and roller bearings and a car weighing only 25,000 lb. are the features which the Minneapolis company has considered would produce a more quietly running vehicle than the conventionally designed car.

The equipment to be used on the Chicago cars is the same as that de-

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scribed in the April 12 issue of the ELECTRIC RAILWAY JOURNAL when bids were sought. In addition to the information published then, General Electric air compressors, G. E. type M control, Tomlinson couplers, Duquad curtain fixtures, Fabrikoid curtains, Trolley Supply Company headlights and trolley catchers have been specified. The seats will be the St. Louis Car Company type. Brill 39-E trucks with Illinois Steel Company wheels and Carnegie Steel Company axles will be used. Motors will be G. E. 275.

Rolling Stock

Ottawa Electric Railway, Ottawa, Canada, recently placed an order for twenty passenger cars. This order is this year's allotment of the forty-seven the company was called upon to provide under its new contract. The cars are known as "pay-as-you-leave" cars, but in practice they are "pay-as-you-pass," as it is found in other places where they are used that more than 80 per cent of the fares are collected before the car stops to discharge passengers. With their introduction the near-side stop will be adopted in Ottawa. Passengers enter at the front and leave by the rear. The detailed specifications follow:

Date of order	May 3
Date of delivery	Aug. 15
Builder of car body,	Ottawa Car Manufacturing Company
Type of car,	Motor, semi-convertible, passenger
Seating capacity	52
Weight:	
Car body	19,000 lb.
Trucks	11,700 lb.
Equipment	8,050 lb.
Total	38,750 lb.
Bolster centers, length	20 ft.
Length over all	45 ft. 3½ in.
Truck wheelbase	5 ft. 4 in.
Width over all	6 ft. 5 in.
Height, rail to trolley base	11 ft. 2¼ in.
Body	All steel
Interior trim	Cherry finish
Headlining	Panelite
Roof	Monitor deck
Air brakes	Safety car type
Armature bearings	Bronze
Axles	4½ in.
Bumpers	Hedley anti-climbers
Car signal system	Consolidated
Car trimmings	Bronze
Center and side bearings	Friction
Conduits and junction boxes,	Northern Electric
Control	GE-K35
Couplers	Hovey
Destination signs	Keystone
Door-operating mechanism,	National Pneumatic
Fare boxes	Cleveland No. 5
Lifeguards	H-B
Gears and pinions	Nuttall helical
Hand brakes	Ackley staffless
Heater equipment	Consolidated
Journal bearings	Friction
Journal boxes	Canada Car Company
Lightning arresters	Westinghouse
Motors	Westinghouse, 514A, inside hung
Sanders	Ohio Brass
Sash fixtures	Ottawa Car Mfg. Co.
Seats	Ottawa Car Mfg. Co.
Seating material	Rattan
Slack adjuster	Westinghouse
Springs	Half elliptic and coil
Step treads	Mason
Trolley catchers	Eclipse
Trolley base	Nuttall No. 11
Trolley wheels,	Ottawa Car Manufacturing Company
Trucks	Canada Car Company
Ventilators	Nichols-Lintern
Wheels	Chilled steel, 26 in.
Special devices, etc.:	
Traffic signal lights.	
Special signal light on front of car to indicate starting of car.	

Cleveland Railway, Cleveland, Ohio, is building sixteen trailers at its Harvard Avenue shops.

Indiana Service Corporation, Fort Wayne—Union Traction Company, Anderson, is contemplating, it is reported, the purchase of about ten all-steel interurban cars. The cars, it is understood, will be of the model recently developed by A. W. Redderson, superintendent of motive power of the Indiana Service Corporation. Ten of these are already in service on the Fort Wayne-Van Wert and the Fort Wayne-Decatur lines.

Grays Harbor Railway & Light Company, Aberdeen, Wash., has purchased a new car for use between Aberdeen and Cosmopolis.

New Orleans Public Service, Inc., New Orleans, La., is rebuilding a number of its double-truck cars for train operation on the Spanish Fort line. The motor cars will be equipped with four G.E. 67 motors per car and will pull one, two, or three trail cars. Automatic air connections with door interlocking mechanism through Tomlinson couplers will be provided. The trailers are rebuilt open cars, but will have windows and sash for use in winter on heavy industrial lines.

Track and Line

Cincinnati, Ohio.—Sealed proposals will be received at the office of the Board of Rapid Transit Commissioners, until June 6, 1924, for the construction of about 5.3 miles of rapid transit line, including 1,600 ft. of subway. The total estimated cost is approximately $1,000,000.

New York, N. Y.—The Board of Estimate has rejected the Transit Commission's award to the Oakdale Contracting Company, the lowest bidder for the construction of the first section of the new Brooklyn crosstown subway.

Chicago Rapid Transit Company, Chicago, Ill., has started formal construction of the 5-mile elevated extension which will run through Evanston and Niles Center to Dempster Street. Preliminary construction work has already progressed to a considerable extent, including the building of a narrow-gage line and a trestle across the north shore channel for the moving of materials.

Wisconsin Gas & Electric Company, Kenosha, Wis., has agreed to comply with the request of the city manager to repair the pavement between its tracks on Milwaukee Avenue as soon as local steam railway crossing work is completed.

Duluth Street Railway, Duluth, Minn., will build this year 1½ miles of track to be known as the Kenwood extension. This new line will serve a fast-growing community and the extension has been ordered by the City Council to be completed and in operation by Aug. 1.

Birmingham Electric Company, Birmingham, Ala., will pave along the car tracks on First Avenue from Forty-first Street to Fifty-seventh Street and from a point near Eightieth Street to Eighty-fifth Street. This was ordered by the City Commission. Estimated cost of the work is $138,400 and under an agreement recently reached by the city and railway this work will be done without any cost to the city. The cost of track reconstruction necessary before the paving is done, it is estimated, will make the cost something like $300,000.

Trade Notes

Worthington Pump & Machinery Corporation, New York, N. Y., has closed its power and mining works at Cudahy, Wis., "in order to concentrate our manufacturing facilities as much as possible." All lines of product will be transferred to the company's other works excepting only the mining, crushing, cement and creosoting machinery which will be discontinued.

Allis-Chalmers Manufacturing Company, Milwaukee, Wis., has taken over crushing, cement, mining and creosoting machinery lines of the Worthington Pump & Machinery Corporation and will continue their manufacture at the West Allis Works. Special attention will be given to the prompt shipment of repair and spare part orders.

The Pantasote Company, New York, N. Y., announces that W. A. Lake, who has been connected with the company for the past fifteen years, has been appointed sales manager of the railroad and marine department for the disposition of all Pantasote and Agasote products in those fields.

Atlanta, Ga.—The Beeler Organization, New York, has been engaged by the city of Atlanta to make a valuation of the railway property of the Georgia Railway & Power Company. This organization has been engaged for some weeks past in making a traffic study in Atlanta for the city and has made a preliminary report, which will shortly be reviewed in the JOURNAL.

New Advertising Literature

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued a twenty-four-page booklet describing and stating the application of various varnishes, insulating compounds and finishing materials. The booklet, which is known as Folder 4249 B, contains complete information for the user of insulating materials in these classifications and has been designed as a book for ready reference in the selection of such material. All of the materials described are used in the manufacture of Westinghouse electrical apparatus and are also made available to the general trade.

Hubbard & Company, Pittsburgh, Pa., has issued a bulletin describing the complete Hubbard line equipment.

Ramsey Chain Company, Inc., Albany, N. Y., manufacturer of the chain with the compensating joint, has issued a complete text book on power transmission, and silent chain transmission in particular. It treats of the comparisons between the various methods of drives, leather and rubber belting, gearing, direct drives and silent chain. It also covers many transmission problems.

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New York, May 24, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 63
Number 21

Consultation of Transportation Men Needed in City Planning

A TRAFFIC conference was held in New York on May 20 under the auspices of the Committee on a Regional Plan for New York and Environs. Besides traffic discussion, progress reports were made on the various investigations of the committee, which is being financed by the Russell Sage Foundation to the extent of $100,000 a year for five years.

The existence of a non-partisan body of this character to study the physical needs of the communities in the metropolitan area, not in terms of any one municipality but in terms of the whole region, certainly is an excellent thing. With the efforts of the committee to secure the adoption of wise zoning laws and a limit to the height of buildings nearly everyone will be in full accord. And with the specification of the general purposes of the committee there can be nothing but praise on the part of the public or of transportation men.

Some of the methods advocated at this conference for attacking the traffic problem, however, do not inspire much confidence in the outcome of the committee's work with respect to this phase of regional planning. While the conference seemed primarily to be directed toward emphasizing the fact that the traffic situation is acute, if that needed to be told, the principal remedial measures suggested showed a disappointing lack of knowledge of the problems of mass transportation. They comprehended only the means to facilitate vehicular traffic.

Several speakers proposed the removal of all surface and elevated railways from the streets of Manhattan. Such a step would relieve vehicular congestion to a certain extent to be sure, but what would happen to the people who have to use the street railways and the elevated? If they rode in buses the congestion would be greater rather than less. It is easy to say, "put the tracks underground," but who would pay the fabulous cost?

According to the report of the consulting engineer of the committee, the removal of surface lines on Second, Lexington, Seventh and Ninth Avenues, the replacement of the Third and Sixth Avenue elevated lines with subways, and the widening of the roadways of Lexington, Park and Madison Avenues would increase the capacity of north and south avenues 67 per cent. The same report states that if no parking were permitted on any north and south avenue on Manhattan the resulting gain in traffic capacity would be 50 per cent. In other words, nearly as much relief could be afforded by parking restrictions at no cost as would be accomplished by building miles of subway at enormous expense.

If any solution of the traffic problem is to be expected in New York or any other city, the co-operation of transportation men is needed. They have been wrestling for years with the problem of congestion and have a real grasp of what is involved in effecting improvements. More good would result from conferences with these practical men than will be likely to come from idle talk of making New York "a modern Venice" with the arteries of traffic filled with gleaming motor cars instead of water and gondolas, the railways all underground and pedestrians wandering through artistic second story arcades and over graceful bridges spanning the streets.

Keeping Riders "Sold" After Delays

THE merchandising methods used on many railway properties for selling rides to the people of the community could to advantage be carried a step farther to cover specific cases where riders need to be resold on the transportation company after an interruption to service. It would be helpful in such cases to inform the riders as to the cause of the delay and perhaps the work done in clearing the trouble. There is nothing to suppress, for delays will occur. The public knows that anything mechanical is subject to failure, and that things beyond the control of the railway often interfere with the movement of the cars. But with knowledge of the cause, there would exist a much more tolerant attitude.

One step in doing this is to have the trainmen inform passengers as to the nature of the trouble and how long the cars are likely to be tied up. For the benefit of patrons waiting for cars, it might be possible often to have the route traversed by an automobile and inform those waiting of the probable extent of the delay. This would enable those in a hurry to save time by promptly seeking parallel routes or other means of transportation. Next day the cars on that route could be provided with posters or handbills explaining the cause of the delay.

This latter method has been used by some of the suburban railroads operating into New York City. Passengers on one road were recently told the reason for an hour's delay one morning and also the method employed, that of rerouting the trains, to get the passengers to their destination. In this instance the rerouting, while done promptly, proved of no avail because the rerouted trains met with another delay. These difficulties were explained in handbills placed in every seat on all trains operating over the delayed division in the evening rush hours that day.

There is little doubt that the passengers of the delayed trains, although greatly inconvenienced during the incident, were somewhat appeased by the explanation given by the railway company, as it showed that an earnest and prompt attempt had been made to keep the trains moving.

Transportation must be sold again and again. Es-

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pecially is this true after a delay. Whatever is done then to appease waiting patrons tends to keep them sold on the impression that the management is awake and responsive to the need for continuous service, that it is quick to handle emergency situations—in general, that the management is "on the job."

Distributed vs. Concentrated Terminals for Suburban Traffic

IF THE plan for caring for suburban traffic in the New York Metropolitan district, proposed by Mr. Turner and outlined in the issue of this paper for May 10, were financially possible of execution, it would be the largest example of the distributed terminal plan for this kind of travel. From the standpoint that the plan contemplates distributed terminals rather than a concentrated terminal, the principle embodied in Mr. Turner's proposal is a sound one. The commuter does not need the elaborate waiting and baggage accommodations provided in the monumental stations which many of the steam railroads have thought it necessary in the past to erect. While he wants to travel between his home and his place of business comfortably, he wants to do so in the shortest space of time, and this he can best do by trains which, at least during the rush hours, will operate as rapid transit trains in the city and as suburban expresses in the country.

In one respect the time is favorable in New York for such an installation. The passenger capacities of the Pennsylvania-Long Island terminal and of the Grand Central station are already in sight. To increase their accommodations for passengers would be enormously expensive, but if done it would neither relieve the commuter situation on any of the lines on the west, except the Pennsylvania, nor help in the distribution of any of the commuting passengers in New York after their arrival.

New York needs more subways. There is no question about that. According to Mr. Turner, at a cost only about 50 per cent more than that for doubling the capacities of the Pennsylvania and Grand Central stations, his plan would relieve the pressure on those stations for through passengers for many years to come, the congestion at the terminals of all the trunk lines bringing commuters to New York would be removed and the city would have 61½ miles of added rapid transit line.

In principle the plan proposed by Mr. Turner is not greatly different from that now being followed on a much smaller scale in London, where a number of trunk lines operate their suburban trains through the Metropolitan and Metropolitan District subways. Another precedent is the use of the Chicago elevated railway by the North Shore Line and the Chicago, Aurora & Elgin trains. Still another precedent is that in New York.

Up to 1898 all of the lines in Brooklyn carried their passengers only to the East River. Then a transfer had to be made to some other agency, either ferry or the cable railway on the Brooklyn Bridge for transit to Manhattan. This corresponds to the present situation in New Jersey for all the lines except the Pennsylvania. The next step in Brooklyn was to run through trains from Brooklyn over the Brooklyn Bridge but to discharge these passengers at one point, i.e., at the end of the bridge. This is what the Pennsylvania, Long Island, New York Central and New Haven roads now do in their two stations. The final step in the Brooklyn case was to run through trains from Brooklyn distributing their passengers throughout the business district of Manhattan. Looking back at the Brooklyn situation, one can easily realize that the final solution was the proper one. It is this same answer which is now proposed for the larger commuter problem now confronting New York.

As explained editorially in these columns two weeks ago, many matters still remain to be determined. One of the most serious is the division of the enormous expense involved. Another is the choice of routes within the city and to some extent without the city. The plan was put forward avowedly to start discussion and it should receive earnest consideration.

Seeking Patronage of Auto Owner Is of Questionable Profit

CONSIDERABLE attention has been paid recently to methods of inducing the business man to leave his automobile at home and use the trolley. Such business may be profitable to the company, provided no additional cars have to be operated on his account. But there is a limit to the amount of business that can be added at the peak hours without involving increased expense.

If the schedules are efficient, the cars will be loaded in the rush hours up to the standard, whatever that may be in any community. At these peak periods transportation is furnished at the greatest cost. It is a famous myth that "the straphangers pay the dividends." As a matter of fact, these same straphangers are usually the most expensive patrons of the road. The entire system has to be designed with sufficient capacity to carry the maximum load that presents itself. This means cars, power, tracks and operators have to be sufficient in size and number to carry about half the total business of the day in some three or four hours out of eighteen or more that the cars are in service. Even with standards of loading calling for perhaps two passengers to every seat in the rush, the average city system operates two to three times as many cars then as in the non-rush hours.

It is easy to see that here is a large investment used just for a small period. Fixed charges on it are likely to be a large part of the total cost. Furthermore, extra men are needed whose working conditions are decidedly poorer the greater the relative number of rush hour cars, and the proportion of time paid for but not worked increases.

While this seems to be discouraging to the company that is making an effort to enlist the automobile owner as a patron, there is a silver lining to the cloud. The absence of parked vehicles on the car line streets and less vehicles moving on the tracks or holding up the cars at the intersections make it possible to maintain higher schedule speeds. And winning the patron for the rush hour may likewise produce many profitable non-rush rides, for it is only in the larger cities that the mid-day schedules are determined by the loading, and usually there is plenty of room in the cars. The best type of patron to try to induce to ride the trolley rather than the private automobile is the housewife shopper. Her patronage is distinctly an addition to the non-rush riding and therefore clearly profitable, even though it should require more cars, because the cars are available.

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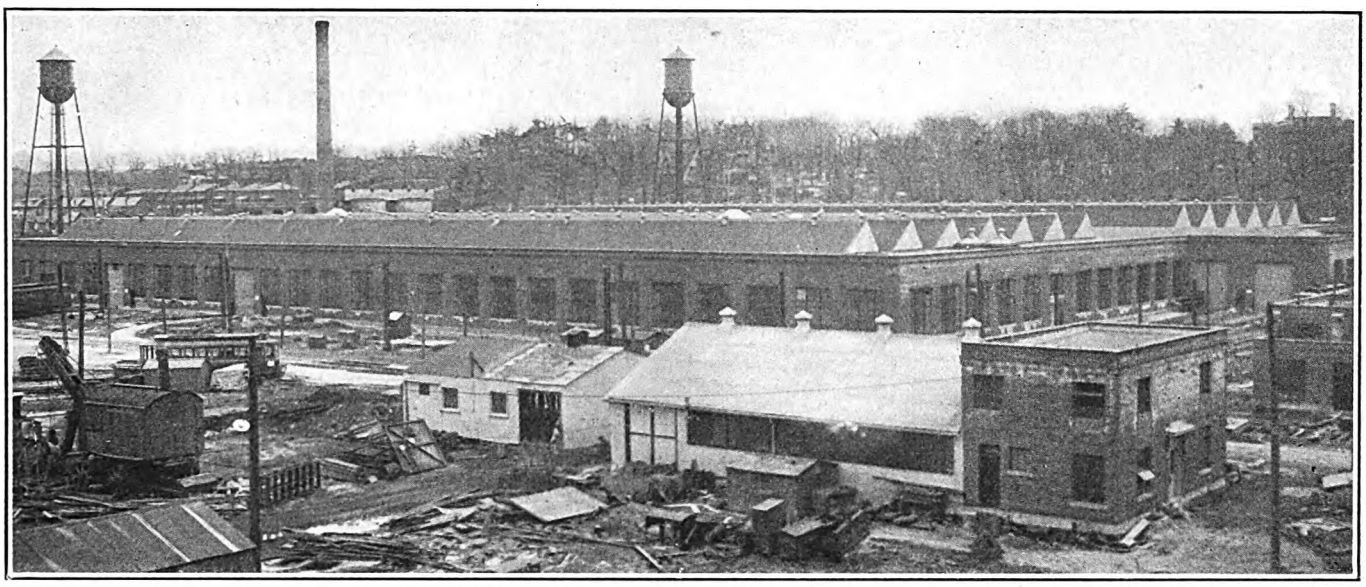


The Toronto Car Repair Shop, in the Background, Is the Largest Building in the Group, Covering 4 Acres. In the Foreground Are the Way Department's Yard Office, Frog Shop and Blacksmith Shop

Toronto's New Shop and Material Yard

Provision Is Made for Car Repair Work, Material Storage for the Way Department and General Stores for the Railway—Eight Permanent Buildings Have Been Constructed on a 22-Acre Plot, with Trolley and Steam Railroad Track Connections—Entire Group of Buildings Is Heated by Central Steam Plant

THE new Hillcrest shops of the Toronto Transportation Commission were recently put in commission after a construction period lasting over a year. Provision is made primarily for the repair work on rolling stock. Space is also allotted to the maintenance of way department for a material storage and track layout yard. In addition, there is on the property a garage for the emergency wagons and a stores building containing general stores for the railway and also for the Toronto Hydro-Electric Commission, which distributes electrical energy locally in the city.

The property is located on the west side of Bathurst Street, between Davenport Road on the north and the main line of the Canadian Pacific Railway on the south. It is about 930 ft. wide, the depth varying from some 890 ft. at the east side to 1,110 ft. at the west side. The total area included is 22.24 acres.

The property is served directly by a siding from the steam railroad. The gage of the Toronto tracks is, however, the odd figure of 4 ft. 10⅛ in., making it very difficult to provide joint track facilities. Accordingly, the two sets of tracks have been kept separate as far as possible, there being only a few pieces of gauntlet track where it was necessary to have both services.

All told there are eight separate permanent structures on the property, as follows:

Main shop building, one story, 467 ft. x 452 ft.

Administration office building, two stories, 82 ft. x 51 ft.

Stores building, four stories, 299 ft. x 115 ft.

Garage for emergency trucks, one story, 140 ft. x 53 ft.

Cement building, two stories, 113 ft. x 63 ft.

Frog shop, one story (office two stories), 85 ft. x 40 ft.

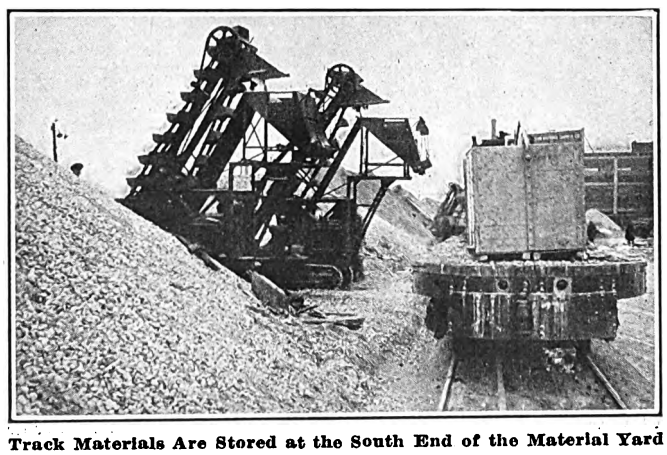
Building maintenance shop, one story, 114 ft. x 40 ft.

Boiler house, one story, 87 ft. x 45 ft.

There are also several temporary buildings for various purposes.

In general, the permanent buildings have structural steel frames, concrete foundations, and floors, brick walls, steel sash and pre-cast gypsum roofs.

Detailed consideration of the shop building will be given in a separate article to appear in a later issue, so that it will not be described here.



Track Materials Are Stored at the South End of the Material Yard and Are Loaded by Barber-Greene Loaders

The offices for the rolling stock department are located in the administration building, the entire second floor being assigned to the superintendent of equipment and his staff. On the first floor quarters are provided for the employment department and the medical staff.

The general stores building is at the southeast corner of the site, fronting on Bathurst Street. It is of reinforced concrete flat slab construction, 306 ft.

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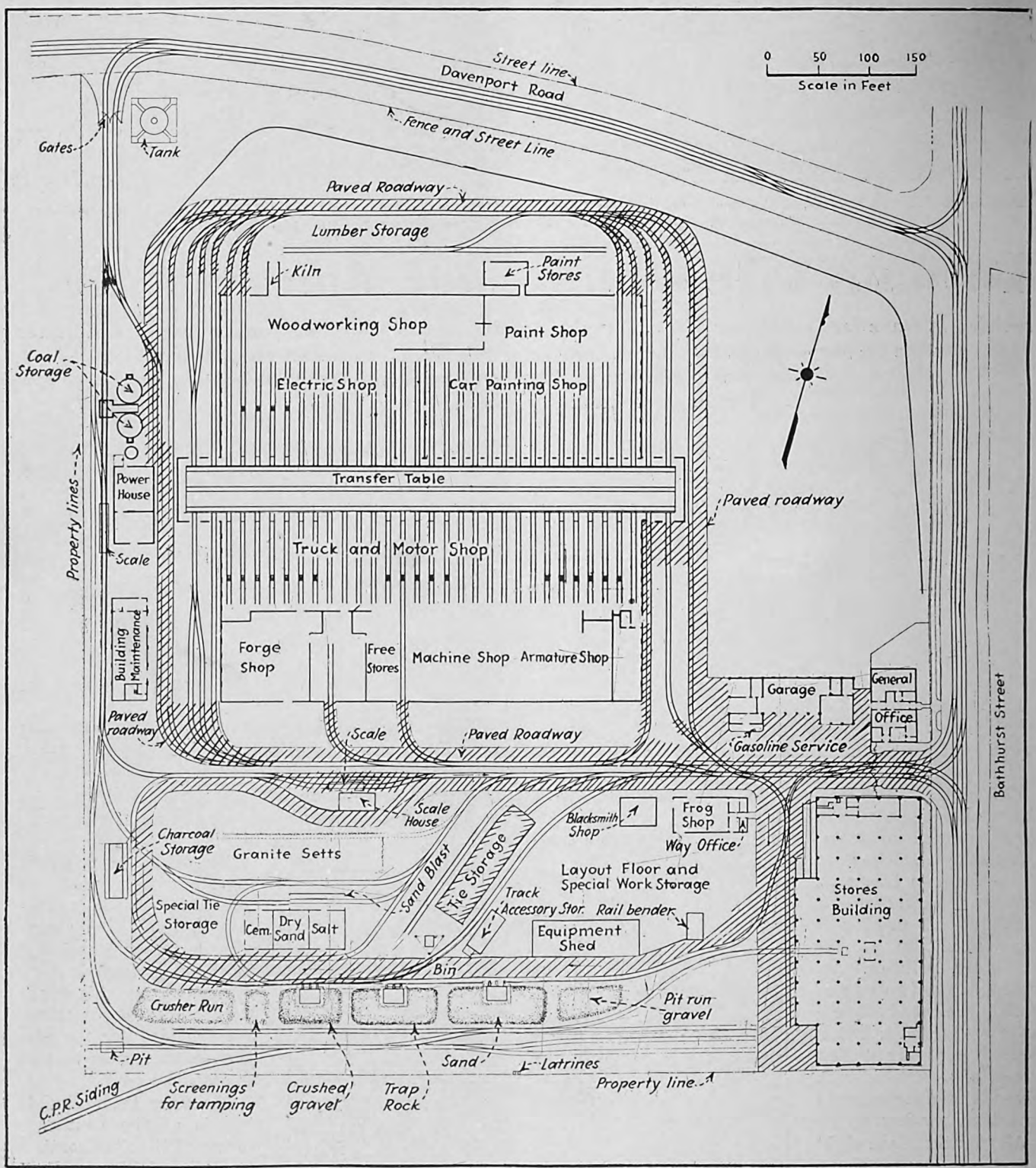
long x 117 ft. wide, with a two-story extension at the west side to accommodate a shipping bay. At present the basement and three stories are being constructed, but the columns and reinforcing are designed for the addition of four more stories if needed. The exposed street front on Bathhurst Street and the north and south elevations have a Queenston limestone base and an artificial stone facing up to the top of the first-story windows. Panels between the windows and the upper floor in these elevations are artificial stone of an ornamental character. The remainder of the facing is of brick.

Provision has been made in the basement and the ground floor for the direct entry of motor trucks, and a railroad siding is also provided on the shipping side of the ground floor.

Arrangements have been made so that the entrances for the two departments are separate, the Transportation Commission having a doorway at the north, directly opposite the office building, while the Hydro-Electric Commission has an entrance at the southeast corner on Bathhurst Street.

In this building will be carried all general stores for the street railway system. Steel bins will be installed for the smaller materials, and the arrangement will be



New Toronto Shop and Material Yard Covers a Plot Approximately 890 Ft. x 1,000 Ft. and Provides Adequate Facilities for the Rolling Stock and Maintenance of Way Departments

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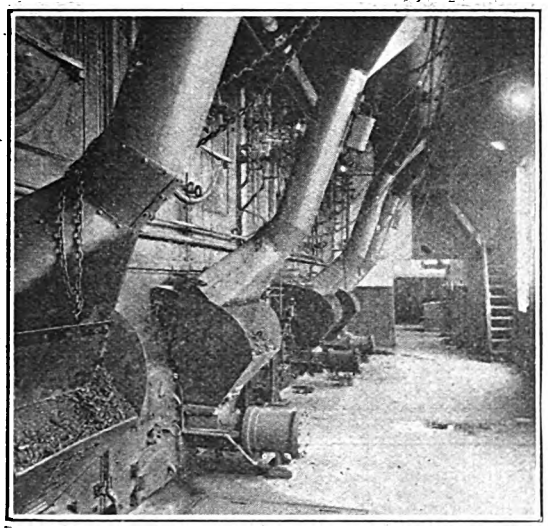
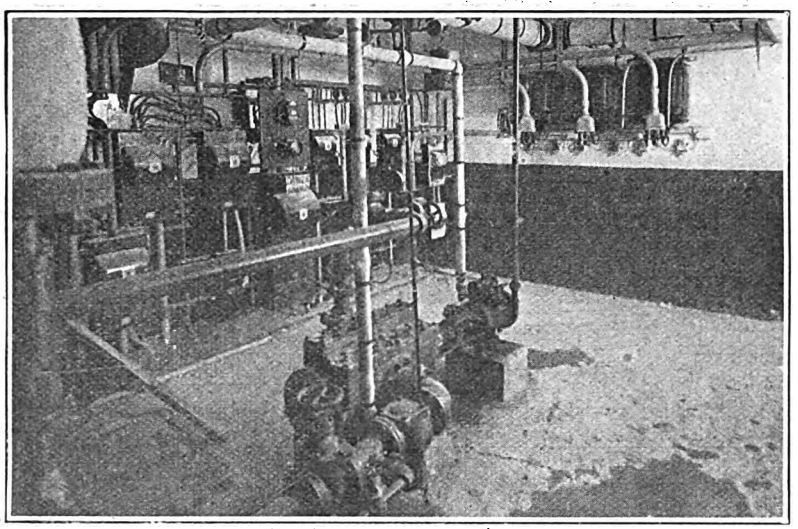




The Heating Is Done by Four 300-Hp. Boilers with Underfeed Stokers, as Shown at the Left. The Mechanical Equipment Room in the Stores Building, Shown at the Right, Is at the Terminus of the Heating Tunnel

such as to facilitate the issue of and accounting for supplies.

On the third floor space has been reserved for a suite of instruction rooms for trainmen. It is planned to install working models of portions of the railway equipment so that the students can get training in actual operation.

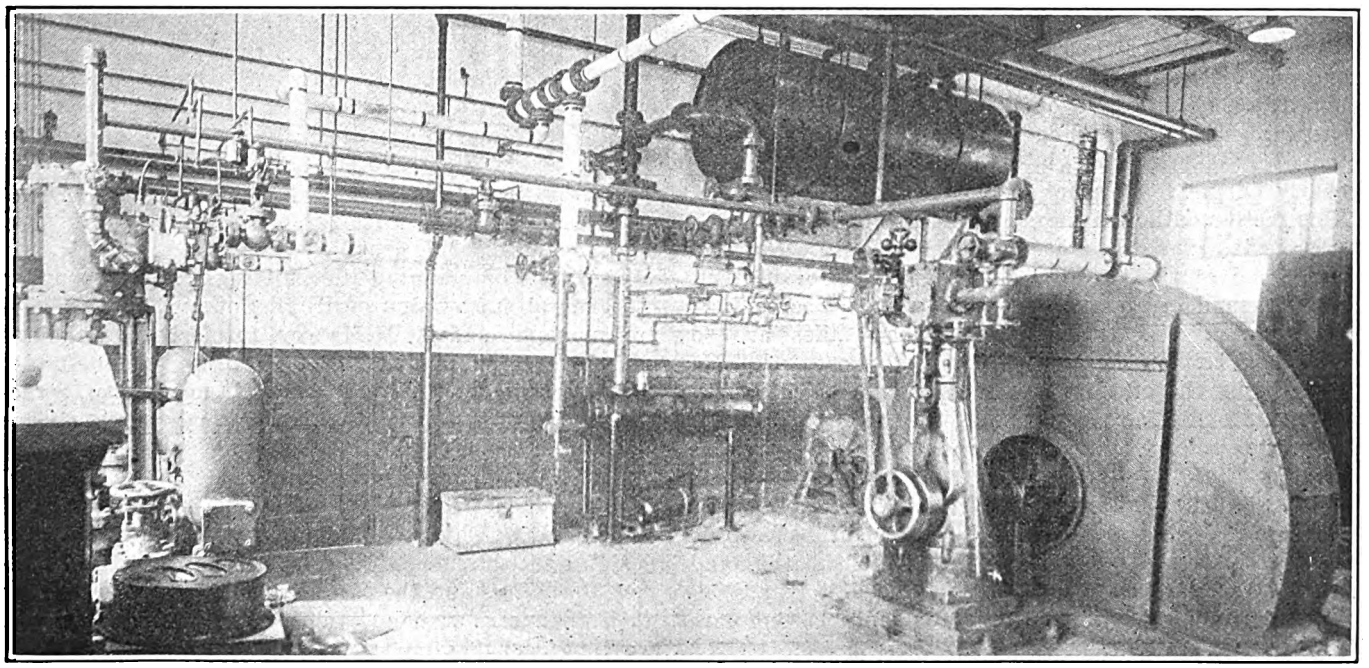
Two automatic push-button freight elevators with micrometer control are installed in the center of the building, and provision has been made in the framing for two additional elevators in case the height of the building is increased.

Immediately west of the administration building is a garage in which are housed the emergency trucks and equipment belonging to the way and line departments. Space also is allotted for the inspection and repair of this equipment and for gasoline and oil service.

The entire group of buildings is heated from a central boiler plant located west of the car shops. Four 300-hp. boilers with underfeed stokers supply steam at 100 lb. pressure. The steam and electric driven blowers, pumps and compressed air plant also are located in the boiler house. The steam is distributed through a tunnel system running directly east from the boiler house and through the car shops, passing just south of the transfer table, between it and the track pits. In this way the tunnel is practically open for a considerable portion of its length, so that inspection is facilitated. Passing out of the shops, the tunnel goes under the administration building and across the roadway to the stores building. The tunnels also provide for all other service piping and electric wiring.

Just north of the boiler house there is a complete coal and ash handling plant. Coal is stored in two concrete storage bins, one for steam coal and the other holding anthracite for use in the Peter Smith car heaters. These bins are fed from a track hopper with an apron feeder and elevator conveyor. A flight conveyor connects the bins with the boiler house coal bunkers, allowing the coal to be fed directly into them. Special ash handling equipment facilitates the removal of the ashes from the boiler room to Differential motor dump cars.

Fire protection is provided by means of an automatic sprinkler system throughout the buildings and a sys-



The Engine Room in the Heating Plant Contains the Pumps and Blowers

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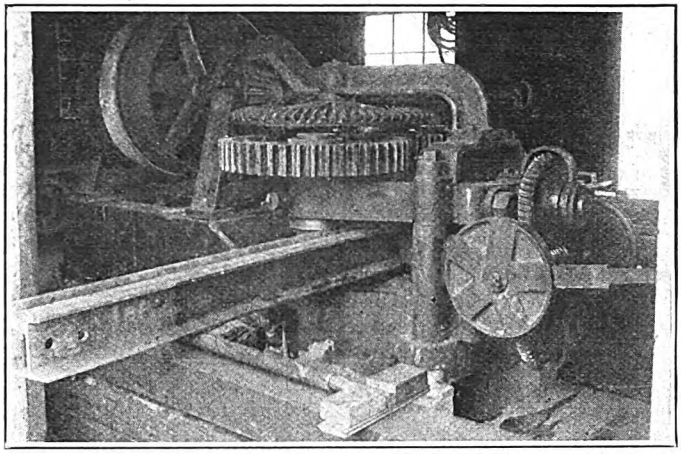

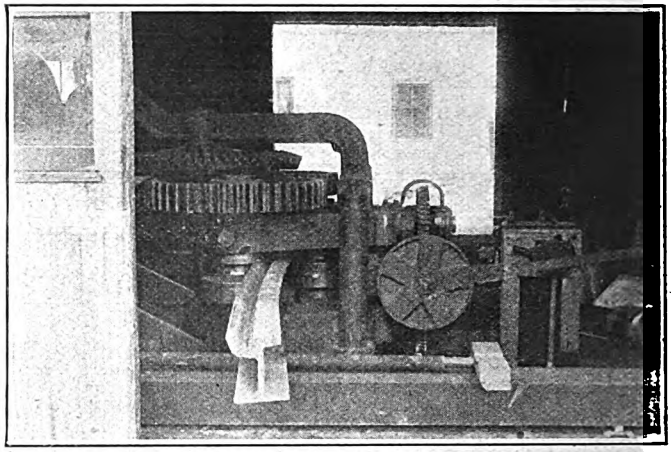

The Rail Bending Machine, Installed in the Layout Yard, Will Bend the Heaviest Rails Used in Toronto to Any Radius

tem of fire hydrants in the yard. This system normally is fed direct from the city water system. To provide an auxiliary supply and insure ample protection in case of failure of the city supply a tank of 100,000-gal. capacity has been erected at the northwest corner, which is the highest point on the property. This is filled by the city pressure, but is arranged with an automatic cut-off valve, which closes immediately if the city pressure fails, preventing the water from feeding back into the city mains. It is estimated that the capacity of the tank is sufficient to control a fire for two hours.

Outside the shop sufficient room has been reserved to provide storage space for cars awaiting repair and those ready for service. Test tracks are included so that the completed cars may be given a thorough try-out under operating conditions before being given final approval.

Paved roadways are installed wherever necessary so that trucks or teams can reach practically any point in the yards. In this way three methods are available for handling material—steam train, electric cars and trucks. In general these paved roadways follow the lines of the tracks, although the tracks are principally of open construction and are not paved.

When the property was purchased it was sloping, being on the side of a hill. The north end was some 30 ft. higher than the south end. It was necessary to do a great deal of excavation and grading to make it suitable for the shops and yard. A datum was established about midway, opposite the Bathurst Street entrance, and the grading was done to that level. In that way almost enough material was excavated to nearly fill in the material yard to the same level as the shop section, although there is still a slight grade.

Materials for track construction are stored at the south end of the yard in convenient piles of pit run gravel, sand, trap rock, crushed gravel, screenings for tamping and crusher run. These piles are so arranged that they are reached on the south side directly by the steam railroad cars and on the north by the commission's cars. This makes it possible to load and unload material at the same time without interference.

The cement building is used for the storage of cement, dry sand and salt. The basement beneath is devoted to a sand drying plant, in which all the sand needed for the cars is prepared. Immediately adjoining this building is a shed used for sand-blasting cars or other apparatus.

The frog shop is used for the repair of special work, or for the construction of any small piece of special trackwork that has to be made for emergency. Adjoining this shop is a layout floor in which any piece of trackwork can be set up and fitted preparatory to installation, insuring that all the parts are correctly made and there will be no delay due to fitting parts.

To the south of the layout floor is a rail bender, which is shown in an accompanying illustration. This bender is of heavy construction and is capable of handling the heaviest girder rails in use. By using special rolls for each section it is possible to bend the rail without distorting it, so that curves of any radius can be laid out accurately.

In the equipment shed are housed all the pieces of construction machinery that are liable to injury from the weather, except some of the heavier cranes. This makes it possible for a repair crew to work on them during the winter and place them in good condition for the coming season. It also makes it possible to retain the better mechanics, as they can be given employment the year around.

Ties are stored in piles near the center of the material yard. There is a gauntlet track on either side of the tie storage, so that access is convenient. Special ties are stored separately, so that they will not be mixed up with the others. A similar storage space is allotted to granite paving sets, which are standard with the commission.

Loading of sand, gravel and similar materials is done by means of Barber-Greene loaders, which are used largely in connection with track construction and at various points about the yard.

The cost per cubic foot of the general repair shops and the boiler house was 14 cents and of the general stores building 22¾ cents.

The work of planning the buildings was done under the general supervision of H. H. Couzens, former general manager, and D. W. Harvey, formerly his assistant and now general manager. The design was done under the direction of W. E. P. Duncan, engineer of structures. James H. Lowry was resident engineer in charge of building construction.

The shop layouts were planned by W. R. McRae, superintendent of rolling stock. Charles A. Remelius of New York was special consultant on problems of shop design and equipment. The layout of the way department buildings and the storage yard was supervised by A. T. Spencer, assistant to the general manager and way engineer.

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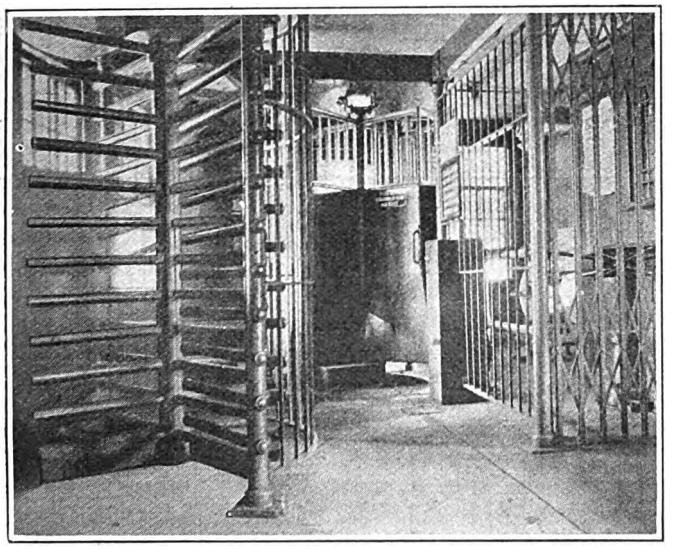
Automatic Passimeter Station

No Operator or Change Attendant Is On Duty During Off-Peak Periods—Iron Fences and Gates Direct Traffic—Additional Turnstiles Used in Rush

A LARGE number of the elevated stations of the New York Rapid Transit Corporation have entrance and exit facilities at either end. At some of these stations in sparsely settled communities it frequently happens that one end of the station is little used during off-peak periods, so that an attendant placed there to collect fares has little to do. To provide an automatic means of collecting fares at such points during non-rush hours the company has installed a number of automatic passimeter stations of a type shown in an accompanying illustration.

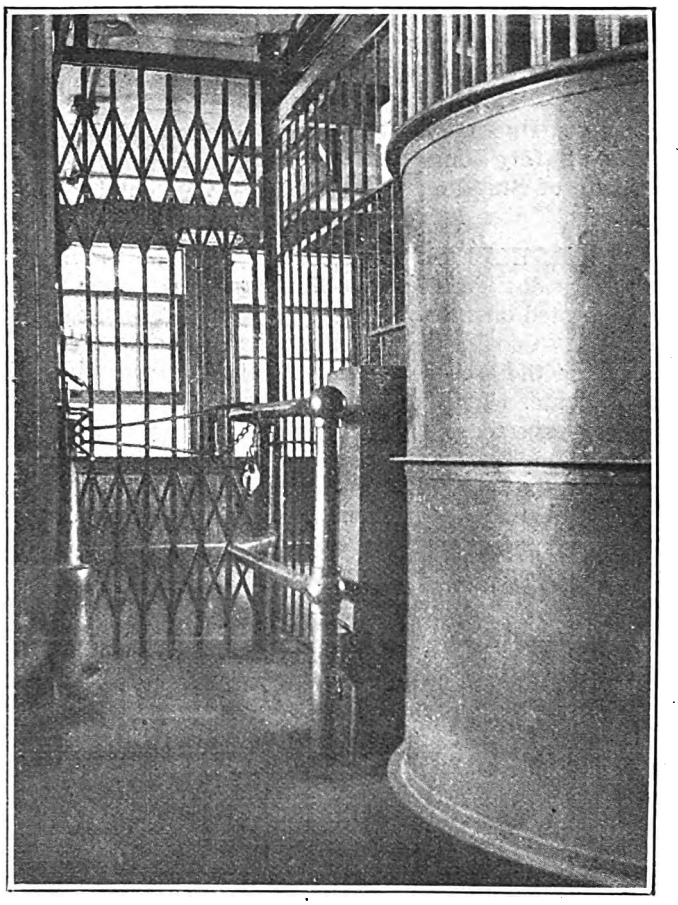
These stations are fenced off by iron fences and pantograph gates, so as to provide three passageways. In the accompanying illustration, the passageway to the extreme right, which is shown closed by a pantograph gate, is used during rush-hour periods, and an operator is stationed in the fare booth. This passageway is provided with a turnstile, which is released by the operator as each fare is paid, this operation registering the fare. The center passageway of the automatic station is used for entrance to the automatic passimeter. An iron fence is provided on either side which reaches from the floor to a support at the ceiling, so that it is impossible for any one to climb over or under this during the period when an operator is not on duty. An automatic fare box arranged to receive nickels only is placed in the iron fence at the right of this passageway and immediately in front of the passimeter. The construction of this fare box and the mechanism for releasing the passimeter and locking it



Arrangement of Automatic Passimeter Station

is of the same type as was described in the ELECTRIC RAILWAY JOURNAL for Jan. 20, 1923, page 127.

The construction of the turnstile, however, is quite different from the one previously described, which has four wooden arms only. In the new design the turnstile is entirely inclosed to a height of about 5 ft., and from this point up to the ceiling it is closed with an open iron framework. Two sheet steel quadrants partially surround the turnstile, making it similar to a revolving door. Thus it is impossible for any one



Sheet Steel Drum and Entrance Passageway from Inside of Station

to get through by climbing over or under the turnstile, and the drum arrangement, which has but two passageways, is constructed so that but one person can pass through at a time. After depositing the fare in the slot of the fare box, so as to unlock the turnstile, a slight push starts it rotating, after which a spring centering device provides for its return to proper position to receive the next passenger.

The third passageway of the station is used for exit of passengers and is provided with a four-arm turnstile, which has arms spaced vertically about 6 in. apart, and extends from the floor to the ceiling. The arms are of iron pipe construction and a ratcheting device on the turnstile prevents rotating except in the direction for exit. Stationary barriers are provided so that it is impossible to enter through this turnstile.

The entire construction of the automatic passimeter station is very strong. The iron fences are very substantial, and particular pains have been taken to provide a construction which will be entirely foolproof. Signs are provided at many locations to tell the passengers just how to enter and manipulate the automatic mechanism. A conspicuous sign is also displayed at the foot of stairways to notify passengers when an attendant is on or off duty, and also to inform them to be provided with exact change for operation of the automatic passimeter.

Another conspicuous sign at the top of the stairway is displayed only when the operator is on duty. During rush-hour periods a gate between the exit and center entrance passageways can be opened, so that exit passengers are not required to pass through the turnstiles, and both the right-hand and center passageways can be used for entrance passengers.

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Revolutionary Traffic Regulations in Philadelphia

Parking Has Been Eliminated on Congested Streets and Safety Zones Established to Prevent Blocking of Standing Trolley Cars—All Vehicle Movements Facilitated

PHILADELPHIA is confronted with the problem of every day getting a million people into and out of a congested business district of less than 2 square miles in area. Considering the limited approaches from the west and the exceedingly narrow streets the problem is most acute. The increase in automobile traffic, which may be expected to continue, and the normal increase in business and in population emphasize the seriousness of the situation.

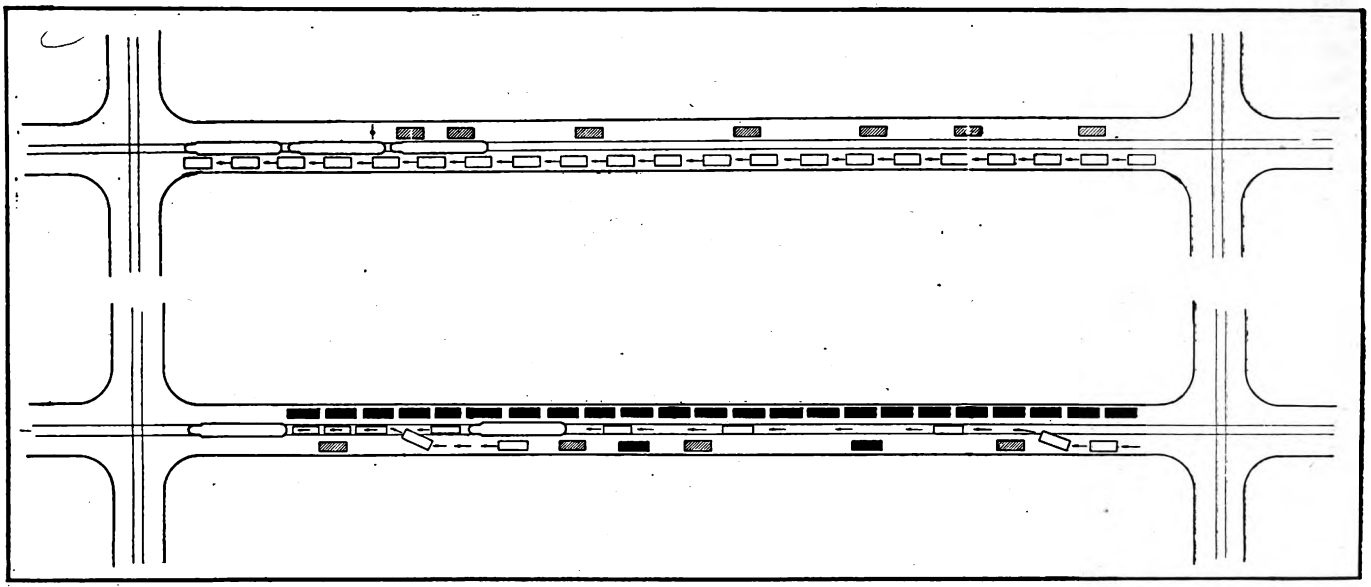
The new city administration realizes that the first step in any plan of improvement lies in using the existing street space to its greatest capacity. To this end a traffic division in the police department was recently created, under the leadership of General S. D. Butler, the director of public safety. How much can be done in obtaining proper use of the existing street capacity has been well illustrated by results from the revolutionary traffic regulations inaugurated on Chestnut and Walnut streets, running east and west through the entire 2-mile length of the business district. For a number of years these have been operated as one-way streets, but the number of parked automobiles and the indiscriminate use of the roadway have reduced its capacity, both for automotive vehicles and for street cars.

Butler's outstanding action has been to abolish automobile traffic on street car tracks of these two streets. Maintaining that automobilists have no right to block street cars by getting in the way, Butler has closed the car track space to them for a distance of forty blocks in the center of the city and has placed mounted policemen on duty to enforce his orders. He also has reserved a right-hand side space of 100 ft. back of each street crossing, where the street cars stop, for the exclusive use of street car passengers. When an automobilist enters the restricted area, he finds it well policed. If he gets on the car tracks a mounted officer orders him off immediately.

Abolishing parking on the left-hand side of these one-way streets has made it possible for automobiles to move in a continuous stream on the left-hand side of the street cars instead of being forced to operate on the car tracks as was previously the case. This has resulted in speeding up trolley service. The running time on a round trip through the congested area has been reduced from 40 minutes to approximately 33 minutes.

Safety experts from the Bureau of Safety, New York, who have visited Philadelphia say the establishment of 100-ft. safety zones at corners for street car passengers will work wonders in accident prevention. One of the large causes of accidents to street car passengers comes from automobiles rushing past cars which are being loaded or unloaded.

These zones permit the loading of three street cars at a time without interruption. Heretofore, with automobiles pulling past the cars as fast as one was loaded and pulled out, persons waiting in the street for other cars were forced to retreat to the curb, or dodge automobiles in the middle of the street. The effect of the new regulations can be seen from the diagram, which compares the present with former conditions.



How the New Regulations Have Improved Conditions on Walnut Street. Above, Present Arrangement; Below, Previous Arrangement

In addition to speeding up street cars and eliminating chances for accident General Butler has prohibited parking of automobiles on the two principal streets. Likewise he has begun to enforce parking ordinances long since dead.

Discussing the new plan, H. E. Ehlers, director of the department of city transit, said: "The consensus of opinion locally seems to be that the scheme has fully proved itself, particularly from the street railway viewpoint."

Director of Traffic G. W. Fritz is quoted as saying: "We are not trying to favor anybody or anything in this traffic rearrangement, but we are trying to work out, in a manner that will be of benefit to everybody, our most pressing traffic problems. The new Chestnut-Walnut Street plan has already shown it is a good thing. I traveled from Twenty-third Street to Third Street in Chestnut yesterday in six minutes."

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Improved Methods Produce Results in Kansas City

Three Years Operation Under Receivership Shows Outstanding Advance in Efficiency—Annual Deficit of $1,500,000 Turned to a Net of Over Half Million—Satisfactory Relations Established with Employees and Public —Continuous Operating Budget Gives Close Control of Expenditures

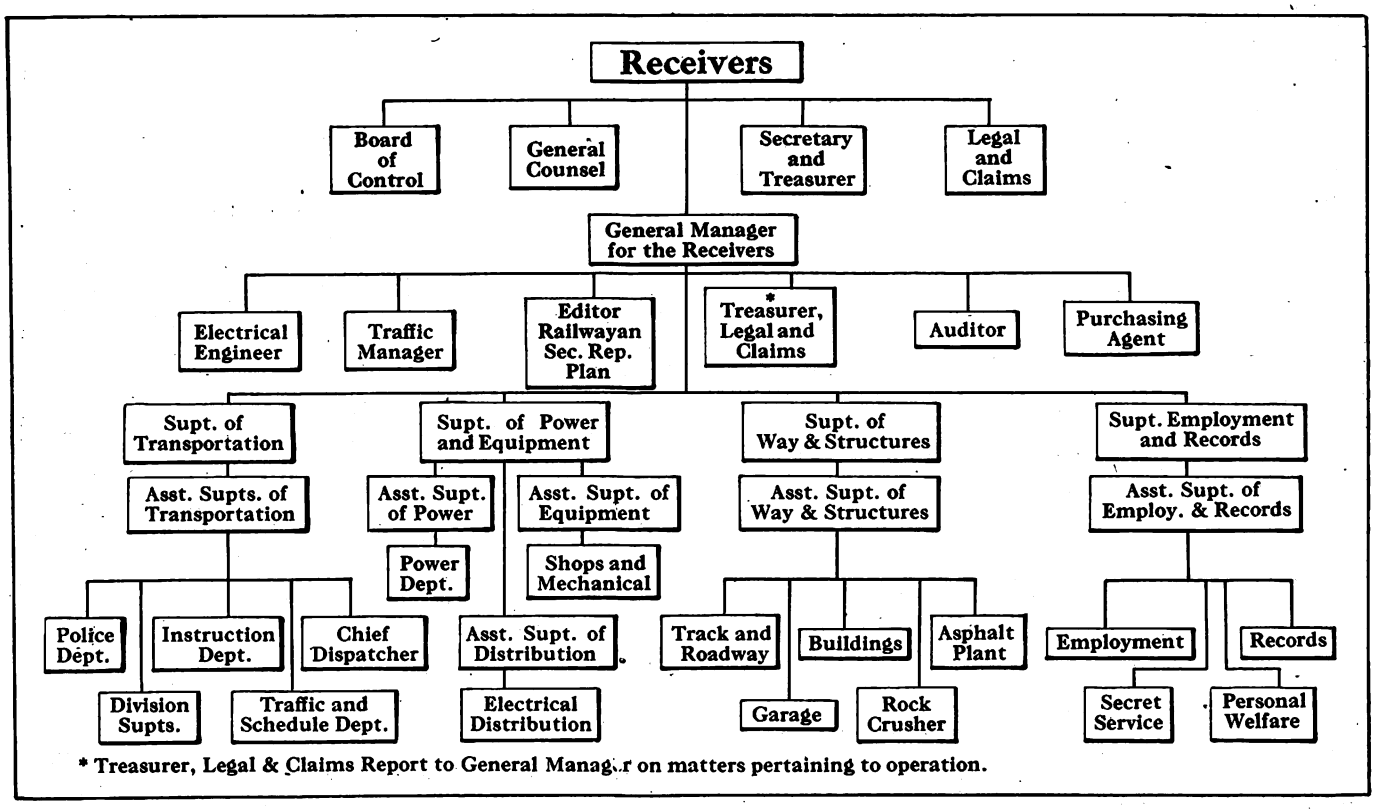
OPERATION of the Kansas City Railways under a receivership in which the interests of the riding public are given first consideration and in which modern management methods have been applied throughout the organization has resulted in so material an improvement in service and efficiency that widespread public support and co-operation have been won. Heavy grades and severe service characterize Kansas City conditions, but the results accomplished during the three years of the receivership clearly reflect the effectiveness of the methods adopted to put this property back into sound operating condition.

Since Sept. 9, 1920, when Col. Fred W. Fleming and former Senator Francis M. Wilson were named receivers by Judge Kimbrough Stone of the United States Circuit Court, the work of rehabilitation has gone steadily forward. F. G. Buffe has been general manager and operating head of the property since the latter part of 1919, when it emerged from a disastrous strike as a result of which 2,500 of its 3,000 employees were permanently cut off the payrolls. Just prior to the receivership, in the latter part of 1919 and the early part of 1920, the entire departmental organization had been completely revamped both in structure and personnel. To obtain an operating force of 1,800 to 2,000 trainmen more than 6,000 men were employed during that period, so heavy was the labor turnover. The transportation, shops, power house and distribution departments were completely overhauled and reorganized. The receivers approved this organization and the active work of rehabilitation went rapidly forward.

Improved Employee Relations

Labor difficulties have been eliminated by building up an employee brotherhood and representation plan. These improved relations have made possible the carrying out of an active program for improving public relations, one of the most important factors being the attitude on the part of trainmen in their contact with the public. Accompanying this has come a constantly increasing efficiency of all of the operating forces throughout the various departments. During 1920 a slight modification of a Beeler plan of routing was put into effect, and this produced an immediate improvement in the service. Some of the steps taken and results accomplished were described in the ELECTRIC RAILWAY JOURNAL of Sept. 24, 1921.

Severe jitney competition was eliminated by the im-



Organization of the Kansas City Railways, Which Is Considered One of the Important Factors in the Record of Improvements Made

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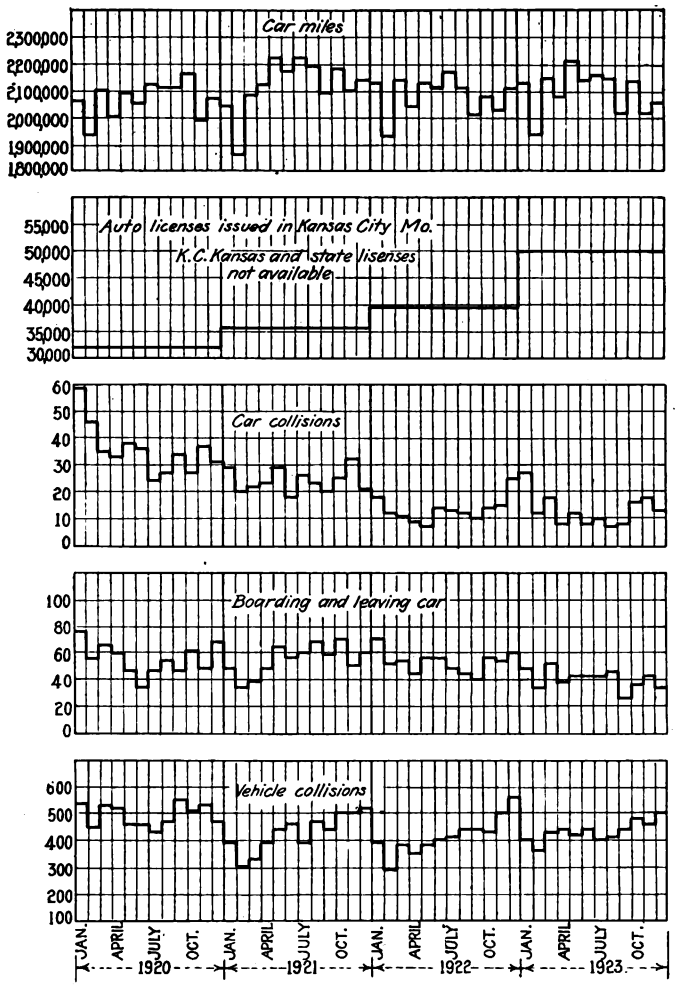

Trend of Accidents in Comparison with Car-Miles Operated and Number of Automobiles Licensed in Kansas City, Mo.

Vehicle collisions have been slightly reduced despite the big increase in number of automobiles, and car collisions and boarding and alighting accidents have decreased substantially.

provements in service and the consequent improved attitude of the public. This resulted in a steady growth in earnings, even though the number of private automobiles registered continued to increase rapidly. As an illustration of the increase in automobiles, registrations in Kansas City, Mo., and Kansas City, Kan., on Jan. 1, 1923, showed 64,300 cars, whereas on Jan. 1, 1924, this number was 83,600.

One factor, which in itself has been a great help in building up the property, is that the receivership has eliminated certain overhead and administration charges and saved approximately $100,000 per year. Furthermore, a wise investment of receivership funds has earned more than $235,000 in interest during the period of the receivership.

INCOME INCREASED

Table I shows a comparison of income statements for the year ended Aug. 31, 1920, just prior to the receivership, with the year ended Aug. 31, 1923, under the receivership. The results accomplished are reflected by an increase in railway operating revenue from $9,198,981 to $10,428,293, which is accompanied by a decrease in operating expenses from $8,333,915 to $7,726,866. The former is attributable to improved public relations, better routing and the elimination of jitneys, while the latter is a direct result of increased efficiency in the operating departments. The statement

TABLE I—INCOME STATEMENT COMPARSION YEARS ENDING AUG. 31, 1923, AND AUG. 31, 1920

	1923	1920
Total railway operating revenue	$10,428,293	$9,198,981
Total railway operating expense	7,726,866	8,333,915
Net revenue from railway operation	2,701,426	865,066
Net auxiliary revenue	81,012	229,923
Miscellaneous non-operating income	146,821	36,359
Total income	$2,929,261	$1,131,349
Taxes	507,993	591,961
Gross income	$2,421,267	$539,388
Interest and fixed charges	1,905,364	2,034,083
Net income	$515,902	$1,494,695*
Increase in net	$2,010,597	

* Deficit.

TABLE II—OBLIGATIONS OF THE KANSAS CITY RAILWAYS AND THE RECEIVERS, THE CASH AND MATERIAL ACCOUNTS AND ADDITIONS TO PROPERTY SINCE RECEIVERSHIP

Indebtedness of the Kansas City Railways at date of receivership, Sept. 9, 1920:		
Notes payable	$2,205,400	
Vouchers payable, current accounts	747,859	
Payrolls	324,556	
Car trust notes	317,507	
Real estate mortgages	23,250	
Miscellaneous accounts payable	50,998	
Twenty-third Street viaduct	143,930	
Accrued taxes	837,467	
Wyandotte County bridge	425,000	
Fifteenth Street subway	100,000	
Injury and damage certificates	126,297	
2,523 suits, amount sued for	27,131,186	
Judgments	525,346	
Claims in Federal court	935,046	
		$33,893,842
Indebtedness of the Kansas City Railways and receivers as of Sept. 30, 1923:		
Judgments on old cases	$525,346 / 1,573,203	
189 cases pending against the Kansas City Railways, amount sued for	2,357,289	
Judgments on appeal	197,032	
405 cases pending against receivers, amount sued for	4,345,904	
Claims pending in Federal court	935,046	
Notes payable	2,205,400	
Vouchers and accounts payable	360,526	
Payrolls	166,253	
Wyandotte County bridge	476,034	
Fifteenth Street subway	100,000	
Accrued taxes	887,112	14,129,145
Reduction in liabilities during receivership		$19,764,697
Cash and material account as of Sept. 9, 1920:		
Accounts receivable	500,475	
Cash assets	252,021	
Materials	833,426	
		1,585,922
Cash and materials as of Sept. 9, 1923:		
Accounts receivable	382,394	
Cash and securities	4,227,383	
Materials	848,364	
		5,458,141
Gain in cash assets during receivership		3,872,219
Capital additions by receivers		1,893,361
Increase in cash assets and property account under receivers		$5,765,581

TABLE III—AMOUNTS EXPENDED BY RECEIVERS FOR ADDITIONS AND BETTERMENTS, INCLUDING EQUIPMENT, FROM DATE OF RECEIVERSHIP, SEPT. 9, 1920, TO AUG. 31, 1923

Balance due on purchase of 95 safety cars	$304,371.67
Purchase of 20 cars (double truck)	275,348.79
Purchase of 3 differential work cars	28,710.69
Replacing 50 old type compressors	15,477.17
Replacing destination signs and curtains on cars	19,577.11
Rebuilding cars 1105, 1116 and 1121	25,643.28
Converting cars 1201 to 1211 to multiple-unit type	33,915.31
Installation of folding doors and steps on 110 cars	30,247.05
Replacing motors on 1500 type cars	18,317.43
Replacing motors at Tenth and Lister shops	17,964.73
Sprinkler system at Tenth and Lister shops	8,924.80
Cost of Twenty-third Street viaduct since receivership	257,257.49
Reconstruction of tracks on Eighth Street, McGee to Troost	29,169.36
Construction of loop at Twelfth and Jackson	27,890.63
Replacement of rail on Broadway, Fifth to Eleventh	6,784.28
Rebuilding track on Grand, Twelfth to Fifteenth	29,559.22
Rebuilding track on Thirty-first, Troost to Woodland	48,406.97
Rebuilding track on Eighth, Broadway to Wyandotte	15,296.97
Rebuilding track on Hemming and Kansas City Avenue	4,482.23
Track special work and O.H.B. Forty-eighth and Harrison	16,705.82
Track special work and O.H.B. Ninth and Brighton	38,830.66
Improvements in Armour Hills addition	12,952.31
Replacing rail on Dodson Line, Seventy-first to M.P. crossing	8,520.06
Rebuilding track on Lexington, Garfield to Montgall	20,816.37
Replacing rail on Walnut, Eighth to Twelfth	16,513.14
Rebuilding track on Twenty-fourth, S. W. Boulevard to Terrace	12,430.50
Curves and change of tracks, Forty-eighth and Prospect	13,761.87
Changing feeders and O.H.B. James and Central to State Line	8,231.92
Installation of extension to chain grate stokers at power house	20,493.43
Installation of ash car system at power house	18,740.18
Installation of skip hoist for ashes at power house	24,695.90
Installation of turbine at power house	4,737.86
Building addition to trainmen's building, Forty-eighth and Harrison	31,232.90
Miscellaneous items of additions and improvements of less than $10,000 each	447,353.49
Total	$1,893,361.59

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TABLE IV—COMPARATIVE STATEMENT OF ACTUAL INCOME AND EXPENSES FOR YEAR 1923 AS COMPARED WITH BUDGET ESTIMATE AND ACTUAL FOR YEAR 1922.

	Actual 1922	Budget 1923	Actual 1923
Passenger revenue	$10,213,928.12	$10,320,000.00	$10,139,878.91
Freight and other transportation revenue	68,191.03	77,500.00	67,521.72
Revenue other than transportation	122,625.71	122,000.00	97,008.21
Total railway operating revenue	$10,404,744.86	$10,519,500.00	$10,304,408.84
Maintenance and operation:			
Way and structures	768,964.58	840,000.00	867,675.24
Equipment	1,053,751.29	955,498.00	934,623.60
Power	1,323,891.86	1,175,586.00	1,144,753.93
Conducting transportation	3,551,130.61	3,557,026.73	3,554,353.04
Traffic	10,090.36	9,200.00	8,264.12
General and miscellaneous	637,907.16	635,227.91	607,379.92
Injuries and damages	720,000.00	720,000.00	720,000.00
Total railway operating expenses	$8,065,735.86	$7,892,539.32	$7,837,049.85
Net revenue from railway operation	2,339,009.00	2,626,960.68	2,467,358.99
Net auxiliary revenue	111,702.35	86,500.00	85,263.80
Miscellaneous non-operating income	113,407.99	152,000.00	173,997.46
Total income	$2,564,119.34	$2,865,460.68	$2,726,620.25
Taxes	533,593.57	516,000.00	474,378.01
Gross income	$2,030,525.77	$2,349,460.68	$2,252,242.24
Deductions from income	1,909,030.74	1,905,650.00	1,900,126.43
Net income	$121,495.03	$443,810.68	$352,115.81

shows a net income of $515,902 for the year 1923, as compared with a deficit of $1,494,695 for the year 1920.

Table II shows what has been accomplished in reducing the outstanding obligations, in building up cash assets, materials and property accounts since the receivership. Comparing the obligations on Sept. 9, 1920, the date of the receivership, with those of Sept. 30, 1923, shows a reduction of $19,764,697 for the period. During the same time the sum of accounts receivable, cash assets and materials on hand has been increased by $3,872,219. In addition, capital additions and improvements amounting to $1,893,361 have been made. The principal items included in these additions and betterments are listed in Table III, which, as will be noted, includes the purchase of 20 new double-truck cars that were described in the ELECTRIC RAILWAY JOURNAL for March 10, 1923, with operating features, Dec. 8, 1923.

CONTINUOUS OPERATING BUDGET HELPFUL

Since 1919 each department has been operated under a continuous budget plan. These departmental budgets are made up by detailed accounts and are prepared six months in advance of the requirements. The individual departmental budgets are compiled by the department heads and their assistants and are then co-ordinated in the auditing department. At general staff meetings the necessary revisions and corrections are made and the budgets are then approved.

Each department head is furnished monthly a statement showing expenditures for the month by accounts, together with the budget allowances. The expenditures for the corresponding month of the previous year, together with the total expenditure by accounts prepared cumulatively for the current fiscal year to date at each monthly report, are also included.

A typical illustration of the results accomplished by this plan is given in Table IV. This shows the combined budgets for operating income and expense for the year 1923, which gave an estimated net income for that year of $443,810.68, in comparison with an actual net income of $352,115.81. Table V is a sample of the monthly reports furnished the heads of departments to show comparisons between detailed budget estimates and actual expenditures. This statement shows the report for November, 1923, for the transportation department, and it will be noted that the estimated expenditures from Jan. 1 to Nov. 30 for that year were $3,257,287.13, whereas the actual expenditures were within $4,824 of this amount. The care with which

TABLE V—COMPARISON OF BUDGET ALLOWANCES AND ACTUAL EXPENDITURES FOR CONDUCTING TRANSPORTATION

Account	Item	Actual, November, 1922	Budget, November, 1923	Actual, November, 1923	Actual, Jan. 1 to Nov. 30, 1922	Budget, Jan. 1 to Nov. 30, 1923	Actual Jan. 1 to Nov. 30, 1923
63	Superintendent of transportation	$28,346.29	$29,500.00	$28,317.05	$330,212.23	$325,755.95	$316,692.03
63B	Superintendent Transportation Board of Control						
64	Passengers, conductors, motormen and trainmen	219,603.72	218,900.00	218,646.49	2,453,134.18	2,466,790.00	2,482,697.12
641	Students' time	1,259.30	1,200.00	2,058.55	12,710.13	12,516.00	17,293.58
642	Extra men's guarantee	289.67	441.00	157.11	5,132.90	5,177.10	3,531.82
65	Freight and express conductors, motormen and trainmen	808.63	746.00	1,136.15	7,883.53	8,388.40	9,649.26
66	Miscellaneous car service employees	5,339.39	4,275.00	4,115.72	45,331.43	47,880.00	50,417.14
6711	Batteries for electric bells, buzzers	276.22	421.00	79.17	4,542.22	4,293.66	3,542.55
6712	Car lighting	1,107.74	1,098.00	989.26	13,701.30	12,682.34	10,370.23
6713	Cord	147.42	162.00	183.42	1,801.44	1,762.58	2,041.70
6714	Waste for motors	382.05	464.00	480.07	1,879.89	3,539.07	6,080.45
6715	Waste for trucks		43.00	30.65	144.01	299.45	647.21
6716	Gear grease	157.74	108.00	117.91	310.80	921.24	1,186.47
6717	Gear lubricants	492.66	433.00	306.36	1,389.60	3,846.86	5,022.14
6718	Compressor oil	127.54	115.00	100.80	499.31	1,174.06	1,165.42
6719	Motormen's tools	6.48	9.00	10.07	158.68	88.44	111.57
6720	Car cleaners' supplies	243.49	304.00	352.55	3,909.23	3,343.71	3,851.79
6725	Miscellaneous	4,619.26	6,750.00	6,406.81	60,636.31	68,535.00	72,109.78
6726	Coasters	15.64	36.00	55.20	620.19	470.79	508.96
6727	Fare boxes—parts	77.64			390.62	333.04	6.39
6728	Tools and other express freight car				10.86	57.92	.28
68	Station employees	139.32	510.00	11.00	5,232.78	6,221.00	3,722.50
69	Station expenses	232.37	270.00	51.69	3,128.69	3,069.75	1,283.47
7011	Foremen, motor and brake inspection	2,652.74	2,896.00	3,483.62	30,686.19	29,619.05	33,443.77
7012	Car placers and shifters	3,924.48	4,200.00	3,574.80	47,632.42	47,040.00	41,489.35
7013	Miscellaneous	3,537.27	3,021.00	3,771.19	33,307.26	32,478.00	38,067.45
7014	Issue clerks	1,154.50	1,154.00	1,157.49	12,233.45	12,968.34	12,647.59
7015	Car oilers	1,583.60	1,613.00	1,619.29	17,791.12	17,852.82	19,185.13
7021	Car washing	874.20	895.00	464.06	12,327.57	9,808.57	7,899.85
7022	Window washing	1,706.57	1,688.00	1,143.67	19,007.77	19,156.68	17,999.94
7023	Car sweeping	3,819.45	3,902.00	3,665.04	42,555.14	43,068.00	42,707.37
7024	Truck washing				1,264.47	762.01	
71	Carhouse expenses	1,652.54	990.00	1,298.68	11,049.79	11,088.00	12,661.51
72	Operation of signal and interlocking apparatus	245.67	255.00		2,499.57	2,874.30	2,041.53
73	Operation of telegraph and telegraph lines	1,206.73	1,200.00	1,234.11	13,232.01	13,440.00	13,864.01
76	Freight and express collection and delivery						444 23
77	Loss and damages		5.00	1.00		55.00	21.77
78	Other transportation expenses	1,880.28	3,000.00	2,056.96	50,055.74	39,930.00	27,705.90
	Total	$287,910.60	$290,604.00	$287,075.94	$3,246,402.83	$3,257,287.13	$3,262,111.26

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these budgets are prepared is also illustrated by the comparatively close agreement between the estimated and actual figures for the various detailed items making up this statement.

Construction budgets for capital expenditures are made up at the beginning of each year to cover contemplated construction work by each department for a twelve-month period, in order to allow the various departments to plan their work a sufficient time in advance and to distribute the expenditures through the year. Monthly cumulative reports similar to those compiled for the operating accounts are furnished to each department head to cover capital expenditures. A combination of the operating and construction budgets enables the management to prepare a cash budget at the beginning of each year.

Employees Carefully Selected

Under the supervision of a superintendent of employment and records, the selection, examination and training of employees has been given very specific attention. This department handles employees' records for all departments and also looks after the secret service work of the company. Applicants for employment are required to submit to a full physical examination, which is equivalent to that required by insurance companies. This practice has resulted in the elimination of many undesirables. In the employment of new men the company has worked on the principle that it is under no obligation to an applicant and that money spent in the careful selection of new employees is a very profitable investment. Once a man is put on the payroll, physical or moral defects become a decided liability. They decrease the man's efficiency, increase accidents, cause irregularity in reporting for work, and in many other ways lower the quality of performance of the operating force. Direct results in the form of reduction in absentees and labor turnover have followed the adoption of these more rigid employment practices.

Minimum Wage Guarantee Attractive

Every extra man is guaranteed a minimum wage of $110 per month providing he makes all "show ups" during the month. By careful scheduling, the average total amount paid out under this agreement to more than 2,000 trainmen in the seven divisions is kept down to less than $160 per month in excess of the actual amount earned. The moral effect of the arrangement on employees and its effect in attracting a desirable class of men to apply for employment are believed to exceed very much the small cost of this arrangement.

Increased efficiency in all of the departments, improved scheduling of runs and careful attention to labor-saving methods have resulted in large savings in annual labor expenditures. As an example of the economies effected, Table VI shows a decrease in the annual payroll of $558,106 for 1923 in comparison with 1920. In this comparison the first five months of 1920 are adjusted to the same rate of pay that became effective subsequent to June of that year. On this basis, the reduction amounts to approximately 9.3 per cent in total annual labor costs. The better efficiency is well illustrated by the reduction in the total number of employees form 4,089 to 3,400 between 1920 and 1923, while at the same time the number of cars in service in the peak hour increased from 640 to 694.

Labor Turnover Reduced

Table VII shows the labor turnover in the transportation department from 1920 through 1923 by years. This was reduced from 81.7 per cent in 1920 to 30.2 per cent in 1923. Another index of the improvement in the performance of transportation employees is furnished by the result of inspections of fare irregularities. During the period from 1921 to 1923 the inspection force itself has been slowly built up with a constantly increasing degree of efficiency, so that the percentage of in-

TABLE VI—TOTAL PAYROLL COMPARISON, KANSAS CITY RAILWAYS

	1920	1923	Decrease
January	$466,030	$458,379	
February	422,758	411,380	
March	461,580	450,742	
April	461,211	446,537	
May	469,510	469,045	
June	496,510*	468,730	
July	511,305	474,429	
August	503,876	468,729	
September	492,396	440,370	
October	499,073	469,796	
November	464,632	443,401	
December	477,794	440,761	
	$5,726,675	$5,442,299	$284,376
Payroll addition if first five months were at same rate as present	273,730		
	$6,000,405	$5,442,299	$558,106
Reduction in annual payroll		9.3% or	558,106
Average number employees	4,089	3,400	
Cars in service, maximum hour	640	694	

* 12 per cent wage increase June, 1920

TABLE VII—TURNOVER OF TRAINMEN

	In Service Jan. 1	Left Service During Year	Turnover	Turnover of Men in Service Less Than One Year	Turnover of Men in Service More Than One Year
1920	2,119	1,732	81.7%	76.1%	5.6%
1921	1,843	755	41.0%	28.7%	12.3%
1922	1,934	580	30.3%	15.5%	14.8%
1923	1,831	563	30.2%	15.7%	14.3%
1924	1,843				

Total turnover 1923 ..... 30.2 per cent
Discharged ..... 10.4 per cent
Voluntary ..... 19.7 per cent

TABLE VIII—COMPARISON OF EQUIPMENT AND MECHANICAL DEPARTMENT EXPENSES AND WORK FOR YEARS ENDING DEC. 31, 1920 AND 1923.

	1920	1923
Number car-miles operated	24,808,411	25,399,290
Total equipment cost per car-mile	$0.0499	$0.0371
Total equipment expenditure	$1,103,715	$943,795
Total cars through shops:		
Wrecks	141	183
Repairs	177	340
New doors and steps	....	159
Utility work	4	21
Overhaul	300	389
Repaint	100	236
Total	805	1,258
Pull-ins, year	24,120	13,814
Pull-ins, average per mo.	2,010	1,151
Pull-ins per 1,000 car-miles	0.97	0.54
Dead cars at divisions afternoon rush, per day	22.3	2.3
Mechanical labor at divisions	$340,164	$169,154

TABLE IX—POWER COSTS DATA, KANSAS CITY RAILWAYS

	1920	1921	1922	1923
Net kilowatt-hour output	189,172,898	129,804,772	123,830,190	128,302,450
Total cost, dollars	2,928,221	1,735,840	1,399,126	1,197,928
Total cost, mills per killowatt-hour	15.469	13.373	11.299	9.336
Cost fuel, mills per kilowatt-hour	11.723	9.379	8.138	6.593
Other cost, mills per kilowatt-hour	3.746	3.994	3.161	2.743
Tons coal burned	401,531	244,215	161,027	198,200
Barrels oil burned	98,109	57,286	190,589	52,225
Total coal equivalent, tons	432,435	262,260	221,062	214,650
Pounds coal equivalent per kilowatt-hour	4.57184	4.04083	3.57040	3.34600
Total cost fuel only, dollars	2,146,470	1,192,543	990,994	834,094
Average cost fuel per ton, dollars	4.9636	4.5472	4.4828	3.8858
Tons coal required, basis 1920 consumption	.....	296,723	283,066	293,289
Saving in coal due to increased economies, tons	.....	34,463	62,004	78,639
Saving in dollars	.....	156,710.15	277,951.53	305,575.43
Saving other items over 1920, dollars	.....	*32,191.58	72,440.66	128,687.35
Total saving per year over 1920 operation, exclusive of saving due to decrease in market price of fuel, dollars	.....	124,518.57	350,392.19	434,262.78

* Increase.

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spections developing fare collection irregularities should have shown an increase if there had been no corresponding improvement in the character of trainmen. In a fifteen-day period more than 5,000 different inspections are made of a given number of conductors, selected at random, so that a fair cross-section of the entire platform personnel is obtained. The figures below show the reduction in the average percentage of total inspections developing irregularities each year from 1921 to 1923:

PERCENTAGE OF INSPECTIONS DEVELOPING IRREGULARITIES IN FARE COLLECTION

January, 1921	4.8 per cent
12 months of 1921	2.2 per cent
12 months of 1922	1.3 per cent
12 months of 1923	0.9 per cent

Corresponding improvement in performance is shown by Table VIII, which reflects what has been done in the equipment and mechanical department. The comparison between the years 1923 and 1920 on this statement shows an increase of 590,889 in the number of car-miles operated, but a reduction in total equipment expenditures of $159,920, or a change in the total equipment maintenance cost from 4.99 cents to 3.71 cents per car-mile, a saving of 1.28 cents per car-mile. At the same time there is a large increase in the number of cars put through the shop for repairs, overhaul and repainting and there is included in the 1923 figure the cost of putting 159 cars through for remodeling doors and steps.

Mechanical labor at the division carhouses was reduced from $340,164 in 1920 to $169,154 in 1923. Along with this reduction in carhouse labor, the pull-ins for all causes were reduced from 24,120 in 1920 to 13,814 in 1923. In these figures, any car which is taken out of service for any reason whatever before having completed its scheduled run is classed as a "pull-in."

Power house operation, which, together with equipment maintenance, is carried out under the general supervision of the superintendent of power and equipment, has likewise shown substantial progressive reductions in costs from 1920 to 1923, as shown in Table IX. Some of the steps taken to improve performance and increase efficiency were described in the ELECTRIC RAILWAY JOURNAL of March 17, 1923. The total cost of power per kilowatt-hour was decreased from 15.469 mills in 1920 to 9.336 mills in 1923. Direct saving in fuel, on the basis of 1920 consumption, amounted to 78,639 tons. The total saving per year in the power department over 1920 operation, exclusive of the saving due to decreased market price of fuel, amounted to $434,262.78.

The severe grades encountered in Kansas City present a serious accident hazard. Every effort has been made to reduce accidents to a minimum. The chart on page 808 gives the record for the years 1920-1923, inclusive, of the monthly figures for car-miles operated, car collisions, boarding and alighting accidents and vehicle collisions. The number of automobile licenses issued in Kansas City, Mo., for each year are also shown in the chart. Each department has been thoroughly drilled in accident prevention work and the company also cooperates in the city accident prevention activities. Although the large increase in the number of automobiles operated in the city has presented a constantly growing problem from the standpoint of vehicular collisions, car collisions and boarding and alighting accidents have been materially reduced in number.

Rochester Bus Accounts

Rochester Railways Drafts Classification for Gas and Trackless Trolleys, Based on New York State Schedules

THE use of both trackless trolleys and gas buses in Rochester has compelled the adoption of some kind of classification of operating expense accounts suitable to both kinds of motive power. Both classes of buses are conducted under the name of Rochester Railways Co-ordinated Bus Lines, Inc., and the classification of accounts adopted has been drafted by the auditors of the Rochester Railways on the basis of the classification of electric railway accounts of the New York State Public Service Commission. This state standard is based on the Interstate Commerce Commission classification, but there are some additional accounts. The new classification is published below.

The account numbers are not consecutive, but are the same as the corresponding or most nearly corresponding account in the Public Service Commission electric railway classification. Where the corresponding railway account has been divided in the bus account, the letters A, B, etc., are used to designate divided accounts, such as (30A) bodies and chassis, (30B) tires, (67A) miscellaneous bus service expenses, (67B) lubricants. The other letters used are "G" for gas buses and "T" for trackless trolley buses.

ROCHESTER RAILWAYS CO-ORDINATED BUS LINES, INC.

WAY AND STRUCTURES

1.	Superintendence.
9.	Misc. Roadway Expenses.
10.	Paving.
11.	Sanding Roadway.
12.	Removal of Snow and Other Obstructions.
19.	Misc. Way Expenses.
20.	Distribution Poles and Fixtures.
22.	Distribution System.
23.	Misc. Dist. System Expenses.
24.	Repairs Buildings, Fixtures and Grounds.
25.	Depreciation of Buildings and Fixtures.
28.	Equalization — Way and Structures.

EQUIPMENT

29.	Superintendence of Equipment.
30–A	Repairs of Bodies and Chassis.
30–B	Repairs of Tires.
32.	Service Equipment.
33–G	Repairs of Engines.
33–T	Repairs of Electric Equipment.
36.	Shop Equipment.
37.	Shop Expenses.
39.	Misc. Equip. Expenses.
40.	Depreciation of Equipment.
44.	Equalization—Equipment.

POWER

45.	Superintendence Power.
48.	Substation Equipment.
49–A	Trans. Poles and Fixtures.
49–B	Trans. Underground Conduits.
49–C	Transmission System.
50–A	Depre. Power Plant Bldgs. and Equipment.
51.	Equalization—Power.
56–B	Station Expenses.
57.	Substation Employees.
58.	Substation Supplies and Expenses.
59–B	Fuel for Power.
59–C	Elec. Energy from Other Sources.

CONDUCTING TRANSPORTATION

63.	Superintendence of Transportation.
64–G	Auto-Bus Operation.
64–T	Trolley-Bus Operation.
66.	Misc. Bus Service Employees.
67–A	Misc. Bus Service Expenses.
67–B	Lubricants.
68.	Station Employees.
69.	Station Expenses.
70.	Garage Employees.
78.	Other Transp. Expenses.

TRAFFIC

79.	Superintendence and Solicitation.
80.	Advertising.
82.	Misc. Traffic Expenses.

GENERAL AND MISCELLANEOUS

83.	Sals. and Expense of Gen. Officers.
84.	Sals. and Expenses of Gen. Office Clerks.
81.	Gen. Office Supplies and Expenses.
86.	Law Expenses.
89–A	Licenses.
89–B	Misc. General Expenses.
92–A	Injuries and Damages.
92–B	Law Exp's connected with Damages.
93.	Insurance.
94.	Stationery and Printing.

The physical life assumed for various parts of equipment in these accounts is as follows:

Street signals	5 years
Poles and fixtures	20 years
Electrical distribution systems	8 years
Shop buildings	35 years
Trolley buses	18 years
Gas buses	10 years

In addition the company has a short section of street paving in a loop over private property. The life of this paving is estimated at twenty years.

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Test of 3,000-Volt Train

High-Voltage D.C. Multiple Unit Train Developed at Erie—There Are Four Motors on the Car, Designed to Run Full Series or Series-Parallel

ON MAY 19, on invitation of the General Electric Company, a number of engineers from the steam railroads in the country, consulting engineers and representatives of the technical press gathered at Erie, Pa., to inspect a 3,000-volt car with multiple-unit control and witness locomotive tests. A train was made of a motor car with parlor, baggage, smoking and main passenger compartments and a trail car. The motor car was purchased from the Michigan Railway. The equipment consists of four GE-280 1,500-3,000 volt railway motors with type PC control and low-voltage lighting.

The motors mechanically are practically the same as the 1,500-volt motors recently built for the Paris-Orleans Railway, except that insulation has been added to take care of the higher trolley voltage. They are coupled permanently two in series so as to give two economical running speeds, full series and series parallel. The gear reduction is 70/21, giving a ratio of 3.33 and a maximum emergency operating speed with 36-in. wheels of 60 m.p.h. The motor capacity is sufficient to handle without overheating a 40-ton trailing coach, and at a somewhat reduced schedule two trailers.

The control is designated as PC-104 electro-pneumatic type and consists of a cam-operated switch group. In general the design is similar to the 1,500-volt control used for the Paris-Orleans motor cars with provision for higher voltage. The low voltage for control and lighting is obtained from a small 65-volt generator, having the armature carried on the shaft extension of a 1,500-3,000-volt dynamotor. The dynamotor winding is used to operate the CP-30 air compressor at 1,500 volts. A 28-cell storage battery is floated across the 65-volt generator control for operation when the set is shut down.

A feature of the control is a line breaker consisting of high-speed contactors connected in series for interrupting the 3,000-volt circuit. When the master controller is thrown to the off position, the motor current is broken by the line breaker, which reduces the duty on the other equipment. The control is arranged for seven stops full series and six steps series-parallel, including the tapped-field connection on the last step.

The heater equipment consists of a 30-kw. and a 10-kw. grid, taking current from the 3,000-volt bus line with suitable control. These heating elements are inclosed in an insulated box underneath the car. The hot air is carried to various parts of the car through a duct by a motor-driven blower. Similar equipment will also be installed for heating the trail coach.

The connection between the 3,000-volt heater bus on the motor car and the trailer is made by a simple device called the type SZ-14-A coupler. A swinging arm with insulating support resembling a miniature trolley and base is mounted on each car, and the connection is made by placing the arm of one car under a hook on the other. The coupler is manipulated from the ground by a switch hook.

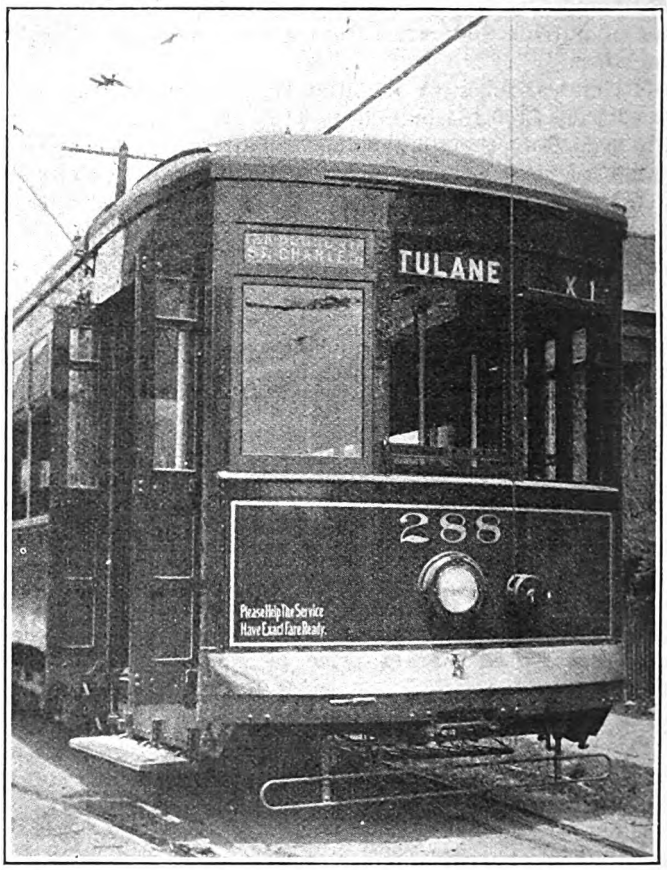
Current is collected from the overhead trolley by a single type S-501 slider pantograph similar to that used on 3,000-volt locomotives, carried on the motor car.

In addition to the test train one of the C., M. & St. P. Railway gearless locomotives was on exhibition. This locomotive has been in use for four years and has run 450,000 miles without the commutator being turned. Ten of the 3,000-volt 12-wheel locomotives being built by the General Electric Company for the Mexican Railways were also inspected.

Roll Signs Indicate Run Numbers

A NEW method of displaying the run numbers on the front of cars in service has been adopted by the New Orleans Public Service, Inc. Over the right-hand front dash window of each car has been placed a Keystone roll sign. This device consists of four vertical rollers, and a sign roll between each pair of rollers. The signs carry figures and letters so arranged that any number from 1 to 99 can be displayed, or, if it is desired, a key letter, such as "X," denoting extra, can be substituted for the first digit. The material of the sign is translucent cloth, black with white lettering, so that an electric light placed behind it illuminates the run number at night. A three-sided box, with its open face against the window glass, surrounds the apparatus.

Many of the cars operated by the New Orleans Public Service, Inc., have already been equipped with these



The Run Number of This New Orleans Car is Indicated by the Roll Sign Over the Right-Hand Dash Window

roll sings, and it is planned to continue the installation on other cars. This method of displaying the run number has proved advantageous not only because the illumination makes it easier at night for checkers to read the figures, but also because, being more or less permanently attached to the car, it cannot be lost, as happens so often with the ordinary metal run number.

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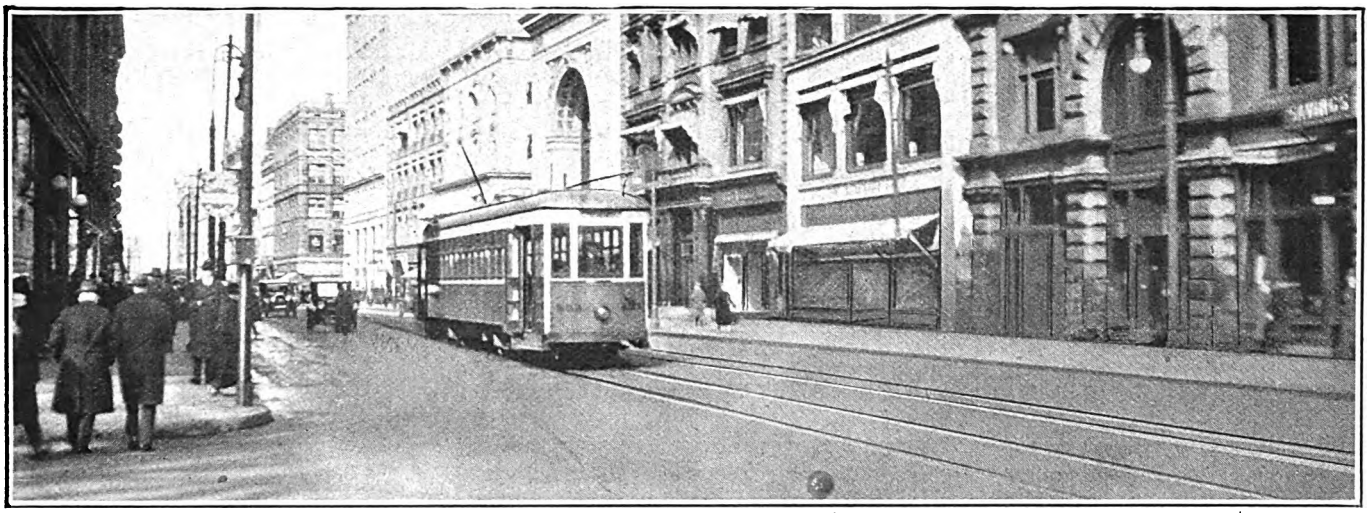
Rugged Cars Handle Large Crowds

Heavy Traffic in the Afternoon Rush Hour and Severe Winter Weather Conditions Were Influential Factors in the Design of a New Car for the Springfield Street Railway— An Unusual Type Truck Is Used



New Car Designed by Springfield Street Railway Specially to Handle Heavy Traffic on Main Street

AFTER giving careful consideration to the particular operating conditions existing in Springfield, Mass., the Springfield Street Railway has designed a new car equipped with many modern devices, yet differing in several important respects from prevalent tendencies of car design. The sharp traffic peak in the afternoon rush hour and the impossibility of operating a short headway on the line where it was planned to place these cars in service dictated that the new vehicles should have a large carrying capacity. And the trying experiences with heavy snows and ice during previous winters convinced the management that the cars should be rugged and powerful.

Practically every car line in Springfield follows Main Street for part of its route. In the late afternoon large numbers of waiting people assemble there at the various trolley stops. When buying new rolling stock, therefore, the railway was desirous of securing cars that could carry away the crowds as fast as they gathered. This the company considered had to be done by increasing the size of the unit rather than by the operation of a greater number of units, because one of the two heavy lines where the cars run has a single-track section that prevents the operation of a short headway. The new type car has a seating capacity of 56 and a rush hour carrying capacity of about 180 passengers.

Peculiar weather conditions prevail in that part of the Connecticut Valley in winter. There are frequent heavy falls of snow, the total for the season of 1922-1923 being 106 in. At one time the snow lay 28 in. deep on the level ground. On the other hand the snow often turns to rain and makes heavy slush in the streets. At night this slush freezes and becomes a serious obstacle to railway operation. To overcome this difficulty the new cars are equipped with 31-in. steel wheels and four 65-hp. motors per car. The motors are Westinghouse No. 532-A.

Each detail of design has been studied and only those devices which are thought by the railway to be well adapted to these severe conditions have been installed. The doors are of the folding type, opening outward, and are manually operated. Manual operation is preferred by the company because the danger of freeze-ups in cold weather is eliminated. The doors are interlocked with the control, but the conductor's bell signal has not been done away with. This was tried, but it was found that if the motorman left the controller on the first point the sudden starting and rapid acceleration of a car as the rear door was closed was unpleasant to passengers and even dangerous. Instances occurred where a car started with a jerk before some elderly person had seated himself or herself and a more or less serious accident resulted. The present practice, therefore, is for the motorman to wait until he receives a signal from the conductor before starting the car. The interlocking arrangement, however, prevents the car being accidentally put in motion while the rear door is open.

The steps are fixed instead of being of the folding type, because the railway has found that in the territory where it operates folding steps are likely to become clogged with snow and ice during the winter. From the pavement to the step is 16 in., from the step to the platform 12 in. and from the platform to the car floor 8½ in. There is a 1½-in. ramp. No outside grab handles have been placed on these cars. As a substitute there are on each platform six stanchions of 1¼-in. enameled iron pipe. These are placed inside of the folding doors, one stanchion on the right, one in the center and one to the left of the opening. It has been found that there is no greater likelihood of boarding and alighting accidents with fixed steps than with folding steps provided there are no convenient hand holds on the outside of the car.

Although the first object sought in the design of this car was ruggedness, care has not been spared to make the interior attractive. The woodwork is

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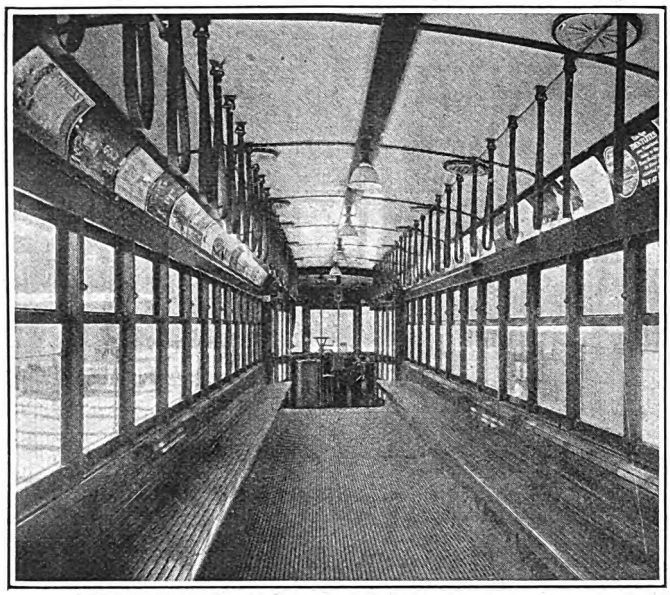


The Interior of the Car Is Pleasingly Free from Unsightly Apparatus

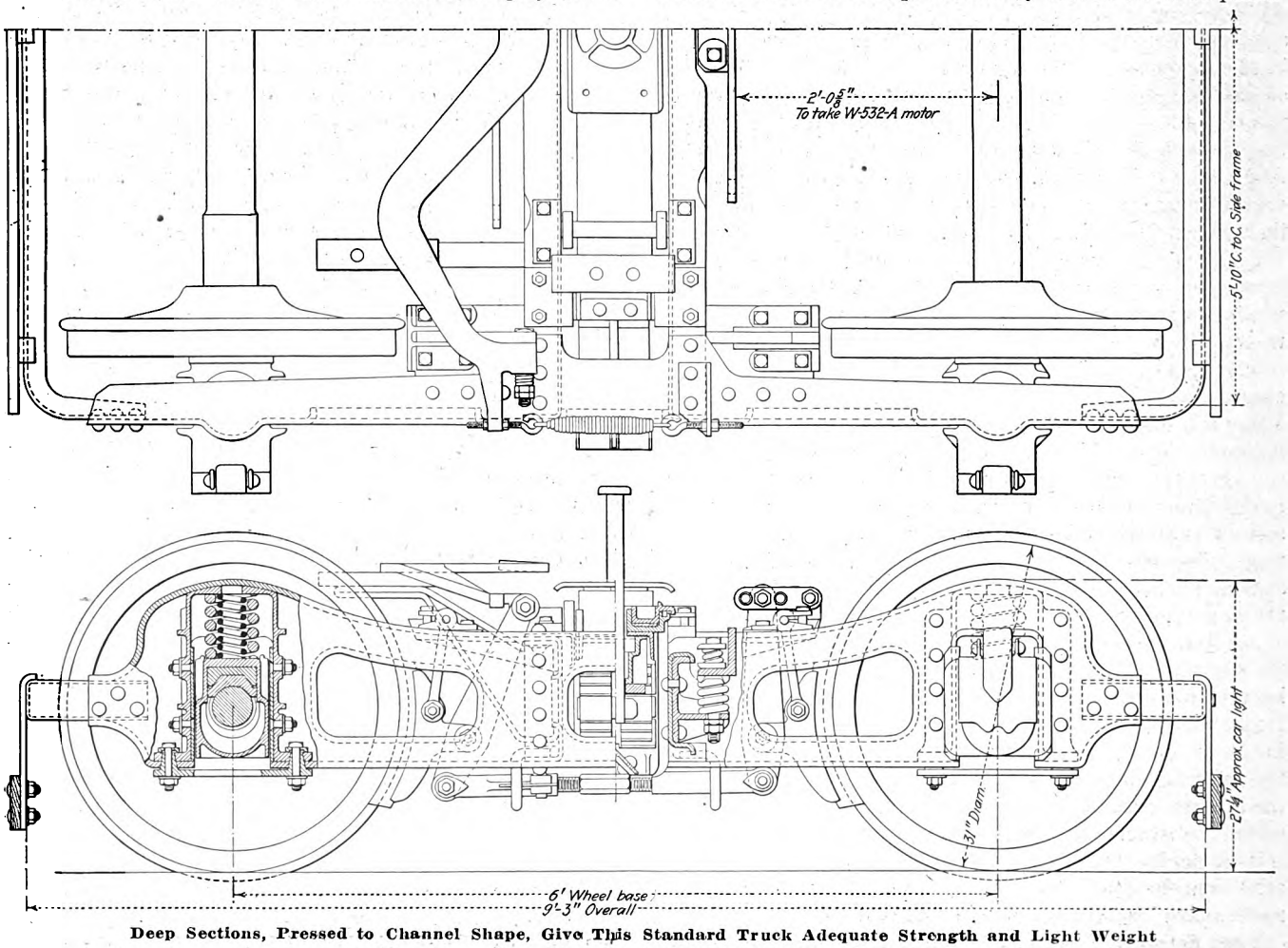
solid mahogany rubbed down with pumice stone and oil and left with a dead finish. Mahogany is preferred over any other wood on account of its better appearance and also because it does not warp readily. Cherry, however, is used for the seats, which run lengthwise of the car. No window curtains have been installed. The decision of the railway to use wooden slat seats and no window curtains was based on the fact that these cars are used on lines where the business is largely short-haul, and it was felt that the greater simplicity thereby accomplished counterbalanced any slight decrease in comfort.

An attractive feature of the car interior is the freedom from pipe, wires, bell cords, switch boxes, etc. All these things have been so located as to be entirely inconspicuous.

In order to assure sufficient warmth during the cold weather already mentioned, each car is equipped with 24 Cutler-Hammer electric heaters. Ventilation is accomplished by twelve Brill exhaust type ventilators. A double floor is used with felt in between two layers of tongued and grooved yellow pine, $\frac{13}{16}$ in. x $3\frac{1}{4}$ in., laid lengthwise. The roof is of $\frac{1}{2}$-in. matched white pine screwed to fifteen $1\frac{1}{2}$-in. x $\frac{3}{8}$-in. forged steel carlines. The ceiling is $\frac{5}{16}$-in. Nevaslip painted with pearl gray Vitrolite.

Artificial lighting in the car is provided by five center lights. In addition to these there are three lights used behind the destination signs and one in the headlight. There are in all six Hunter signs, one over each of the four doorways and one over the center vestibule window at each end of the car. An interesting feature of the lighting arrangement is the use of steel lamp shades inside the car. These are white enamel and are used instead of the ordinary glass lamp shade because of the danger of breakage when the conductor carries the International automatic fare box and registering apparatus through the car.

Ten of these cars were built by the Wason Manufacturing Company in 1923 and placed in service during last December. The side plates are $\frac{3}{32}$-in. steel. The exterior of the car is protected by eleven coats of paint.



Deep Sections, Pressed to Channel Shape, Give This Standard Truck Adequate Strength and Light Weight

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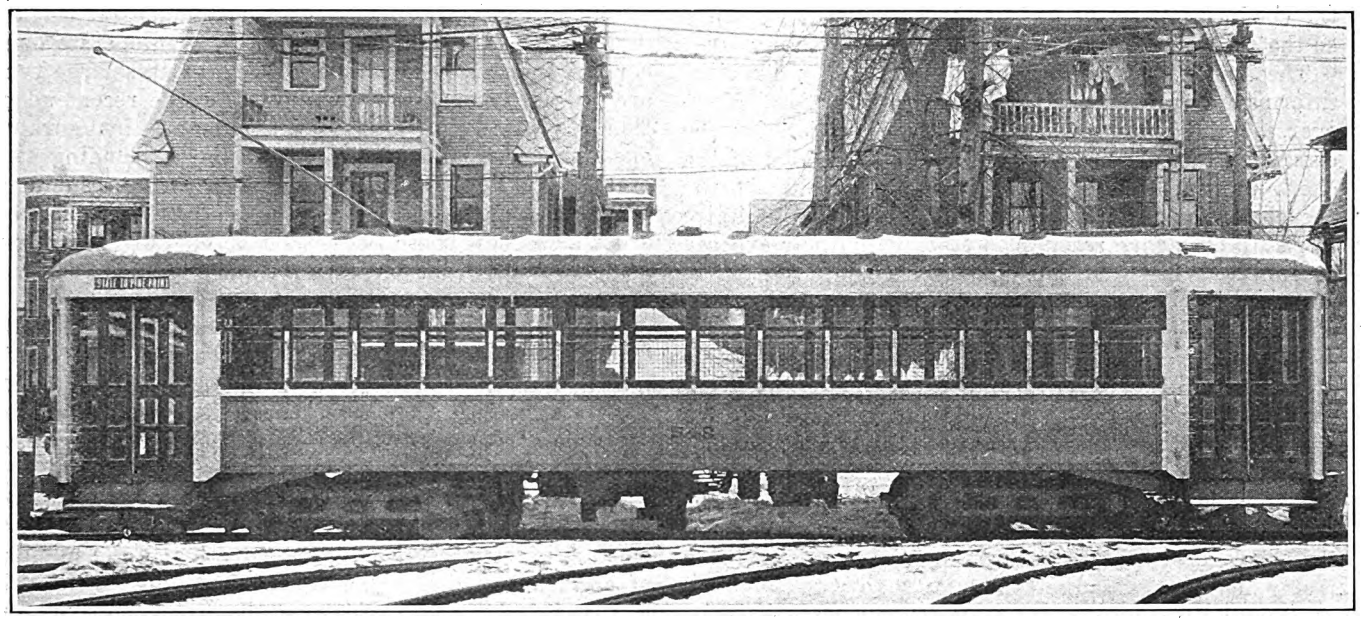


These Cars, Being Large and Heavy, Are Good Snow-Fighters

These are, in order, a priming coat, a filler, four coats of rough rubbing material, two color coats and three coats of railway varnish.

The car weighs complete 42,200 lb. The principal dimensions are as follows:

Length of body	35 ft. 0 in.
Length over all	48 ft. 4 in.
Truck centers	24 ft. 0 in.
Width over all	8 ft. 4⅛ in.
Height from rail to floor	36½ in.
Height from rail to top of roof	11 ft. ⅛ in.

The trucks used are Standard C-50-P-L. They are of the built-up type without side equalizing bars, the side frames being pressed in one piece to replace the equalizers and to form pedestal ways, which are reinforced by steel castings. The frames are pressed to channel shape, and by using deep sections the weight of the truck has been considerably lessened without reducing the strength. Connections between the side frames and the transoms are stiffened by cast steel gussets which also serve as supports for the brake rigging.

The truck brake rigging is of the direct-connected type with extensions riveted to the truck side frames for the application of release springs. All pins are case hardened and all holes bushed.

Coil equalizer springs are placed on top of the journal boxes, giving a long spring base and easy riding. Riding qualities are improved by the use of volute springs in connection with the elliptical bolster springs. The combination is so arranged as to bring the volute spring into action only with a certain passenger load, thus allowing for a more ready deflection with lighter loads and a stiffening up with heavier loads.

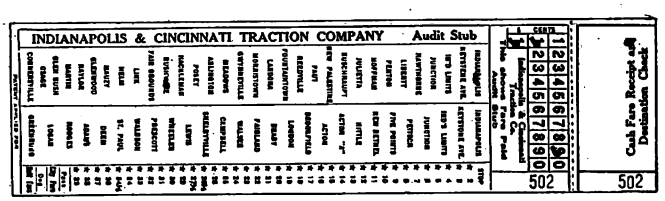
Journal boxes are arranged to receive A.E.R.E.A. standard 3¾-in. x 7-in. journals and are fitted with A.E.R.E.A. standard bearings and wedges. Wear plates are attached to the pedestals and tie bars are also provided. The latter are jig drilled and so constructed as to insure a tight job.

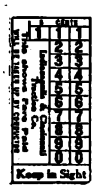
Bolsters are of the built-up truss type, the top member being a rolled channel and the bottom member a bar. They are fitted with the Standard Motor Truck Company's "Ideal" lubricated center plates and plain side bearings. The general arrangement of truck and arrangement of pedestal tie are shown in accompanying illustrations.

New Duplex Ticket Promotes Tidiness in Cars

THE Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., has designed a duplex ticket form in which the stub given to the passenger acts as a cash fare receipt and also as a hat check. This ticket has the double advantage of promoting tidiness in the cars and facilitating the work of the conductor.

For several years the railway had been having trouble with the old type fare register used. When it was decided finally to give up these devices a question arose as to what should be used in their stead. The ordinary cash fare receipts were considered undesirable because so many passengers threw them on the floor, giving a very untidy appearance to the cars. The railway officials were particularly desirous of making a feature of





This Form of Duplex Ticket Recently Adopted by the Indianapolis & Cincinnati Traction Company Facilitates the Work of the Conductor. At Right Is Shown the Reverse Side of the Stub

clean cars when new rolling stock recently purchased by this company was placed in operation. This desire has resulted in the adoption of the new type ticket.

The ticket is about 8 in. long with a stub 1 in. long which is folded back, punched, torn off and given to the passenger. A long coupon carrying complete information concerning the journey is retained by the conductor and turned in to the auditor. The hat check given to each passenger when fare is paid is lifted by

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the conductor near the end of that individual's journey so that he does not throw it on the car floor.

The amount of fare punched is ordinarily sufficient information to show the passenger's destination. However, at the present time it is the practice for the conductor to make a pencil notation on the back of the check showing the number of the station to which the passenger has paid fare. Sometimes passengers desire to retain cash fare receipts to accompany their expense accounts. When this happens there is no objection to permitting them to retain the checks because the serial numbers prevent their use for repeated trips.

The new ticket is printed on paper stock which is about half way between ordinary hat check stock and cash fare receipt stock. On account of being printed flat, however, the extra weight of the stock does not result in a cost higher than that of a thin folded duplex receipt. The tickets are carried flat and the small receipt check can be folded over so easily that the whole operation is thought by the company to be faster and easier for the conductor than with the ordinary duplex fare. Rights to manufacture and sell the new type ticket have been acquired by the National Ticket Company of Cleveland.

Largest Open Cars Converted for One-Man Operation

Public Service Railway of New Jersey Has Removed Running Boards, Screened Sides and Cut an Aisle Through Middle of Its Latest Type Summer Cars to Permit Operation by One Man

A VEHICLE possessing a number of unique features has resulted from the conversion by the Public Service Railway, Newark, N. J., of 50 of its most modern open type cars for one-man operation. These cars were built only a few years ago and are believed to be among the largest open street railway cars operated in the country, seating 96 persons. Reconstruction included removal of the double running boards, installation of screens between the posts, placing of doors at both ends to close the vestibules and cutting of an aisle through the middle of the cross-bench seats.

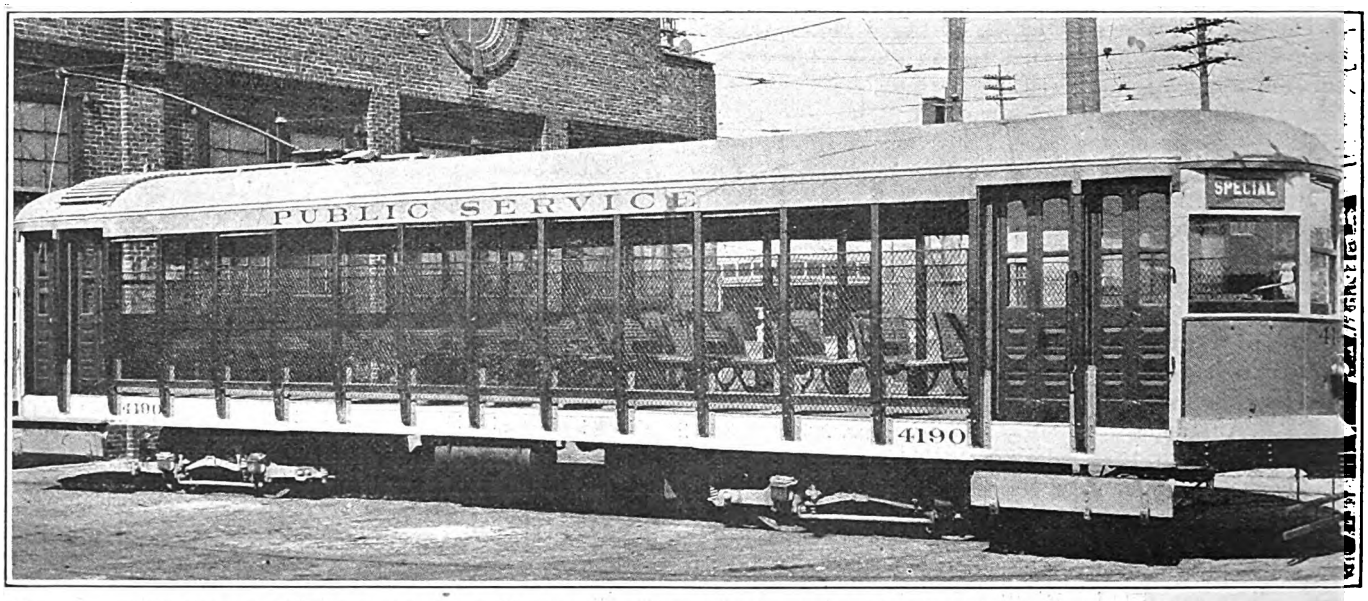
For many years it has been customary on certain divisions of the Public Service Railway to operate open cars in summer. Two hundred cars of this large type are ordinarily used in Newark. Since the recent adoption of the 5-cent fare the company has inaugurated one-man operation on many of its lines, including several lines which formerly used open cars in summer. With the approach of warmer weather the question arose as to how these lines could be operated. Conversion of some of the open cars for one-man operation has been the company's answer.

The vestibule doors are all operated pneumatically and are arranged to be controlled from the motorman's position. Entrance and exit will be by the front doors. The rear doors are for emergency exit, but they can be controlled from the rear end if it should be desired to operate the car with two men.

The removal of the double running boards from the near side and the installation of screens between the posts is expected to result in a reduction in the number of accidents, which has naturally been high with this type car. Closing up fifteen of the sixteen former entrances to the car might be expected to result in decreasing the speed of operation. The company questions, however, whether this will actually occur. In practice it was frequently necessary with a car of this type to wait while a prospective passenger walked up and down alongside the car looking for some special seat that took his or her fancy.

The seating capacity has been reduced from 96 to 62. One bench has been removed altogether, causing a loss of six seats, and 14 benches have been cut through by the aisle, causing a loss of two seats per bench, or 28 all told. Thus 34 seats have been lost. This loss, however, is not so serious in reality as it might appear, because it was comparatively seldom that the six seats on each bench were all taken. Some loss in carrying capacity will result from the elimination of the running boards, although the running board load will largely be transferred to the center aisle.

Another important feature of the conversion is the fact that these cars can now be operated on the pay-as-you-enter or pay-as-you-leave plan, instead of having the old-fashioned hand collection, as was necessary before.



Fifty Cars of This Type Are Being Converted by Public Service Railway for One-Man or Two-Man Operation

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Relieving Congestion on Atlanta Streets

Street Cars Forming 9 per Cent of Total Vehicles In and Out of Business District Carry 72 per Cent of the Passengers

THE relocation and wider spacing of many car stops, the berthing of at least two cars at a time in the downdown district to receive and discharge passengers, the installation of more raised safety loading platforms, employment of additional street collectors to enable passengers to get on both front and rear ends of the cars, better parking restrictions, giving precedent to street cars over all other forms of traffic, and co-ordination of all other traffic with the movement of street cars are included among the recommendations recently made to the City Council of Atlanta, Ga., by John A. Beeler, consulting engineer, New York. These are contained in a preliminary report, bringing attention to remedial measures that are immediately available for relieving the traffic situation without loss of time or any considerable expenditure of money.

One of the most interesting parts of this preliminary report is a study showing the relative efficiency of street cars and other vehicles in the use of the streets. A check was made covering the number of street cars and other vehicles, and the number of riders entering and leaving the business district on the main thoroughfares during the hour from 5 to 6 p.m. The results are summarized in the following table:

	Street Cars	Other Vehicles
Number of units	346	3,505
Total passengers	16,286	6,345
Passengers per vehicle	47	1.8
Per cent of total traffic units	9	91
Per cent of total passengers	72	28
Number of street cars required to handle all passengers	482	
Number other vehicles required to handle all passengers		12,552

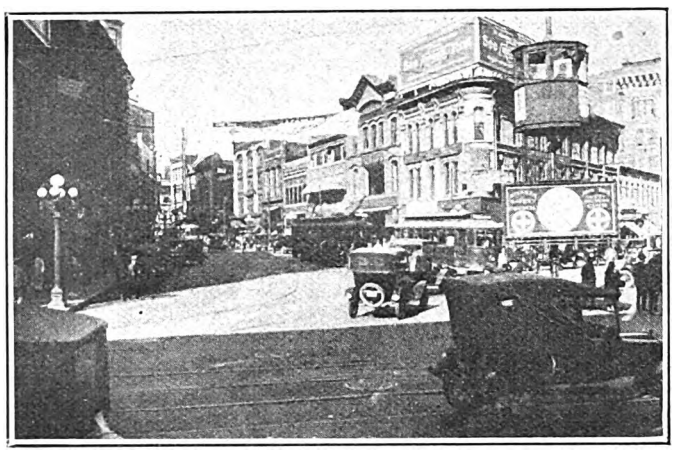
The number of vehicles recorded includes both horse-drawn and motor-driven units, although the former constituted but 1 per cent of the total. Hired drivers of taxicabs and jitneys were not included as passengers. The total number of units observed was 3,851, of which 346, or 9 per cent, were street cars. The total passengers carried were 22,631, of which 16,286, or 72 per cent, were on the street cars. Each street car thus carried 26 times as many passengers as the other vehicles, the average on other vehicles being 1.8 passengers.

On the basis of this loading, 136 more street cars, making a total of 482, could have handled all of the passengers, thus decreasing the total units using the streets from 3,851 to 482. To handle this same number of passengers in vehicles other than street cars would have required 12,552, or more than three times the number now used. The report points out that these figures show the relative importance of the street car and indicate that it is the prime factor in handling mass transportation. The necessity for speeding up its movement and increasing its general efficiency is thus extremely important from the viewpoint of the car rider and public generally.

Main Causes of Congestion

In discussing causes of the severe congestion in Atlanta, the consultant points out that the total population of 240,000 people living within the city limits is within an area of 26 square miles. This gives an average of 9,230 people per square mile, which is stated to be 50 per cent higher than the average of other cities of a size similar to Atlanta. The number of automobiles recorded by the registration in Fulton and DeKalb Counties, which have a total population of 310,000 people, has grown from 13,446 in 1918 to 38,251 in 1923.

The principal business district of the city is comprised within an area approximately 1,500 ft. wide by 3,000 ft. long, which is equal to less than one-sixth of a square mile. Most of the streets in the business section are narrow and some of the most important ones end blindly, others do not match up. In addition to this, practically all of the streets in this district, whether east and west or north and south, converge into Peachtree Street. This concentration of business district and



Five Points, in the Heart of Atlanta, Ga., Where Five Streets Converge, Creating a Most Difficult Job for the Traffic Officer and Slowing Up Street Cars and All Traffic

layout of streets result in a tremendous concentration of vehicular and street car traffic.

Checks of motor vehicle speeds on the main thoroughfares of the business district between the hours of 4:30 and 6:30 p.m. showed an average speed on Peachtree Street of 7.67 m.p.h.; on Forsythe Street of 6.28 m.p.h.; on Broad Street of 6.65 m.p.h.; on Marietta Street of 7 m.p.h., and an average for the district of 7.14 m.p.h. Checks of street car speeds in this district during the evening rush hour show the following average speeds in miles per hour: On Peachtree Street, 4.29; on Forsythe Street, 4.58; on Broad Street, 4.10; on Marietta Street, 3.43; and average for the district, 4.11. The low average speed shown on Broad Street, the consultant explains, is due to the fact that the cars turn on and off Broadway at every street intersection in the district, while on Peachtree and Forsythe Streets they nearly all go through. The slowest speed of all in the district was on Decatur-Marietta Street, the main east and west traffic way, where it was 3.43 m.p.h. Here the car stops are closer together, a large number of both right and left hand turns occur at Broad, and the traffic delays at Five Points all tend to retard traffic movement.

Remedies Suggested

As to the remedies suggested and summarized at the opening of this review, the report points out that car service may be improved and general traffic movement aided by the expedient of placing car stops farther apart and where they will least interfere with traffic movement. In places the stops are now but 250 to 300 ft. apart.

In connection with traffic regulation and parking, the

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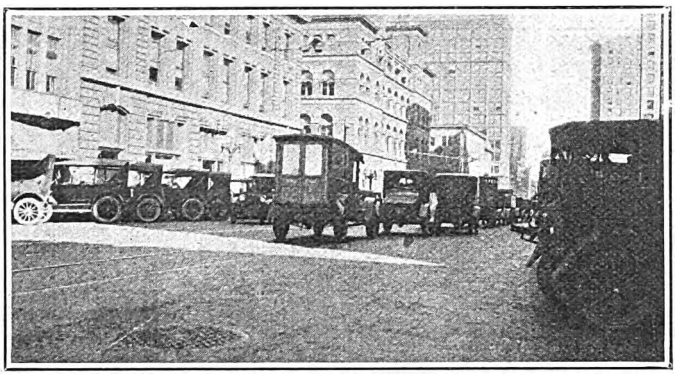
report states that "where either loading platforms or safety zones are installed, they will fail of their purpose unless traffic is kept moving. Regulations should be such that vehicles will not be required to stop behind standing street cars, but will proceed past the safety zones or platforms whenever the traffic officers permit. No vehicles should be allowed to stop opposite platforms or safety zones at any time except for traffic control.

"Vehicles must keep clear of the car track in approaching street intersections, and at all double berthing and loading points. Owing to their superior carrying capacity, the street cars should be given the preference as far as practical in crossing movements by traffic officers, and the other movements co-ordinated therewith. This will facilitate the movement of the greatest number of people with a minimum loss of time. Full recognition of the relative importance of the various factors in mass transportation must not be lost sight of.



Diagonal Parking Is One of the Evils with Which Atlanta Is Beset, as Seen on Marietta Street Looking Toward Five Points

"The system of controlling traffic by means of signal lights is a commendable one, but it will fail of its chief purpose if personal supervision is lacking in directing the more complicated traffic movements."

It is pointed out that angular parking is especially undesirable, as it not only occupies a large amount of the street space, but causes traffic interference and increases the accident hazard on account of the backing out of automobiles from the curb. The report comments that there may be as yet no general necessity for prohibiting all parking during the rush hours, but that the time is rapidly approaching when all parking will be prohibited on the main thoroughfares of important cities and their use given over solely to moving traffic. Such action is necessary in Atlanta along the three blocks on Peachtree Street between Luckie and Ellis Streets. This constitutes the chief bottle neck through which the heaviest car and vehicular traffic passes in entering and leaving the business district.

Street Cars Still Are Wanted

THE inquiring reporter of the Chicago *Tribune* asked a thought-compelling question the other day, and the answers indicated that people do not take their transportation quite so much for granted as might be assumed.

"If the pages of history were to be turned back one hundred years, which of the modern conveniences you now enjoy would you dislike most to give up?" was the question the reporter asked of three men and two women.

Two men frankly declared that most of all they'd hate to lose the street cars. They admitted they couldn't afford autos, and if the street cars were not present they'd have to walk. The other man declared all methods of transportation were the most important to him. The women were divided between an electric curling iron, electric washing machine, sewing machine, automobile, telephone and electric lights.

The Readers' Forum

Houston Situation Much Improved

CITY OF HOUSTON
Legal Department

HOUSTON, TEX., May 14, 1924.

To the Editors:

It is with a great deal of interest that as city attorney of Houston I have read your synopsis of Mr. Beeler's report on our street railway situation. (Issue of March 15, 1924, page 407.) This situation has been a source of constant unrest and threatened litigation for a number of years.

Some months back the City Council authorized Mayor Holcombe and myself to select an expert to investigate and report on our local street car situation, and we were not limited as to the amount we should pay nor was any suggestion made as to the organization we should employ.

The Beeler Organization made a very thorough and extensive study of our problem and submitted to us a report which we feel correctly analyzed the situation and suggested the remedy. This matter was placed before the public and at an election held in our city under the referendum provision of our charter the people voted approximately three to one to adopt Mr. Beeler's report and to settle the street car controversy along the lines recommended.

This action was taken by the City Council and we feel that a most satisfactory solution of our transportation problem has been arrived at. The street railway company is so far living up to its part of the agreement to the letter and has adopted the suggestions contained in the Beeler report, with the result that our street car service is now more satisfactory than it has been in the last twelve to fifteen years.

We naturally feel very grateful to Mr. Beeler and his assistants for their work in this matter, and I believe that this same feeling is shared by practically all of our citizens. Mr. Beeler's report showed that he had a very thorough grasp and understanding of street railway transportation, and it was so fair and unbiased that there was no difficulty in our getting upon common ground and satisfactorily adjusting our difficulties with the street car company.

In view of the good work done by Mr. Beeler and his associates, we feel that it is but fair that we let those interested know how we feel about the matter.

SEWALL MYER, City Attorney.

The Los Angeles Railway has adopted the practice of notifying the public in advance of parades and other events which will affect the service. Being in possession of this information, riders can arrange their travel to avoid the interruption.

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Association News & Discussions

Regional Plan Committee Discusses Traffic

VARIOUS phases of the traffic problem in the metropolitan district were discussed at a conference held at the Town Hall, New York, on May 20 under the auspices of the Committee on a Regional Plan for New York and Environs. About 200 delegates from civic, municipal, commercial and industrial organizations within 50 miles of Manhattan attended the meeting and took part in the discussions.

Although the principal object of the conference was to emphasize the fact that the traffic problem in New York city is a very serious one, several suggestions were made for its solution. In the report of E. P. Goodrich, consulting engineer of the committee, the cost of traffic congestion on Manhattan Island was estimated at $500,000 a day, and the cost of congestion in the whole region at $1,000,000 a day. Approximately 2,030 persons were killed by motor vehicle accidents in New York and its environs during 1923, and it is estimated that with a registration of 2,180,000 vehicles in 1930, there will probably be 4,100 fatalities that year.

Among the causes of traffic congestion mentioned in this report are narrow streets inherited from former times, building heights too great for the capacity of adjacent streets, lack of zoning ordinances to regulate the size and use of buildings, lack of planning ordinances to prevent laying out new streets too narrow for their ultimate use, inadequacy of arterial thoroughfares and lack of a comprehensive plan for the development of the region. Although there is already in New York City a motor vehicle for every 16 persons, and in the metropolitan district one for every seven persons, the automobile saturation point in this region will not be reached until 1950, according to the estimates of Mr. Goodrich, when he expects there will be 16,800,000 persons, and a motor vehicle for every 3½ persons in the region.

In discussing possible solutions of the traffic problem in New York City. Mr. Goodrich, Mayor Hylan and H. W. Corbett, an architect, suggested the removal of all surface and elevated railways. It was proposed that the passengers now carried by these lines might in that case be carried by buses or by new underground rapid transit lines. Mr. Corbett also suggested that the street surface should be given over entirely to vehicular traffic and pedestrians accommodated by second-story arcaded sidewalks within the building lines. Graceful bridges would span the streets connecting these arcaded sidewalks, and in his imagination, the streets of New York would then resemble the canals of Venice. Among the other suggestions made for the relief of traffic congestion were the creation of new highways to by-pass congested areas and the limitation of building heights by institution of a graduated tax on buildings according to their height.

High buildings are a direct tax on the community, through the necessity of maintaining fire-fighting facilities of excessive capacity and cost. The elevators in high buildings require extra annual inspection. Potential accidents during fires in high buildings are more serious than in low ones. High buildings cast shadows over adjoining properties and deplete the physical stamina of tenants. Other economic objections exist to such structures, and some means should be found to make them contribute to the relief of the financial burden which they place directly upon the shoulders of the community.

That what is most needed now is more good railroad engineering in solving the traffic problem was the opinion expressed by J. Rowland Bibbins, consulting engineer, Washington, D. C. He stressed the need for bringing experienced transportation men into active co-operation with the work of the committee.

The scope of the regional plan was outlined by Frederic A. Delano. Among the major questions which the committee is considering he mentioned development of the water front, housing, zoning, parks, need for additional bridges and highways. Others who spoke at the conference were George S. Silzer, Governor of New Jersey; George R. Lunn, Lieutenant-Governor of New York; John F. Hylan, Mayor of New York City; Robert W. de Forest, president Russell Sage Foundation; Arthur S. Tuttle, chief engineer Board of Estimate; General H. L. Scott and Walter Kidde, New Jersey State Highway Commission; Dwight W. Morrow, Lawson Purdy and George McAneny, chairman New York Transit Commission.

American Association News

Subjects and Meetings

THE committee on subjects and meetings met in New York on May 16 to shape more definitely the program for the annual convention at Atlantic City. The members present were: Frank R. Coates, chairman; F. W. Doolittle, Harry L. Brown, Cornell S. Hawley and Secretary J. W. Welsh. The program was tentatively outlined as follows, speakers were agreed upon and the work of securing them put in motion:

First day: A paper on "Financing of Electric Railways." Another paper on "Customer Ownership," followed by discussion on the subject by a representative of a holding company in the East and one in the West.

Second day: Two papers on "Coordination of Motor Vehicle and Electric Railway Service by Electric Railway Companies," to be presented by a speaker representing the motor vehicle interests and by a railway man.

"Necessity of Electric Railways to Communities," a symposium to be participated in by the mayor of a city, a real estate man, an officer of the U. S. Chamber of Commerce, a public utility commissioner, and a manufacturer.

Third day: "Management and Modernization." The time at this session will probably be turned over to the committees on interurban and city operation, which will present a five-minute report from each of the fourteen regional vice-chairmen, introduced by a general report of each committee chairman.

The committee decided to recommend to the executive committee that no business meetings be held on Wednesday, making this the day off for all associations for inspection of exhibits. The executive committee will also be called on to decide whether the American Association meetings shall be on Monday, Tuesday and Thursday mornings or Tuesday, Thursday and Friday mornings, the latter having prevailed as the recommendation from the subjects and meetings committee.

The committee also voted to have a special committee appointed, with President Budd as chairman, to make formal inspection of exhibits of manufacturers, as was done last year.

Valuation

A MEETING of the committee on valuation of the American Association was held at association headquarters, New York, May 19. Reports were received from the various sub-committees containing the material to be included in the annual report of the committee. There was considerable discussion, particularly regarding the terminology to be recommended by the committee and the relative weight of the several elements going to make up cost and value.

Members of the committee present were: F. W. Doolittle, chairman; E. J. Bechtel, H. A. Clarke, Thomas Conway, Jr., J. A. Emery, T. E. Francis, W. H. Maltbie, L. R. Nash, A. S. Richey and Frank Silliman, Jr.

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Maintenance of Equipment

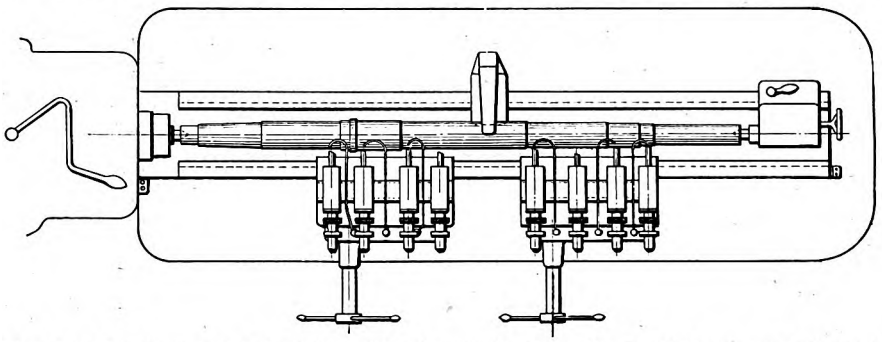
Tripling Armature Shaft Production

BY O. H. JORGENSEN
Chief Draftsman Equipment Department,
Chicago Surface Lines

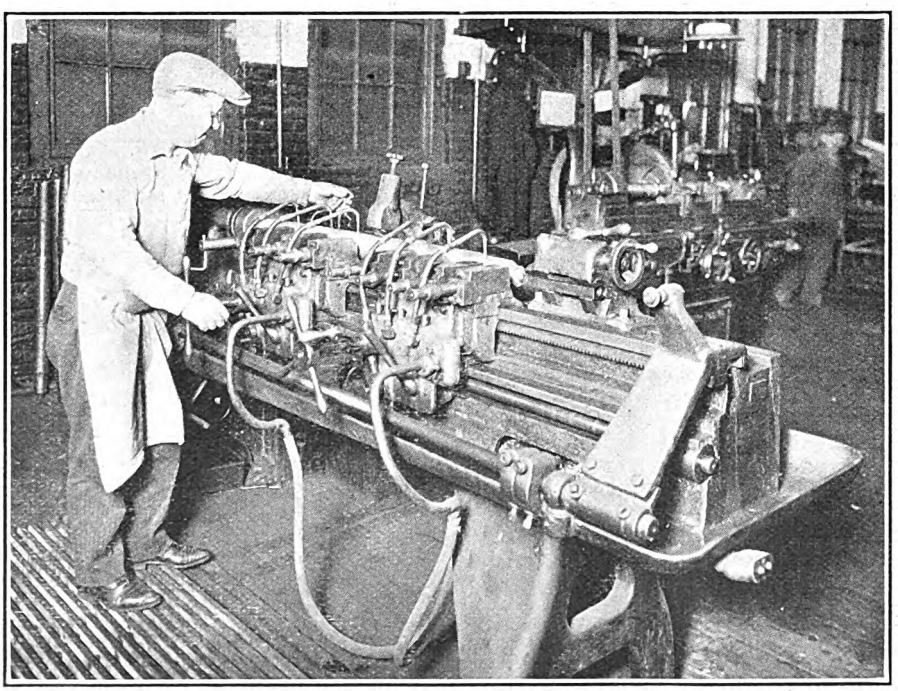
AN EXAMPLE of the saving which can be effected by the use of modern machine tool equipment is furnished by the "Lo-Swing" lathe in the West shops of the Chicago Surface Lines. This machine, which is used for turning armature shafts for replacements, turns out eight and one-half shafts in eight hours, in comparison with three shafts turned out in the same time by a single tool post engine lathe operated by a highly skilled and efficient machinist. Thus by the use of this machine the production has been practically tripled with no increase in labor costs.

The figures quoted are taken from shop records over a period of two years and include the time required for setting up the machine, which averages two hours for each different size of shaft.

Armature shafts are delivered to the "Lo-Swing" lathe in the rough-turned state, as they are received from the steel mill. The rough-turned diameters are $\frac{1}{8}$ in. greater than the finished diameters, and these again are $\frac{1}{32}$ in. larger than the finished sizes after they are ground. The shafts are lifted and handled by means of a hand-operated chain hoist traveling on an I-beam, and after being centered, are turned in the "Lo-Swing" lathe and are then moved by the same crane to the grinder.



The Two Carriages May Be Driven Simultaneously from the Lead Screw, or Independently, Either from the Lead Screw or by Hand. The First Tool on the Left Has Finished Its Cut and the Remaining Five in Operation Will Finish Simultaneously



In the West Shops of the Chicago Surface Lines, This "Lo-Swing" Lathe Turns Practically Three Times the Number of Armature Shafts Formerly Produced in a Single Tool Machine

An accompanying illustration shows the lathe in operation, and the line drawing illustrates the set-up with six tools of the eight in the cutting position and the turning operation nearly completed. The first tool on the left has finished its cut, and the five other tools will finish simultaneously. Automatic stops are provided for limiting the travel of each carriage either together or independently.

On the machine illustrated, which is called a 3½-in. size and is manufactured by the Fitchburg Machine Works, Fitchburg, Mass., a shaft having maximum dimensions of 4 in. diameter and 60 in. length can be handled. Although only six tools are used in turning armature shafts, the machine will accommodate eight. A pump mounted in the base casting and driven through spur gearing from the driveshaft provides a continuous flow of cutting lubricant to the tools. Each of the six adjustable nozzles distributing the lubricant has a shut-off valve.

A switch for stopping the driving motor is mounted at each end of the machine. The two carriages may be set to operate in unison from the lead screw, or may be operated separately either by hand or by the lead screw. The shank of each tool holder is equipped with a graduated dial, enabling the operator to increase or decrease the depth of his cuts with close accuracy.

A 10-hp. individual motor, having a speed of 900 r.p.m., drives the lathe by means of a Morse silent chain. The use of chain drive on this machine was an experimental installation and has been very successful.

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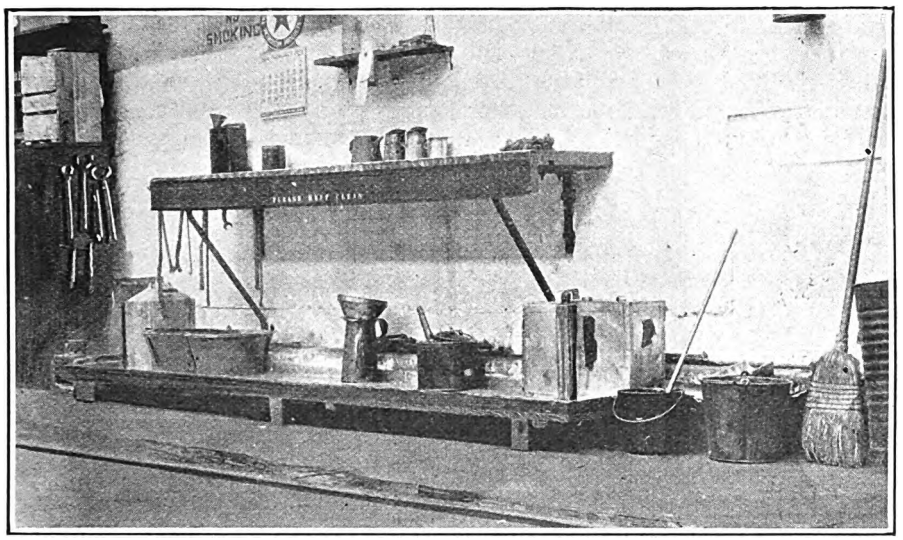


Shelf and Bench for Lubricants Arranged to Keep Them Free from Dirt

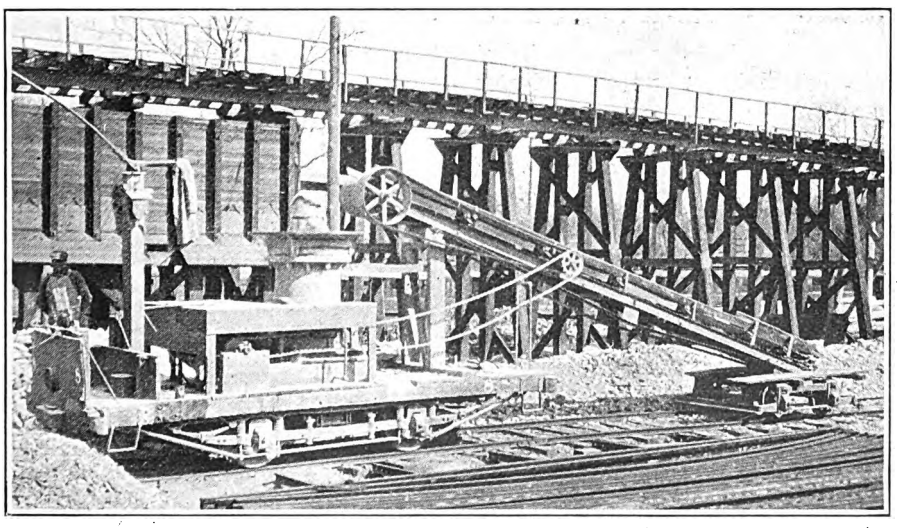
Shelf and Bench Keep Lubricants Clean

THE importance of keeping lubricating oils free from dirt has been emphasized particularly to the employees connected with the equipment lubrication on cars of the Philadelphia & Western Railway, Norristown, Pa. To assist in keeping clean the funnels, measures and other utensils used in connection with lubrication, a shelf and oil bench have been constructed along the wall of the shop adjacent to the inspection tracks. The shelf is supported by brackets at either end. The top is covered with tin, so that it can be cleaned readily and be kept clean easily.

A tray for the pans and larger utensils has been constructed underneath the shelf. This is about 8 in. above the floor level, 12 ft. long by 2 ft. wide, and is also lined with tin. The walls adjacent to this oil bench are whitewashed and the floors are given particular attention in order to keep them clean and free from dust. A sign stenciled along the front edge of the shelf reads "Please Keep Clean."

Crusher Car Converts Concrete Into Ballast

A CONVENIENT apparatus for converting old concrete track foundations and worn paving blocks into ballast has been designed by the Memphis Street Railway, Memphis, Tenn. An Austin No. 3 stone crusher has been mounted on the framework of an old single-truck car. This is fed by an inclined belt conveyor, the outer end resting on a light railway truck and the inner end being supported just above the crusher. This apparatus has been successfully used on several recent track reconstruction jobs and has provided material for ballast at a considerable saving from the cost of new material.



Rock Crusher Mounted on a Single-Truck Car Is Economical Means of Converting Paving Material Into Ballast

Some Essentials for Bonding and Welding Repairs

By J. C. LINCOLN
Liteweld Company, Cleveland, Ohio

THE great advantages of electric welding and bonding equipment for electric railway companies have long since ceased to be questioned by executives in the field. The value of this class of maintenance tool in reducing maintenance costs and in speeding up repairs to cars and track has been definitey proved, but the widely differing costs obtained by various roads indicate that the skill of the operator and the design of the welding machine itself play an important part in the amount of saving to be made.

The operation of a welding machine is comparatively simple, certainly much more so than almost any of the other types of machine tools used by the maintenance department. But just as it would be unreasonable to expect that any one can be relied upon to produce satisfactory work on even a drill press, so it is true that a certain amount of aptitude and interest is necessary in order to make a good welder. Given these, practice will soon give the requisite neatness and speed.

A good operator should have a reasonably clear idea of the effect of heating and cooling upon the weld itself and upon the metal behind it. He should realize the importance of avoiding undue expansion and contraction, especially on car repairs, and he should be ambitious to learn. With these qualifications any reasonably handy man can be trained to save many times the cost of his time by reclaiming equipment which would otherwise rust uselessly on the scrap pile.

The design of the welding machine itself is, however, hardly less important. The efficiency of even the best of operators may be much hampered by unsuitable equipment. The choice, therefore, of a welding and bonding machine for electric railway work is worthy of careful investigation.

The requirements of railway maintenance work differs considerably from those of industrial welding. It is sometimes assumed that a welding machine of this latter type, which may be giving excellent results in a factory on the work for which it was designed, will be equally applicable to bonding and other railway work, but this is not necessarily the case.

The industrial welder, when used

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on production work, has its current requirements more or less limited. Overload capacity, although desirable, is not usually essential. The electric railway welding machine, on the other hand, must be prepared to tackle any work that comes along, from repairs on a worn frog to building up a cracked car-frame. Overload capacity is thus a necessity.

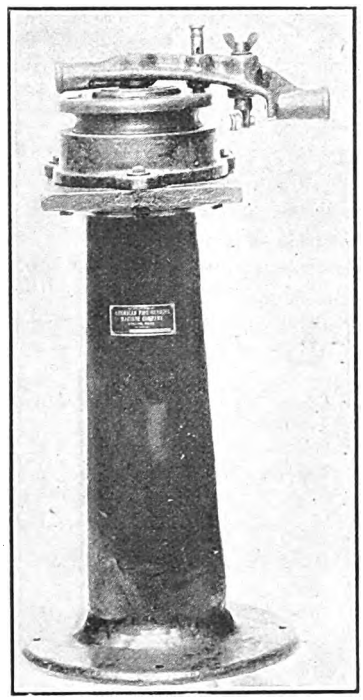
Portability in the case of an industrial welder is usually of minor importance. In the case of an electric railway welder it is one of the chief essentials, for unless the machine can be readily transported anywhere it is needed, its usefulness will be much curtailed.

A welding machine which is believed by the writer to meet these requirements was described in this paper last week.

New Equipment Available

New Pipe-Bending Machine

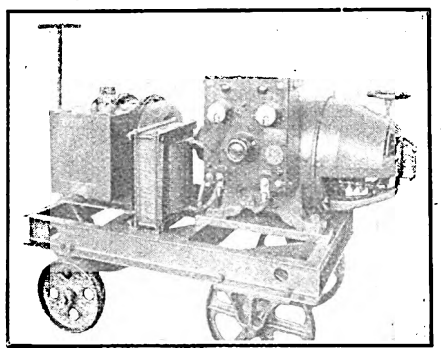
A MACHINE designed particularly for making cold pipe bends to a very small radius has just been placed on the market by the American Pipe Bending Machine Company, Boston, Mass. This machine will bend pipe cold up to and including a diameter of 1¼ in. The manufacturer states that pipe can be bent on this machine to a very small radius without splitting, crimping, or flattening.



Machine for Bending Pipe Cold to a Small Radius

Portable Arc Welder

A NEW portable arc welding set embodying features of economy and simplicity is being marketed by the General Electric Company, Schenectady, N. Y. This unit is designed to insure smooth and rapid deposition of metal with thorough penetration. It will deliver continuous power and permit rapid production, both with high current and large electrodes, as well as with low current and small electrodes.



Portable Welding Outfit

This welder is a two-unit set, consisting of a motor and a generator. The generator is self-excited and all regulation of current is accomplished by turning a handwheel on the generator. A self-adjusting, stabilizing reactor is provided, which automatically steadies the arc under all welding conditions. It can be used with any of the commercial sizes of metallic electrodes from 1/16 in. to ¼ in. diameter. The generator voltage can be adjusted to suit the character of the work. Any value of current between 75 and 300 amp. can be obtained in a large number of steps between these limits.

Among the advantages claimed for this outfit are an arc easy to start and maintain, roller bearing wheels, holes in base for crane hooks and adaptability to long or short leads, for working close by or at a distance from the set.

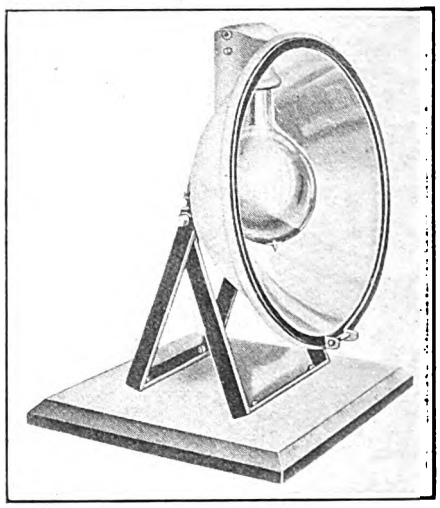
Among the mechanical advantages are included motor and generator insulation designed to withstand severe operating conditions both with regard to duty cycle of the load imposed and general atmospheric conditions under which ordinary insulation fails. Bearings are waste-packed and oil cannot be spilled if the set is tipped when being moved.

A WD-12 generator is used. This is a two-pole, self-excited, constant-energy, single-operator machine with a dual magnetic circuit designed to operate at 60 volts open circuit and 20 to 25 volts under load. It is rated 200 amp. for continuous service, 250 amp. for one hour and 300 amp. for short periods. The motor is a standard General Electric 10-hp. unit. The complete set has three bearings, the two units being close-coupled by a solid flange coupling. All parts, including generator, motor, generator control panel, motor starter and stabilizing reactor, are mounted on a welded structural steel base of rigid construction and light weight.

The assembled unit is about 63 in. long, 29 in. wide and 47 in. high, weighing about 1,600 lb.

Floodlight Projectors for Night Work

THE Western Electric Company, New York, N. Y., is offering a new line of seven Davis floodlighting projectors. The Sunlight projector shown herewith is particularly suitable for the illumination of track which is being repaired or laid at night, and excavating jobs. This projector can also be used indoors as well as out. The housing is of spun aluminum highly polished on the inside to form the reflector. It is supplied either with or without a front glass and is provided with a simple socket adjustment to adapt it for use with 300 to 500-watt Sunbeam Mazda lamps. Smaller sizes from 100 to 200-watt lamps can also be used by applying a reducer to take the medium base.



Floodlight Projector for Temporary Lighting at Night of Excavating and Similar Jobs

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The News of the Industry

Cincinnati Paying for Mistakes

Expert Reports That City Erred in Its Fare Policy—Car Riders Now Suffering

Street car riders in Cincinnati, Ohio, are paying the penalty of the mistakes made by city officials. This is perhaps the most important criticism contained in a recent expert report. On the other hand, recommendation is made that the Cincinnati Car Company refund to the Cincinnati Traction Company at least a portion of the profit which was found to have been made by the car company from transactions in steel rails between the two companies. This last suggestion was made to Judge Robert S. Marx of the Hamilton County Superior Court in the Master Commissioner's report on the past ramifications of the traction company.

This was the only criticism of the traction company to be found in the report, which was filed as a part of the litigation in the suit brought against the traction company by Robert S. Alcorn, attorney, as a taxpayer. Alcorn sought to compel the company to return to the city $1,050,000 in what he claimed to be deficiency in the payment of franchise taxes to the city, and to enjoin the traction company from charging a higher rate of fare than 5 cents. The report placed the blame for the present condition of the company, together with the present high fare, upon the city of Cincinnati.

RALWAY FREE OF FRANCHISE CLAIMS

The report not only holds that the traction company should be adjudged free of any of the franchise claims set forth in Mr. Alcorn's suit, but says that because the city officials insisted on an initial 5-cent fare at the time of framing the service-at-cost ordinance, the car riders will have to take the consequences, arising from the present deficit of the traction company and pay much higher rates of fare in the future. The efforts of the city officials at the outset to keep the fare down merely added to the deficit of the traction company, and except for the attitude of the city officials on this matter the fare would probably never have mounted to more than 8 cents, the Master Commissioner says in his report.

The report was filed by Carl A. Nau of Cleveland, appointed Master Commissioner in the case by Judge Robert S. Marx to examine the books and records of the traction company. Assisted by other members of his firm, Nau, Rusk & Swearington, Mr. Nau made an investigation which lasted more than a month, and extended into every phase of the companies' enterprises since 1917, when the service-at-cost ordinance was put into effect.

Mr. Nau blames the present predicament of the company on the fact that when the service-at-cost franchise became effective the fare was placed at 5 cents. This rate of fare was known to be inadequate to meet the cost of operations and the fare should have been 6 cents, the accountant says. Thus the scheme started, his report states, with a known loss in operation, and instead of providing a surplus to absorb future losses, it began with a deficit which never has been overtaken. Tracing the result of this mistake, the report says:

> By the end of 1919 this accumulated deficiency amounted to $1,669,597. An attempt to keep fares from going up still further, and at the request of the city, this deficiency was funded by the issue of $2,000,000 in debenture bonds.
>
> When a deficit of $665,304 occurred in 1920 the city passed ordinances deferring payment of the $350,000 franchise tax to prevent further increases in fare, but this action was only a temporary expedient and merely postponed the evil day.
>
> Had the initial fare been made 6 cents and then increased or decreased, it is our opinion that the maximum fare would never have exceeded 8 cents and that there would be no necessity for the present 9-cent fare.

The cost of making the examination was borne by W. Kesley Schoepf, president of the Cincinnati Traction Company.

Impressive Safety Parade in New York

Barron G. Collier, special deputy police commissioner of New York City, was grand marshal of a public safety parade under the auspices of the Bureau of Public Safety, Police Department, on May 17. Fifth Avenue was the scene of this two-hour procession, which included floats and marchers and bands and banners, presenting innumerable safety slogans and representing nearly everyone interested in safety work—except the street railways.

The parade was quite a picturesque and impressive dramatization of the need for carefulness and the penalty for carelessness. It was viewed along the line of march by probably several hundred thousand people, who must certainly have carried away with them a new thoughtfulness for playing safe.

In a foreword in the program of marching order of the parade, Mr. Collier said:

> It has been our hope that this parade would so graphically present the story of the bureau and its work that each of you would feel the message that it has for you; that you would leave knowing that safety is a personal and individual matter, and that the responsibility rests upon you too, in order that we might have your co-operation to the fullest extent, building toward a proper knowledge of the dangers with which we are surrounded and the most effective way with which to combat them—carefulness.

Des Moines Men Receive Increase of Five Cents

An increase of 5 cents an hour over the present maximum hourly wage of 54 cents, group insurance for the men and their families and a pension agreement were granted the employees of the Des Moines City Railway by the board of arbitration headed by the Rev. John T. Noonan. The decision of Father Noonan was signed by both of the other arbitrators, the Rev. Frank W. Mutchler, for the union, and W. C. Harbach, for the Des Moines City Railway.

Granting of the 59-cent wage comes almost three months from the date of the union's presentation of a demand for an increase of 26 cents an hour. The new wage agreement is retroactive to March 1, the date of expiration of the old contract.

Acceptance of the arbitrator's award by the union is regarded as a foregone conclusion, the Rev. Mutchler, having concurred in the report by affixing his signature. The hesitancy of the union to accept the Owen award a year ago resulted from the refusal of J. B. Wiley, business agent of the union, who was acting as the street car men's arbitrator, to sign the report.

Des Moines car riders face an 8-cent fare, perhaps inside of thirty days, as a result of the award. The award means that practically $25,000 in a lump will be taken from the stabilizing fund which is now only $37,000 above the minimum necessary to maintain 7-cent fares. With this deduction there would be left in the fund only $12,000 above the minimum fund of $100,000.

The company's monthly reports for February and March showed an average monthly deficit of $8,000. With a pay increase of $12,000 a month the stabilizing fund will fall below the $100,000 mark this month, automatically bringing a return of 8-cent fares.

Court Upholds Right of Springfield Council to Ban Jitneys

Leaders of the bus men of Springfield, Mass., recently announced that operation of the buses would cease pending ultimate decision of the controversy arising from the ban placed on jitneys by the Transportation Board. The decision of the Transportation Board followed conviction on May 20 of two jitney operators in police court on a charge of operating buses for hire without a license. Richard Talbot, counsel for the bus operators, said that he expected to take the case to the Supreme Court.

A test case was made of independent bus operators in Springfield following condemnation and banning of this type of operation. On May 1 buses were banned, but Thomas M. Brunton and

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George Mallis continued making their runs after their licenses had been discontinued. The operators were accused on two counts. The first complaint was thrown out. It alleged a violation of the city ordinance by operating without a license between fixed termini. However, the operators were found guilty on the second count. This was based on the statute forbidding the operation of buses for hire without a license in a manner similar to that of street railways. On this point Judge Wallace Heady in the District Court found sufficient evidence for convicting them of operating "for hire" no matter if the revenue received did not constitute their only or chief object in operating.

Judge Heady's decision defended the right of the licensing board of the city government to refuse the jitney men a license. He said that controversies between individuals and the lawful public authorities could not be settled by countenancing lawless and forbidden acts of the individuals in the public streets. To attempt to continue operation of the buses, he though, was akin to anarchy. The court went into detail on the term "for hire," declaring that compensation or reward was one of the motives as well as one of the very considerable results of the operation. Mayor Leonard said the decision was not a question of personalities but of a principle which involved all the people.

Cincinnati Men Vote Down Renewal of Wage Contract

Members of the carmen's union voted down on May 15 a proposal submitted to them by the Cincinnati Traction Company, Cincinnati, Ohio, for a renewal of their present wage scale. The proposition, which was submitted to the union several weeks ago by W. Kesley Schoepf, president of the company, lost by a majority of fifty-eight votes. A total of 1,164 votes was cast, of which 611 were recorded against the proposition. The matter now goes to arbitration. The existing contract, which was made last year for one year's duration, expires June 30. The highest scale of pay for platform men is 53 cents an hour, with 7 cents an hour more for one-man car operators.

In submitting his plan for a renewal of the present working agreement unchanged for three years, President Schoepf advised them to consider also the worth of a rather long-time wage contract because of the uncertainty of economic conditions and that they were voting their opinions regarding it. The fact was pointed out that coal miners and other union labor organizations had acted favorably on proposals of contracts for a longer period than one year.

Under the terms of the existing contract between the Cincinnati Traction Company and the union, should either desire to "open" the contract it is necessary to give a thirty-day notice prior to July 1. Because of the negotiations of the traction company with the city for a new or an amended franchise the officers of both the union and the traction company consented to go into conference some time ago rather than wait for the usual time.

Bus Service Begun Between Vancouver and New Westminster

De luxe motor buses began operating between Vancouver and New Westminster under the name of the B. C. Rapid Transit Company, a subsidiary of the British Columbia Electric Railway, on May 1, five Fageol buses and one White bus being used. The distance between the two cities is 12½ miles and a fifteen and twenty minute service is being given.

The British Columbia Electric Railway operates an interurban line on its own right-of-way between the two places, charging 35 cents return fare. The new bus line charges 35 cents one way and 60 cents return, but it has been well patronized from the start in spite of the higher fare.

On beginning operations the B. C. Rapid Transit Company took over the Blue Funnel Motor Line, a jitney service which has been in existence for about ten years. Thomas D. Coldicutt, manager of the Blue Funnel Motor Line, is now traffic superintendent of the B. C. Rapid Transit Company.

Previous to the Blue Funnel Motor Line being taken over a number of the drivers owning cars and operating in conjunction with this line broke away and formed their own organziation, known as the Westminster Motor Line. A rate war then started, both jitney lines cutting the fare to 25 cents return, which fare is now continued by the Westminster Motor Line, operating some eighteen jitneys.

In spite of the lower competitive fare the B. C. Rapid Transit buses are being well patronized, the public gladly paying the additional fare for transportation in a superior vehicle run by a substantial operator.

The new buses terminate at the interurban stations of the British Columbia Electric Railway in Vancouver and New Westminster. As considerable revenue is derived from parcel express, arrangements had to be made to take over this business. All shippers in Vancouver and New Westminster were notified in advance of the new service.

Previous to starting operations the full equipment of buses was paraded through the business streets of Vancouver and New Westminster so as to obtain the best advertising possible for the new service.

Six Killed and Twenty-four Injured in Indiana Wreck

Five persons were almost instantly killed, one died of shock and twenty-four others were injured, two seriously, when the Wabash Valley Flyer, a crack Indiana Service Corporation train between Fort Wayne and Indianapolis, and an extra trail train collided at a curve inside the town limits of Roanoke, north of Fort Wayne, on Monday evening, May 19, at 6 o'clock.

Three separate investigations of the tragedy were under way on May 21 by the Interstate Commerce Commission, the Public Utilities Commission and the local authorities. It is expected that next Monday, May 26, a joint session will be held in an effort to fix responsibility for the fatal crash.

Coroner J. W. Good of Huntington County began an immediate investigation. He places tentative blame for the tragedy on the crew of the eastbound extra train, which is believed to have over-run orders to meet the flier at Mahon, nearly a mile west of the point where the cars crashed.

Robert W. Feustel, president of the Indiana Service Corporation, in a statement issued on May 21, said that the eastbound crew was to blame for the tragedy and expressed the belief that this would be shown definitely at the coroner's inquest.

Motorman Frank Nolna, of the extra train, was seriously injured, but it was expected he would be able to testify on May 23 before both the coroner's body and the joint meeting of the Interstate and the Public Service Commissioners.

Both wrecked cars were destroyed beyond all hope of repair. They were built of wood. The Indiana Service Corporation recently laid out a program of steel car construction, and a greatly enlarged part of the company budget during the coming year will probably be applied in furthering this plan of substitution, as a result of the tragedy.

Railway Reported to Be After Bus Line

J. K. Newman, representing the reorganization committee of the United Railways, St. Louis, Mo., conferred recently in Chicago with John Hertz, president of the Chicago Motorbus Company, who also is interested in the People's Motor Bus Company, St. Louis, regarding the possibility of arranging to include the St. Louis bus lines in the new company which will be organized to succeed the United Railways when the receivership of that company is lifted.

The competition of the bus lines is not unduly severe, but the bus company has applications pending for eight new lines.

Mr. Newman is reported to have made the following statement:

> Buses are a necessary part of any large transportation system. It is self-evident, however, that if they operate as competitors of the railways, fares on the railways cannot be lowered to the level that would be reached if bus profits went into the treasury of the railway system.
>
> People want buses and they should have them. If a man wants to pay 10 cents to ride home in a bus he should have that privilege. The reorganization plan contemplates satisfying that demand, but if the buses are competitors, they reduce railway traffic materially. If the buses operate in conjunction with the railway the profits of the buses could be thrown into the railway treasury and make up for the loss in traffic. It would mean in the end lower fares.
>
> I do not mean that the buses if coordinated with the railway would not compete with the street cars. They would. But the receipts would go to the same pocket and a reduction in street car traffic would mean an increase in bus traffic. The volume would be the same.

While it is known that the reorganizers of the railway would prefer to purchase the People's Motorbus Company outright, it has been intimated that Mr. Hertz and his associates might be invited to become financially interested in the railway and operate the bus lines as an auxiliary to the street cars.

Charged by the court with the responsibility of conserving all the resources of the railway, the receiver has been prevented from establishing bus lines.

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Rehearing Held on Santa Monica Bus Franchise

Acting upon a petition of some 1,500 protestants, the California State Railroad Commission held a rehearing on May 8 on the application of the Pacific Electric Railway for a bus franchise on Pico Boulevard from the terminus of the Los Angeles Railway's local Pico Boulevard car line in Los Angeles to the city of Santa Monica.

Several months ago applications of the Pacific Electric Railway, Bay Cities Transit Company, United Stages, Inc., and D. G. Henderson were before the commission for a bus line permit on Pico Boulevard, which connects Los Angeles and the Santa Monica Bay district. At that time the Pacific Electric Railway was granted the bus franchise. After the franchise was granted Mayor Steele of Santa Monica joined in a petition to the commission protesting against the granting of the franchise to the railway, claiming "excessive and unreasonable rates of fare were proposed to be charged." The petition was also presented to the City Council, Board of Public Utilities and Mayor of Los Angeles, asking the city of Los Angeles to join with Santa Monica and oppose the railway.

In the petition it was alleged that the Railroad Commission had no jurisdiction and was without authority in law to grant a bus transportation franchise on Pico Boulevard within the city of Los Angeles. The petition further alleged that the schedule of fares of the rail line was in excess of the bus fares proposed to be charged by the other bus lines that made similar application for the franchise.

The commission explained its stand in the matter of the bus permit granted the Pacific Electric and declared the provision whereby the commission could order the Pacific Electric to extend its line from Santa Monica to the terminal of the Los Angeles Railway line on Pico Boulevard in Los Angeles had an important bearing on the granting of the permit. Commissioner Shore, who presided over the case, stated that the commission regarded buses as auxiliary feeders for rail lines. Mayor Steele said his protest was based chiefly on the high rates, stating that the Bay Cities Transit Company, which operates the bus system in Santa Monica, could offer more reasonable rates.

At the rehearing on May 8 it was claimed by counsel of the Bay Cities Transit Company that if it was given a permit for the Pico Boulevard bus line the company would put on three or four buses, and that when they paid for themselves additional buses would be operated to meet public demand. The Bay Cities Transit Company's application, denied at the previous hearing, was due to lack of proper financial backing, Commissioner Shore stating that $40,000 in cash and $100,000 at the end of the first year's operation would be required of the operating company that was given the certificate.

The Bay Cities Company proposed a method of financing the operation of the proposed bus line by incurring indebtedness, which was different from the commissioner's suggestion, who stated he could not consider any proposition of financing bus operation on Pico Boulevard which did not show the qualities of a substantial certainty. If the Bay Cities Company's petition is denied its counsel threatens to carry the case to the Supreme Court.

The Pacific Electric Railway now holds the certificate to operate over the Pico Boulevard route, but execution has not been made final, pending the outcome of this rehearing. The commission is expected to decide the matter during the next few weeks.

Ninety-five-Cent Pass in Washington, Pa.

Inviting its patrons to join the Washington Unlimited Ride Club, the Pittsburgh Railways put into effect on May 19 an unlimited-ride, fully transferable weekly pass to be sold at 95 cents for use on local cars within the city of Washington and East Washington. The cash fare of 6 cents remains. Washington, a flourishing industrial and educational community of 30,000 or more is the terminal city of the Pittsburgh-Washington interurban division. In one of its advertisements on the new pass the company urges the purchaser to bear in mind that for 95 cents he will from Monday morning to Sunday midnight need no change, need no transfers, be free to ride any number of times, be free to transfer his pass to another and make his fare as low as he pleases, just by making greater use of the cars. The company has installed fare boxes to aid in the collection of cash and ticket fares, but no change will be made in the method of accounting for these. The company explains that the purpose of the passes is simply to reduce the number of transactions due the various classes of fares. A great deal of poster and other advertising matter pertaining to the new plan accompanied its installation.

Buses Will Replace Trolleys in Plainfield

All lines of the Public Service Railway in Plainfield, N. J., are to be abandoned excepting the Union line, which runs through Bound Brook, Elizabeth and to Newark, N. J., according to an agreement entered into May 12 by the City Council of Plainfield, the Public Service Railway and the Public Service Transportation Company. Buses are to be substituted in lieu of the trolleys and the tracks of the Fourth Street line, the Arlington Avenue and the Netherwood lines are to go. The agreement also establishes a 5-cent fare within the city limits on both the buses and the trolleys remaining in service, but with no provision for transfers. The railway retains its franchise rights in the streets affected under the terms of the agreement, the maintenance of service by means of buses being construed as a fulfillment of the franchise obligations. The bus permits are to be for one-year terms. The transportation company which will operate the buses now has seven vehicles in operation and will install more in the near future. As each line is organized and equipped to handle the traffic, the tracks will be taken up.

Will File Improvement Plans for Brooklyn "L"

The Brooklyn-Manhattan Transit Corporation will send to the Transit Commission for approval plans for steel guard rails which will be installed immediately on the Myrtle Avenue elevated and part of the Fulton Street lines. This, however, is only a beginning. The company expects to replace the present wooden inside guard timbers on all of its elevated structures, as rapidly as it requires replacement, by substituting steel rails. The company will also send plans to the commission for additional bracing for the Fifth Avenue line near Fourth Street, Brooklyn.

When these plans are approved by the Transit Commission the B.-M. T. will have carried out, or will have made complete preparations to carry out, all the major recommendations recently made by the joint committee of engineers representing the city, the Transit Commission and the company, after their thorough inspection of the structures, cars and tracks of the elevated portions of the company's rapid transit lines.

New York's Mayor Suspicious of Railway's Bus Proposal

Mayor Hylan of New York at a meeting of the Board of Estimate on May 16 admitted that, in certain conditions, he was prepared to vote for a plan submitted by the Fifth Avenue Coach Company, even though that would involve a 10-cent fare, instead of a nickel.

Representatives of the Third Avenue Railway and of the Fifth Avenue Coach Company, operating the buses on Fifth Avenue, presented plans for a bus transportation line extending along the Concourse from 138th Street and Mott Avenue to the northernmost limit of the Concourse, including spurs and side lines to serve the more thickly populated areas adjacent to that thoroughfare.

The Third Avenue Railway offered a universal system of transfers between the new buses and the company's trolley cars operating in Third Avenue. Of this proposition the Mayor said:

> You don't need to make any proposal here. Neither the Third Avenue Railway, nor the I. R. T., nor the B.-M. T. can put anything over on us. Even if you offered to let the Bronx people ride free, I should vote against your proposition, for I should be sure there was some trick in it. You can't get anything here during my administration. Your plan of a universal transfer is just another scheme to fool the people. I will vote against your proposal on general principles.

When the application of the Fifth Avenue Coach Company came up for consideration, Mr. Wood, its general manager, said his company would be satisfied to undertake the task on a temporary permit for ninety days, revocable at any time after that at sixty days' notice.

Representatives of the Third Avenue Railway prevailed upon the Mayor to permit them to place their Bronx bus plan on the calendar in the form of a petition. Then, on the Mayor's recommendation, all the applications went over for action in committee at a later date.

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New York Men Reject Suggestion of a 5 per Cent Wage Cut

Employees of the Interborough Rapid Transit Company, New York, through their delegates, unqualifiedly rejected on May 20 the appeal of the management that they accept a 5 per cent cut in wages. In fact, the delegates unanimously countered with a demand for a 20 per cent increase in pay. The executive committee of the brotherhood is not scheduled to meet again until June 3.

Frank Hedley, president of the company, in a letter to employees on May 19 in regard to his request for a 5 per cent decrease in wages, called the attention of the men to the fact that the average wage paid by the Interborough is higher than the weekly wage paid in representative manufacturing establishments in either the city or the whole state as reported by the Industrial Commission of New York. Answering the question as to how the road can keep going when it is not earning enough to pay expenses, taxes and interest, Mr. Hedley said:

> We have not been able to meet our payments as they became due and we have been obliged to put some of them off in the hope of better times. We are behind in the payment of our undisputed taxes to the extent of about $968,000. Of late we have been compelled to go rather slowly in the matter of prompt settlement for injuries.

Mr. Hedley pointed out the following facts for the consideration of his men:

1. Earnings are not enough to meet expenses, taxes and interest on borrowed money.
2. Cash on hand is not enough to pay off deferred taxes, claims and similar items.
3. If you consent to go back to the rate of last year, we shall probably just about break even during the year commencing July 1, 1924.
4. After you take off this year's 5 per cent increase the average wages will still be ahead of the increase in the cost of living, and greater than the average wages paid in most of the industries in the city and state of New York and more than the average wages paid in cities where they have an increased fare.

Mr. Hedley asked the men to consider these facts in making up their minds as to whether his request for wage reduction was not fair and reasonable.

Bus Competition of York Railways Ordered to Stop

The Pennsylvania Public Service Commission recently ordered John H. Longstreet, a bus operator, and his agents to cease operating motor vehicles as common carriers within the Commonwealth of Pennsylvania until they had obtained from the commission a certificate of public convenience. The bus has been operating since October 1, 1923.

Following the refusal of the York Railways to extend city service to a real estate development, known as East York, approximately 1 mile from the end of the Market Street line, the real estate operator placed in operation on a thirty-minute schedule a twenty-one-passenger bus called a "Community Bus." The route of the bus paralleled the tracks of the York Railways from East York to Centre Square, York, a distance of 2½ miles. On the outside of the bus was lettered "Maintained by voluntary contributions."

It was the contention of the operator that he did not need a certificate of public convenience, claiming that he was not charging a fare or operating for profit. The railway entered a protest before the commission and on May 3 last received a favorable decision.

The commission ruled that the circulation of cards reading "Don't ride in the trolley cars, wait for the bus, give away a nickel—save 2 cents" forced one to the conclusion, in the light of the complainant's 7-cent fare, that the purpose was to enter into a regular-scheduled competitive service with the railway company. The commission also stated that the fact that the bus operator received passengers at any point along the route completely nullified the conception of an engagement in private carriage for the benefit of the residents of a given community.

Routing Cars Around a New Merchandising Loop

All the town sat up and looked surprised when Herpolsheimer's store in Grand Rapids bought free transportation for the public from the Grand Rapids Railway, Grand Rapids, Mich. It's one thing to charter a score of cars to give the orphans an outing or carry a Sunday school picnic to the boats or to boost the ball game, but the instances are isolated where the cars have been called into play by the retailer to direct a stream of shopping to a special merchandise event. Yet this is just what Herpolsheimer Company, a large department store in Grand Rapids, did April 30 to celebrate with all due honors its fifty-fourth anniversary sale during May.

An agreement was reached between the Grand Rapids Railway and this large store whereby every street car in the system would carry people downtown between 9 and 11 a.m. on a stipulated day, at the expense of the Herpolsheimer Company, and this was broadly advertised as an anniversary feature.

The day previous each car bore a sign on the front which read "Ride Free to Herpolsheimer's—54th Anniversary Tomorrow, 9 to 11 a.m.," while on two windows of each car appeared a card reading "Free Ride on This Car Friday 9 to 11 a.m. Compliments Herpolsheimer's—54th Anniversary." Over the mouth of the fare box was placed a hood which explained "Free Ride Courtesy Herpolsheimer's—54th Anniversary."

A double-page newspaper announcement told of scores of special offerings just for a three-hour period from 9 to 12 a.m. This spread showed by comparison of old and new types of cars the rapid progress of the local railway since the days when Herpolsheimer's began business. Crowds availed themselves of the opportunity to join in the celebration and the close co-operation of the railway officials, the staff and the store helped every phase of the plan, drawing compliments from the shopping and traveling public.

Store officials declared that, regardless of their destination, Herpolsheimer's enjoyed having people make use of the cars freely with its compliments, since it was its birthday and the treat should naturally be on the store.

Agitation for Staggered Hours Being Heeded

Managers of fifteen theaters in New York recently decided to conclude their performances on matinee days at 4:40 p.m., so as to make it possible for their audiences to use the various transportation lines before the height of the rush hour. This action on their part is entirely voluntary. The desirability of an arrangement of this kind has been stressed on several occasions by the New York Transit Commission, and during the severe snowstorm of Feb. 19 officers of the commission got into touch with large employees of labor principally through the Chamber of Commerce and urged the early dismissal of forces so as to relieve traffic congestion.

The action of the theater managers is in keeping with that of several business concerns that have voluntarily adjusted the working hours of thousands of employees so as to bring them to their offices ahead of the peak rush in the morning and to send them on their way homeward ahead of the evening maximum loads.

In commenting on the action of the theaters Commissioner Harkness said that the difference should be particularly noticeable on Wednesday and Thursday afternoons, particularly in the winter season, when all traffic upon the subways, elevated railroads and surface car lines is at its maximum. The addition, just at five o'clock or a few minutes after, of the thousands forming the matinee audiences in the theater districts has been a serious tax upon the transit facilities. The situation upon Saturday afternoons has been almost as bad, but has been mitigated slightly, however, by the fact that the Saturday half holiday, which now so generally prevails in many trades and professions in New York, has lightened the late Saturday afternoon traffic to some extent.

Working along similar lines, P. H. Woodward, general passenger agent of the Long Island Railroad, has urged a general readjustment of Manhattan's business hours as a palliative for the commuter congestion on railroads into New York. The Long Island road is taking the initiative in an effort at readjustment. Its employees are largely commuters, riding free but filling space just the same. The working hours of hundreds of employees are being changed from 9 and 5 to 8:30 and 4:30.

Approves Requests for Intracity Increases

In filing its formal appearance with the Indiana Public Service Commission on May 16 in the cases of the Fletcher Savings & Trust Company, Indianapolis, as receiver for the Beech Grove Traction Company and the Union Traction Company, as operator of the Broad Ripple line in Indianapolis, the city corporation counsel approved the requests of the companies for increases in the intracity fares to be equal to the 7-cent fare granted the Indianapolis Street Railway. The Beech Grove line proposes to sell four tickets for 25 cents, just as the railway will do. The Union Traction Company does

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not make any such proposal and the corporation counsel said he believed it should be required also to issue tickets at that rate. A movement is on foot to cut the fares for school children on all intracity lines.

General Fund Not Available to Pay Seattle Tax

Court action, with the city of Seattle as defendant, impends as the result of Corporation Counsel T. J. L. Kennedy's opinion on the street railway tax agreement, by which the city was to pay three-fourths and the Puget Sound Power & Light Company one-fourth of the 1919 taxes on the Seattle Municipal Railway. The Corporation Counsel now rules that the city has no legal right to draw on either the general fund or the street railway department for the money wherewith to pay its share of the 1919 railway property tax, and that the city is without authority to issue bonds for the purpose of meeting the payment. The Corporation Counsel also holds that the City Council, in agreeing to share payment of the tax, exceeded its authority.

As a result, the Council, meeting in a committee of the whole, has instructed the city clerk to notify A. W. Leonard, president of the Puget Sound Power & Light Company, that the city will not voluntarily pay any part of the 1919 tax. The Council has been advised that if the county treasurer is forced to proceed in distraint in the case he can act only against the power company, as the railway property appears on the assessment rolls in 1919 as company holdings.

Mr. Leonard, in a letter to the Council, urged the payment of the city's share of the taxes. Corporation Counsel Kennedy, however, held that the tax cannot be paid from the general fund because the tax was included in the original purchase, and not incurred later; that it cannot come from the railway revenue fund, because of statute prohibition, and because of the outstanding indebtedness against the railway at present; it cannot be raised by bond issue, he asserts, because provision for bond issuance was not included in the original purchase ordinance.

Relic Uncovered in Grand Rapids Street

The Grand Rapids Railway, Grand Rapids, Mich., in constructing new track in the downtown section, encountered what proved to be a novel but formidable problem in preparing the excavation. The obstacle was an old cable conduit.

The cable road was an episode in the history of Grand Rapids of more than thirty years ago. The company expected the excavation would be an easy job with electric drills and a steam shovel, but the conduit had to be broken up by battering ram methods and then carted away in fragments—a slow and costly process.

The conduit was in as perfect form as when it was built. The steel forms were somewhat rusted, but the construction still would have been serviceable if Grand Rapids were to return to the cable road methods.

Illinois Company Will Make Wage Overtures

A committee named by the street railway employees' local, No. 313, of Illinois, to negotiate with the Tri-City Railway on a new wage contract beginning in June, has left the matter of a wage scale entirely in the hands of the company officials with a recommendation that an increase be granted and that the first offer be made by the company. This move, which became known in union circles, is different from the course that has been followed in recent years, when negotiations of a wage agreement were being held between the railway company and its employees. It was explained by union officials that if the offer of the company is unfavorable, then a board of arbitration will take charge of the controversy. The union has fixed no figure as to the increase it will ask. Working conditions have practically been agreed upon and therefore will not enter into the wage controversy, it was stated. The car operators receive 58½ cents an hour at present, while the maximum wage paid to the shopmen is 68½ cents. The agreements of the railway employees expire at midnight May 31.

It became known that the employees of the Iowa division of the Tri-City Railway will handle the wage negotiations with the traction company in the same manner as on the Illinois side. The Iowa operators and shopmen also ask more wages, but have not fixed a definite amount for the increase, giving the company an opportunity to make the first offer.

Utility Measures Will Go Before California Voters in November

According to petitions being circulated throughout the State of California several utility issues will probably come up before the voters at the ballot next November. Proponents of these measures must succeed before Aug. 5 in securing the required number of signatures.

One issue involving traffic control, and known as the franchise act, provides that the State Railroad Commission shall have the exclusive power to grant determinate or indeterminate franchises for motor vehicle transportation for compensation upon streets and highways, the same to apply to interurban and suburban railways. Another act favored is one to tax publicly owned public utilities, which provides that utilities owned by municipality, county, district or other public agency are subject to the same tax as utilities owned by corporations. Another act is proposed to regulate publicly owned public utilities, which provides that they shall be under the jurisdiction and control of the State Railroad Commission.

Two proposed state constitutional amendments are favored, one of which is known as the utility tax amendment and provides that a public utility, paying state taxes, may deduct from gross receipts from operation of its business any amount it pays to another public utility when that amount is included in gross receipts from which tax of the latter utility is computed. A municipal public works act is proposed which authorizes two or more municipalities to acquire or control by contract public works for supplying inhabitants with light, water, power, heat, transportation or other utility service.

Application of Business Principles Responsible for Detroit Success

"Such success as has been ours I attribute, first, to our strict adherence to sound business principles and, second, to freedom from political interference. Under the Detroit charter we are responsible to nobody but the Mayor. The City Council cannot meddle. I am not prepared to say that municipal ownership is a success, even in Detroit—only time can demonstrate that—much less that it would be a success for cities of the nation at large."

The speaker was Griffith C. Ellis, president of the Detroit Street Railway Commission. He was talking about the experiment in municipal ownership in that city. He has been wintering in California and the Los Angeles *Sunday Times* recently sought him out so as to tell its readers about the situation in Detroit. Mr. Ellis said that his training as a business man led him to the conclusions shared by most other American business men—he was opposed to government ownership or, for that matter, to encroachment by government upon the functions of private business, except when absolutely necessary, and then as little as possible. Mr. Ellis is quoted in part as follows:

Municipal ownership was undertaken by Detroit as an emergency measure. The city and the Detroit United Railways had been at loggerheads for years. The people were getting more and more exasperated, the city was being strangled for lack of adequate service, the company was getting more and more apprehensive of the future and was spending less and less money, the property was running down, and there was nothing in such a situation to attract new capital.

When it was proposed that the city pay for pavement laid between the rails of the municipally owned railway, we refused to concur. In Detroit as in most other American cities, the railway always had been required to lay the pavement and we insisted that our experiment be conducted under precisely the same conditions as governed private business in the same field elsewhere. By accepting a gratuity from the city and permitting the taxpayers to do the paving, we could have saved $1,000,000 a year, but we refused on principle, and, of course, we pay full taxes.

We have been censured because we carry no depreciation account. We believe in the principle of such accounts and the time is not distant when we shall open one of our own, but for the present we need all our money for repairs and replacements. Our best answer to criticism, perhaps, is that admittedly the property is now in far better condition than it was when we took it over.

All repairs and replacements have been paid for out of earnings. I do not know whether we are required legally to do so or not, and it makes little difference, for we assumed that we were and we knew that if we were not we ought to be. Money raised by bond sales has been spent on nothing but extensions and the purchase of new equipment.

Increased wages to platform men, awarded by an arbitration committee to which a dispute was referred, have forced us to raise fares from 5 cents to 6, with tickets sold in strips at reduced rates, which brings the average down to about 5.55 cents.

We are paying the second highest wages in the country—exceeded only by New York and Chicago—and giving the second cheapest fare. Raising the fare higher would have put us in better financial position, but we chose to reimburse ourselves only for the actual loss imposed by the arbitration award.

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News Notes

Cohoes Trackless Trolleys Delayed.—The Capitol Transportation Corporation, formed by officials of the United Traction Company, Albany, N. Y., has received a setback in its application to operate trackless trolleys in the city of Cohoes. The residents there are not satisfied with the proposed route of operations and as yet no permit has been granted.

Course in Utilities at Harvard.—Harvard University, has established a course on public utilities in its school of business administration. The professor in charge will be Theodore Howard Dillon, who will have associated with him Charles Williams of the Philadelphia Electric Company.

Seeks Increased Rates.—The Nova Scotia Tramways & Power Company, Halifax, N. S., is seeking permission to increase its railway fares from 7 cents to 10 cents.

Complains of Trolley Delay.—Delay of trolley traffic on Lake Street, a main artery for motorists between Minneapolis and St. Paul, Minn., by automatic semaphores has become so harassing that vice-president J. T. McGill of the Minneapolis Street Railway asked the street railway committee of the City Council to help expedite travel across street intersections where these semaphores operate.

Who Decides Bus Permits?—City Solicitor Gaffney of Philadelphia recently stated that a motor bus line was not a street railway referring to the act of the Public Service Commission in granting to the Philadelphia Rural Transit Company a certificate to operate a bus line in Germanstown before the City Council had granted such permission. He said that in this case the certificate granted was only a temporary one. He stated further that a case will be brought up before the Superior Court shortly involving a bus company in Chester procuring a certificate and beginning operation without a franchise from the municipality. A second company appeared and secured a certificate from the City Council, but had no sanction of the Public Service Commission. The question which the court will decide is which of the two companies has the right to operate.

Pays for Paving.—Carrying out the provisions of the contract agreement for the reorganization of the Pittsburgh Railways, Pittsburgh, Pa., Arthur W. Thompson, president of the traction company recently transmitted two checks, a total of $75,000 to C. K. Robinson, special assistant city solicitor in charge of public utilities litigation, as the first quarterly installments for street repaving work and for bridge toll and pole tax. The payments were divided into two items one of $50,000 and a second for $25,000. Under the provisions of the contract agreement, the company will pay the city $200,000 a year in quarterly installments to finance the cost of street work between the railway tracks. Another provision of the contract stipulates that as a substitution for all bridge tolls, pole tax, car tax, etc., the company shall pay the city $100,000 a year in quarterly installments.

Pays Its Share of Paving.—Instead of contesting the right of the city of Pottsville, Pa., to compel it to pay a part of street-paving costs where its tracks are located, the Eastern Pensylvania Power & Light Company recently announced it would pay its full share. Last year the company protested against being compelled to pay these costs.

Decrease in Accidents.—The Morris County Traction Company, Morristown, N. J., reports a decrease of 51 per cent in accidents in April, 1924, compared with April, 1923. During April a year ago 60 per cent of the cars were two-man operated and in April, 1924, all the cars were operated as one-man cars. On the main line, on which one-man operation was started on March 23, 1924, the company reports a decrease of 42 per cent in the number of accidents over a similar period during 1923.

Ohio Property Starts Bus Operation.—The Columbus, Newark & Zanesville Electric Railway, Zanesville, Ohio, has received the first of its new bus equipment for use on the Ridge Avenue route. The two new Fageol coaches ordered cost in the neighborhood of $9,200 apiece. The buses will be run to the Kearns-Gorsuch plant and will relieve congestion that has been felt there in the past.

Seeks Increased Fare.—The Texas Electric Railway, which operates the lines in Waco, Tex., has petitioned the City Commission for authority to increase the fare in Waco from 5 cents to 7 cents with four tickets for 25 cents. Before the petition was submitted to the City Commission, the matter of increased fares was placed before a meeting of the stockholders of the line, held in Waco and presided over by Jack Beall, Dallas, president of the Texas Electric Railway. Mr. Beall submitted to the meeting of stockholders a statement of the financial condition of the property and declared that service could not be maintained at its present standard under a 5-cent fare. The president declared that he believed the company entitled to a 7-cent fare with a 3½-cent rate for school children. He said the proposed extension of the line to the Bellmead shops and railway yards of the Missouri, Kansas & Texas Railway Company could not be undertaken unless the 7-cent fare was granted.

Want Center Curbing and Poles Removed.—An ordinance providing for the removal of the curb and trolley poles of the United Railways in the center of Delmar Boulevard from King's Highway to Clara Avenue has been presented to the St. Louis Board of Aldermen by the Director of Streets and Sewers, Clinton H. Fisk. The center curbing separates the street cars from the vehicular traffic along Delmar Boulevard and has been a decided advantage to the railway in the movement of its cars. The curbing inclosed a strip 32 ft. wide and the company has established wooden platforms for the convenience of patrons desiring to get on and off cars. These platforms have served as safety zones for pedestrians menaced by speeding automobiles. However, autoists claim that the parked right-of-way of the street cars prevents a free movement of automobile traffic and that the poles in the center of the street are unsightly.

"The First Electric Railway."—The papers, of Binghamton, N. Y., during the week ended May 17 carried a picture of Binghamton's first trolley car in 1886. The occasion was a controversy in the New York *Herald-Tribune* as to when the first electric car was operated in the United States.

Bus System Refused.—The Public Service Commission recently issued an order denying the petition of the Washington & Rockville R.R., Washington, D. C., for permission to substitute a bus system on the Silver Spring end of its line. At the same time the commission granted permission for the use of one-man safety cars on the line provided the tracks are lowered at Silver Spring to eliminate the grade crossing. This means the railroad will have to pay the $17,500 demanded by the state roads commission as its share of the expense of the elimination of the grade crossing at Silver Spring. The company notified the commission it was willing to pay $12,500 as a fair proportion of the cost. The commission has received assurance that a number of residents of Silver Spring will buy bonds of the company, which will be used to make up the difference between what the company is willing to pay and what the State Roads Commission demands.

Company to Assume Loss.—The St. Paul City Railway, St. Paul, Minn., has assumed liability for repayment to employees of $44,000 savings funds deposited to their credit with the Capital Trust & Savings Bank, which was closed by the state department of banking. This money represents a monthly deduction of 2 per cent from the pay of each worker for a long period. Horace Lowry, president, said it was only right that the company should assume the liability and guarantee repayment on demand. The company selected the bank and will take over a proportionate amount of the assets and shoulder any loss that may result from the liquidation.

Would Limit Bus Franchise Ten Years.—To obtain a bus ordinance against which no reasonable objections could be raised, Charles B. Hall, president of the City Council of Philadelphia, Pa.; Chairman Walter of Council's committee on transportation and public utilities, and City Solicitor Gaffney recently discussed amending an ordinance, now before the Council, granting the Philadelphia Rural Transit Company a franchise for a city-wide system of motorbuses. It was decided to recommend to the Council an amendment whereby the life of the proposed franchise would be limited to ten years. In addition to the change in tenure for the franchise, another change agreed upon would provide for a fee of $50 for every motorbus to be paid to the city. Coleman J. Joyce, counsel for Philadelphia Rapid Transit Company, said he would submit the proposed amendments to his company.

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Foreign News

Chain of Tourist Hotels Planned by P-L-M

Le tourisme is a business in France. There is not a single element catering to the traveler today but what is developing its tourist business by the inauguration of electric railway feeders and motor buses and stages in natural and historic sites throughout the rhomboid of modern France. In the forefront of the movement is the Paris-Lyons-Mediterranean Railway, the first trunk line to inaugurate long-distance tourist routes by motor bus and electric railway in the Alps. Next in order follows the Midi Railway in the Pyrenees districts and the State Railways in the famous historic forest regions of the Ile de France, immediately surrounding the capital.

Besides the formidable Route des Alpes itinerary from the Mediterranean to Lake Geneva and to Mulhouse, the circuits of the Forest of Fontainebleau and Avignon and the Ardech, the railway is fathering a series of stop-over hotels available for tourists at the end of each day's run. The project is still in the paper stage but, following in the footsteps of the Compagnie Generale Transatlantique in Morocco, a chain of what may be called "motor-bus hotels" is soon to come into being. The capital set aside by the railway for the purpose is 12,000,000 francs, and the president of the subsidiary company is Monsieur Stephane Derville, president of the board of the P-L-M Railway.

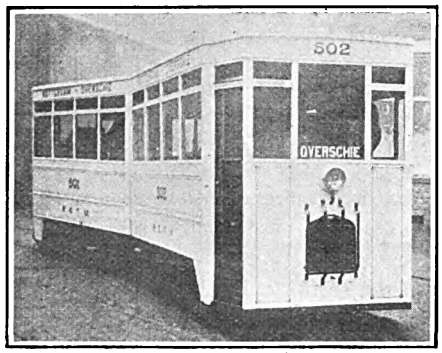
Paris Car Tracks May Be Removed

The Paris, France, Prefecture of Police, which regulates street traffic, is preparing to issue new regulations, which will result in a whole new layout of street car traffic in the near future. So far as possible it has been deemed desirable for aesthetic reasons to keep the street cars off the more imposing boulevards and avenues. This has resulted in placing car lines on some of the most crowded thoroughfares of the city, although there are tracks on many wide streets and boulevards. Weaving their way through side streets to central points like the Opéra, the Madeleine and Saint Germain des Pres, they have proved a drawback to rapid movement of other street traffic. It is now proposed to terminate these lines at what may virtually be called the belt of the outer boulevards, taking into consideration that the five great railway stations must perforce have direct connection. From these points, none of which is more than half a mile from the Opéra quarter, accelerated service will be run to the immediate suburbs as at present. The chief relief is looked for in the Rue Reaumur and the Rue du Quatre Septembre.

Since the street car lines are now a part of the Transports en Commun, which comprises all local transportation facilities in the city, there may be no loss in revenue to the company as a whole. The change will mean an increase in bus lines and increased traffic on the various subways, of which new short connecting links are being opened.

Articulated Car Shows Speed to Hollanders

The street car pictured on this page accommodates from twenty to thirty persons (assuming that some of them stand) and, being built in two sections, can negotiate short turns easily. The



Car with a Ford Motor Operated in Rotterdam

correspondent says that a Ford motor in a Dutch car is an experiment that promises to be highly successful, as Ford motors have shown a tendency to supplant other varieties in Rotterdam and elsewhere. The JOURNAL is getting further information.

More London Tube Extensions

It is reported that the contract has been let for the construction of the tunnels for the extension of the Charing Cross & Hampstead Railway from Charing Cross to a junction with the City & South London Railway at Kennington, a distance of about 2 miles. The cost of the tunnel work is put at about £400,000.

On May 3 it was announced that contracts had been settled for the driving of the tunnels of the City & South London Railway southern extension from Clapham Common to Morden, a distance of about 5 miles. The price is about £600,000. The cost of stations, rolling stock, etc., will bring the total up to about £3,500,000.

These two extensions and the prolongation northward of the Charing Cross & Hampstead Railway to Edgware (now under construction) will complete the major part of the underground railways developments at present authorized.

If the contractors complete their work in the fifteen months allotted, it will be the quickest piece of tube tunnel driving yet accomplished. To insure that the work is done on schedule time, ten rotary excavators will be employed, each having a forward drive of 15 ft. to 20 ft. per day. The total weight of cast-iron segments for lining the tunnels amounts to 60,000 tons. There will be seven stations, all equipped with escalators. The population served by the extension is about 300,000 and it is estimated that it will carry 50,000,000 passengers annually.

The City and South London Railway is now linked up with the Hampstead line by a new tube extending from Euston to Camden Town, a distance of a mile. The section from Euston to Moorgate has been entirely reconstructed and the Underground began through train service between Hendon, Golder's Green, Highgate and the City on April 20. The whole of the work was accomplished without interruption of the normal services provided on the Hampstead Line.

Provision had to be made for the uninterrupted flow of traffic on six separate tube lines, which converged to a point just south of Camden Town. Flat junctions were out of the question, as during busy hours trains would have to wait for each other to pass. The difficulty has been overcome by means of "flyover" and "flyunder" junctions. The trains on each line will run in separate tunnels which rise over or pass under each other.

Ninety-six trains per hour will have to pass over the junction in all directions. The maximum capacity of the new junction is 160 trains per hour. Although work was started from several different points and altogether some seventeen connections were made between new and existing tunnels, at no point was the margin of error in calculation more than one quarter of an inch.

Trolley Bus Not Approved for Dundee. — Dundee, Scotland, being a city of very steep gradients, is not suitable for the adoption of the railless system of electric traction, according to Walter Young, general manager of Dundee Corporation Tramways, reporting to the tramways committee. That the tramways there could be superseded by trolley buses, he says, is unthinkable. Dundee, he continues, is well served by the tramways and will be for many years, and it would require a much more mobile vehicle than a railless car to supersede the tramways.

War Bonus Gives Paris Omnibus Company Profits. — The Compagnie Générale des Omnibus de Paris, the bus section of the Transports en Commun, showed gross profit for 1923 of 18,664,356 francs, and net profit of 12,880,160 francs. The third payment and the part of the war bonus guaranteed by the municipality of Paris, as a result of the taking over and welding of all public service vehicles into a single unit, amounted to 17,537,805 francs. Accordingly the bonds show a "dividend" of 58 francs and the stock of 33 francs. The showing is considered remarkable, but it is made possible by what amounts virtually to a municipal subvention.

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Financial and Corporate

Municipal Line Needs $987,500

New York City Official Requests Addition to Revolving Fund for Staten Island Line

Commissioner Grover A. Whalen of the Department of Plant and Structures of New York City has sent to the Board of Aldermen a request that it adopt a resolution asking the Board of Estimate to authorize the issuance of $50,000 in special revenue bonds to replenish the revolving fund for the operation by the city of the Staten Island Midland Railway, a 32-mile line.

Attached to the application Commissioner Whalen submitted a statement covering the city's operation of the Midland lines. In it he says, in part:

When the road was turned over to this department by the receiver its rolling-stock equipment consisted merely of four passenger cars, the prior operation having been conducted with cars leased from the Richmond Light & Railroad Company, and it was therefore necessary for the city to purchase rolling stock required for the operation.

The commissioner's statement recites the authorization of $100,000 special revenue bonds for the revolving fund approved in 1920 and 1923 and continues:

In addition to the moneys already expended by the city for replacements and betterments on other than rolling stock on the Midland trolley lines, it is estimated that an expenditure of $987,500 will be necessary for renewal of tracks, new cars and for repairs to carhouses if the city is to continue the operation for any considerable time, but with such expenditure it is estimated that safe operation would be assured for from five to ten years.

The statement includes a table showing total investments by the city, including the revolving fund, of $450,000.

The statement continues:

In addition thereto a considerable amount of work was done for the betterment of the railway, and these items are carried and charged to the capital account, being a first lien on the property of the Staten Island Midland Railway.

A summary of the betterments follows:

Rehabilitation of overhead line and signal systems		$37,512.88
Rehabilitation of track and roadway		74,201.80
Rehabilitation of building and structures		45,863.41
Rehabilitation of sub-station equipment		9,435.29
Rehabilitation of receivers' cars:		
Passenger	$543.68	
Service	957.65	
		1,501.33
Reorganization of road		15,023.93
Total betterments		$183,538.64

The commissioner says that in accordance with the agreement entered into with the receiver of the Staten Island Midland, the following accounts were set up on the books, being a charge against operating expense:

To take care of taxes	$57,139.88
Interest (5 per cent per annum on investment)	46,279.67
Total	$103,419.55

Up to June 30, 1923, the commissioner explains, there has been set aside for depreciation reserve the sum of $22,000. For the period subsequent the engineers of the department are now revising depreciation charges and upon their report there will be set up the revised charges. The statement concludes:

There is as of March 31, 1924, unvouchered bills for power amounting to $32,018, and for materials, supplies, etc., amounting to $10,500.

It will be seen that it is now necessary to apply to the Board of Aldermen and to your board for a further issue of special revenue bonds to meet the expenditures of operation if the operation of the Staten Island lines by the city is to be continued.

It should be stated—and it is gratifying to note—that a comparison of revenues shows an increase of 10 per cent in receipts for the year 1923 as compared with the year 1922.

$124,838 Net for Toronto Municipal Line

The report of the Toronto Transportation Commission, the second to be issued since the city took over the system of the Toronto Railway, shows the total revenue for 1923 as $11,852,334, and the net $124,838. The income available for fixed charges was $3,747,654, allocated as follows: Interest and sinking fund on capital account, $2,387,725; depreciation $877,090; reserves of unredeemed tickets, workmen's compensation, public liability and contingencies, $358,000; leaving a surplus on the year's operation of $124,838.

The expenditure covering extensions is given as approximately $27,000,000; that for civic car lines, $2,400,000, the price of property of Toronto Railway (if the majority award is sustained), the Toronto and York Radials, and the Toronto Suburban Railway, $12,500,000; discount on debentures and expenses, $1,250,000. The total accumulated reserves are $4,137,708.

Will Purchase Fort Wayne & Northwestern Railway

Within a short time the Indiana Service Corporation will apply to the Indiana Public Service Commission for permission to purchase the entire Fort Wayne & Northwestern Railway at an approximate price of $20,000 per track mile. The Fort Wayne & Northwestern Railway operates an interurban electric railway from Fort Wayne, Waterloo and Kendallville and furnishes light and power to several smaller towns and cities along the right-of-way.

If negotiations are concluded during the week of May 18 and permission for the sale is granted by the Public Service Commission, the Indiana Service Corporation will ask permission to issue $859,000 in bonds.

The Fort Wayne & Northwestern Railway was organized in 1905 as the Toledo & Chicago Interurban Railway, sold under foreclosure to the bondholders.

Slight Increase in Net Income

Baltimore Company Fell $524,000 Short of Earning Surplus Specified by Public Service Commission

After paying all operating expenses and fixed charges, including interest on income bonds, the balance of the United Railways & Electric Company, Baltimore, Md., for the year ended Dec. 31, 1923, was $1,799,356. From this was deducted $818,448 for dividends, leaving $980,907 for depreciation and surplus. During the last five years the company has spent for the items of maintenance and depreciation alone $13,914,385. During 1923 nearly $3,000,000 was put back into the property for upkeep and improvements. The Baltimore property comprises 415 miles of electric railway.

The Public Service Commission has ruled that the best interests of the

EARNINGS AND EXPENSES OF THE UNITED RAILWAYS & ELECTRIC COMPANY, BALTIMORE, MD.

	1923	1922
Operating Income:		
Revenue from transportation	$16,281,848	$15,962,185
Revenue from other railway operations	179,949	160,406
Total operating income	$16,461,799	$16,122,592
Operating Expenses:		
Maintenance of way and structures	$968,245	$917,891
Maintenance of equipment	986,679	913,205
Maintenance of power	40,669	49,014
Total maintenance	$1,995,593	$1,880,110
Depreciation	823,090	806,130
	$2,818,683	$2,686,240
Power service	1,312,621	1,223,227
Conducting transportation	5,065,084	4,998,870
Traffic	9,677	15,329
General and miscellaneous	1,433,252	1,514,699
Transportation for investment—credit	*16,917	*9,245
Total operating expenses	$10,622,402	$10,429,122
Taxes, licenses, etc.	1,800,335	1,740,512
Total operating expenses, taxes, etc.	$12,422,737	$12,169,634
Net operating income	$4,039,060	$3,952,957
Non-operating income	160,028	156,246
Gross income	$4,199,089	$4,109,203
Interest on funded debt	2,093,415	2,137,051
Remainder	$2,105,674	$1,972,152
Other Deductions from Gross Income:		
Rents	$406,594	$419,406
Interest on unfunded debt	70,745	96,087
Interest on income bonds	559,080	559,080
Amortization of discount on funded debt	50,376	58,088
Miscellaneous	42,613	40,222
Total	$1,129,408	$1,172,883
Net income (transferred to profit and loss)	$976,266	$799,269
Car-miles	35,873,841	34,964,036
Revenue passengers	238,658,380	233,732,146
Transfer passengers	92,838,315	90,808,955
Revenue passenger per car-mile	6.6527	6.6849
Maint. cost per car-mile	.0557	.0538
Depreciation per car-mile	.0229	.0231
Ratio to Total Operating Income:	Per Cent	Per Cent
Maintenance and depreciation	17.12	16.66
Operating expenses and depreciation	64.53	64.69
Taxes	10.93	10.79
Operating expenses, depreciation and taxes	75.46	75.48

*Decrease.

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public require that the company should earn a surplus of $1,500,000 above all operating expenses (including depreciation), taxes, maintenance and interest on all of its bonds, including income bonds. The company's surplus as defined by the commission on the basis of a 7-cent fare was $976,266, or $524,000 less than the $1,500,000 specified by the commission.

The company is planning ahead financially. In 1922 it not only paid off all its own maturing obligations but called for redemption and paid off all of its 7½ per cent and 8 per cent obligations. In other words, during 1922 the company paid off $10,484,000 of underlying bonds, notes, car trusts and bank loans, and as an offset there was issued and sold a total of $8,500,000 securities, $6,000,000 of which were first consolidated mortgage bonds bearing 6 per cent and $2,500,000 five-year 6 per cent notes. At the same time holders of $2,684,000 of 4 per cent bonds exchanged their bonds for 6 per cent bonds paying the company $250 per $1,000 bond for the exchange. The result of the general plan of financing was that the company's maturing obligations were refunded, high interest bearing obligations were retired and the company's floating debt was paid. All of this was accomplished without any increase in fixed charges against income in 1922 and an actual decreasing charge thereafter.

With the accomplishment of this financing, the next step contemplated the bringing together of the three principal subsidiary companies, namely, the Maryland Electric Railways, the Baltimore, Sparrows Point & Chesapeake Railway and the Baltimore, Halethorpe & Elkridge Railway, into one company and have this consolidated company authorize a first and refunding mortgage. Accordingly, in January, 1924, the company, on behalf of the Maryland Electric Railways, sold $4,000,000 of the latter company's first and refunding mortgage gold bonds, Series A, 6½ per cent, due January 1, 1957.

The United Railways has no floating debt and, upon completion of the financing above mentioned, will retire the entire floating debt of the Sparrows Point and Halethorpe Companies and have on hand more than $1,000,000 for improvements, betterments and acquisition of new and additional property.

By agreement of Dec. 11, 1923, the wages of all employees were increased. It is estimated that this increase will cost the company approximately $175,000 per annum. The motormen and conductors, who form the largest class of employees, will receive the major portion of this amount.

In conclusion, President C. D. Emmons of the company says it may interest stockholders and the public to know what became of the 7-cent fare in 1923. He says that first of all, principally because of the fact that children ride for 4 cents, the average fare was not 7 cents but 6.80 cents, and the 9 per cent park tax on gross revenue within the city further reduces the average fare received by the company to 6.33 cents. He says that of this 6.80 cents:

Approximately 5 11/100 cents or	5 11/100 cents	was paid to employees for wages; to manufacturers for necessary supplies and material; to the tax collector, and for depreciation.
Approximately 1 30/100 cents or	1 30/100 cents	was paid for property rented and for money borrowed. (This represents the company's bonded debt held by approximately 115 savings and other banks in Maryland and approximately 5,036 individual investors.)
Approximately ½ cent or	33/100 cent	was paid to 2,016 stockholders.
Approximately 1/6 cent or	6/100 cent	was credited to surplus.
	6 80 cents	

Decrease in Traffic in Toledo in April

Slight industrial let-down in April brought about a decrease in car riding at Toledo and resulted in a deficit of $12,057 to the stabilizing fund, bringing the balance in the fund to $74,374 and pointing the way to fare increases or drastic curtailment of expenses.

Gross revenue of the Community Traction Company for April was $347,099. This is an increase of $19,115 as compared with the similar month last year. Increase of $18,826 in operating expenses due to higher wages and maintenance, increased fixed charges of $2,033 and additional interest and dividend expense of $3,270 offset this increase in revenue. A total credit of $70,000 was made to the maintenance fund. During April 4,984,013 revenue passengers were handled. This is an average of 166,134 a day, compared with a daily average of 179,028 a year ago.

Commissioner Cann in his report to the board of control declared that further decline in riding can be looked for in the summer months.

The commissioner urged speed in settling the power rate case as a means of obtaining relief for the company. He also favored the extension of the use of one-man cars to several other lines in the city.

$187,341 Increase in Earnings in Portland, Ore.

The Portland Electric Company, Portland, Ore., the successor to the Portland Railway, Light & Power Company, reports for 1923 a balance of $735,162 compared with $547,821 for 1922. The company operates 298 miles of line. Its earnings statement follows:

STATEMENT OF EARNINGS OF THE PORTLAND ELECTRIC COMPANY

	1923	1922
Gross earnings	$10,825,380	$10,120,898
Operating expenses	5,647,130	5,439,499
Taxes	1,003,878	881,757
Interest	2,066,823	2,126,892
Dividends—		
Prior preferred	205,001	32,543
First preferred	375,000	375,000
Second preferred	75,000	.....
Balance	$1,452,548	$1,265,207
Depreciation	717,386	717,386
Balance	$735,162	$547,821

GENERAL STATISTICS FOR THE CALENDAR YEARS

	1923	1922	1921
Number of revenue passengers carried	67,995,333	68,661,868	69,840,734
Number of transfer passengers carried	22,565,980	22,762,174	22,686,798
Number of non-revenue passengers carried	2,575,181	2,476,672	2,535,218
Total passengers carried	93,136,494	93,900,714	95,062,750
Number of car-miles run	16,034,821	15,972,536	16,175,365

New Jersey's Tax on Gross Receipts Up $123,655

The State Board of Taxes and Assessment of New Jersey has announced that public utilities of the state, consisting of street railway, gas and elec-

Conspectus of Indexes for May, 1924

Compiled for Publication in this Paper by

Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Street Railway Fares* 1913 = 4.84	May 1924 **6.95**	Apr. 1924 **6.94**	May 1923 **6.88**	May 1921 **7.24**	May 1923 **6.88**
Street Railway Materials* 1913 = 100	Apr. 1924 **163**	Mar. 1924 **164**	Apr. 1923 **175**	Sept. 1920 **247**	Sept. 1921 **156**
Street Railway Wages* 1913 = 100	May 1924 **219**	Apr. 1924 **219**	May 1923 **208**	Sept. 1920 **232**	Apr. 1923 **207**
Steel—Unfilled Orders (Million Tons) 1913 = 5.91	Apr. 30 1924 **4.21**	Mar. 31 1924 **4.78**	Apr. 30 1923 **7.29**	July 31 1920 **11.12**	Feb. 28 1922 **4.14**
U.S. Bank Clearings Outside N. Y. City (Billions)	Apr. 1924 **15.96**	Mar 1924 **16.12**	Apr. 1923 **15.74**	Mar. 1920 **18.54**	Feb 1922 **10.65**
Business Failures	Apr. 1924	Mar 1924	Apr. 1923	Jan. 1924	Sept. 1923
Number	**1,730**	**1,652**	**1,638**	**2,258**	**1,280**
Liabilities (millions)	**72.97**	**61.33**	**52.06**	**109 1**	**27.50**

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Eng. News-Record Construction costs 1913 = 100	May 1924 **222.4**	Apr. 1924 **221.6**	May 1923 **216.7**	June 1920 **273.8**	Mar. 1922 **162.0**
U.S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Apr. 1924 **148**	Mar. 1924 **150**	Apr. 1923 **159**	May 1920 **247**	Jan. 1922 **138**
Bradstreet's Wholesale Commodities 1913=9.21	May 1 1924 **12.56**	Apr. 1 1924 **12 66**	May 1 1923 **13.67**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
Dun's Wholesale Commodities 1913 = 120.9	May 1 1924 **184.7**	Apr. 1 1924 **186.8**	May 1 1923 **192.9**	May 1 1920 **263.3**	July 1 1921 **159.8**
U.S. Bur. Lab. Stat. Retail food 1913 = 100	Apr. 1924 **141**	Mar. 1924 **144**	Apr. 1923 **143**	June 1920 **219**	Mar. 1922 **139**
Nat. Ind. Conf. Bd. Cost of living 1914 = 100	Apr. 1924 **161.8**	Mar. 1924 **163.2**	Apr. 1923 **159.1**	July 1920 **204.5**	Aug. 1922 **154.5**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen and conductors on 105 street and interurban railways in the United States, operating more than 100 passenger cars each, and weighted according to number of cars.

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tric light, water, telephone and telegraph, district telegraph messenger, sewer and oil or pipe companies, will pay as a franchise tax for the current year a total of $5,433,983, an increase of $123,655 over the franchise tax for 1923. The tax is levied against a total of 227 corporations. The total gross receipts of all of the utilities amounted to $109,584,977. The receipts of the street railway companies were $20,604,659. The Public Service Corporation paid the largest tax. It was divided as follows: Public Service Railway, $891,747; Public Service Electric Company, $1,391,923; Public Service Gas Company, $1,192,276, a total of $3,475,947. The total receipts of the Public Service Railway were $17,834,957, a decrease of $3,964,761 from the total receipts of 1922. This decrease, of course, is brought about because of the strike of the employees last summer. The total tax of $891,747 to be paid by the Public Service Railway for 1924 is a decrease of $198,238 from 1923.

$330,915 Net for Pacific Electric Railway

The Pacific Electric Railway, Los Angeles, Cal., operating 682 miles of line, reports net income of $330,915 for the year ended Dec. 31, 1923. The earnings of the company, reported in the fortieth annual statement of the Southern Pacific Company and proprietary companies, are shown in the accompanying statement.

INCOME ACCOUNT OF PACIFIC ELECTRIC RAILWAY, YEAR ENDED DEC. 31, 1923

Operating revenues	$21,641,553
Operating expenses (including depreciation)	16,164,457
Net revenue from operations	$5,477,096
Taxes	1,013,344
Equipment and joint facility rents—net	.....
Net operating income	$4,463,752
Interest accounts with affiliated companies:	
Credit	.....
Other income	216,292
Gross income	$4,680,044
Interest on funded debt—bonds and notes	$2,754,928
Interest accounts with affiliated companies:	
Debit	1,239,341
Other income charges	354,860
Total deductions	$4,349,129
Net income	$330,915
Income applied to sinking and other reserve funds	.....
Income balance transferred to credit of profit and loss	$330,915

New Jersey Board Reaffirms Its Position on Depreciation Charge

An order issued by the Board of Public Utility Commissioners of New Jersey takes issue with the contention of the Public Service Railway that earnings in 1923 did not justify setting aside more than $550,000 for depreciation and directs that no dividends be paid until the full amount of $1,100,000 be set aside as directed in a previous order, which the board holds to be not an "unreasonable stipulation."

The board directs the company to charge to an appropriate expense account $800,000 for depreciation, and further directs that up to and including July, 1926, the company shall pay periodically into the proper suspense account sums to aggregate $300,000, and concurrently to credit these amounts "to accrued depreciation of road equipment." That is, to depreciation before the board's order was first issued in 1921. The order says:

> If and when earnings justify, the amount so charged to suspense shall be amortized by debits to the account of "miscellaneous debits" until the amount so charged to suspense shall be entirely extinguished; and no dividends may be paid on the capital stock of the company until this shall have been done. The company is ordered to reform its books of account for Jan. 1 last to conform with the conclusions of the board.

Tentative Plan Announced

$500,000 Yearly Reduction in Fixed Charges Under Terms Suggested for St. Louis

Plans are taking definite shape covering some of the details of the terms of the proposed reorganization of the United Railways, St. Louis. It has been suggested that for each share of the existing common stock and $2.50 there be exchanged one-tenth of a share of a new issue of common stock of no par value. This would wipe out the old issue of common stock and create 24,913 shares of new common for which the company would receive $622,825 cash. For the 163,830 shares of preferred stock there would be exchanged new common on a share for share basis upon payment of $12.50 cash additional for each share thus exchanged. This would bring an additional $2,047,875 into the treasury. It is hoped to be able to pay $2.50 annual dividends on this new common stock, making it a 10 per cent stock.

The tentative refinancing plan calls for the issuance of $10,000,000 of 7 per cent preferred stock in exchange for the $9,790,000 of St. Louis Transit Company 5 per cent bonds. Transit bondholders are said to have agreed to accept this stock on the basis of the exchange of ten shares of stock for each $1,000 bond. This would leave $210,000 of this stock unissued in the treasury of the company.

Another $10,000,000 of preferred stock is also to be underwritten at 70, which would net $7,000,000.

The retirement of $2,000,000 of Suburban first mortgage bonds by payment in cash and the exchange of the Transit bonds for preferred stock would reduce the bonded indebtedness by $11,790,000 and leave the amount of bonds outstanding at $38,900,000.

It is also said that the plans call for the exchange of the $4,500,000 of Suburban general bonds for new first mortgage bonds of the Suburban to draw 5 per cent interest instead of 8 per cent as under the present extension agreement.

The fixed charges of the company under this plan would be $1,712,400. They would include $225,000 on the Suburban general bonds at 5 per cent, $1,212,000 on the United Railways general mortgage bonds and $275,480 on the underlying bonds. This is a decrease of $549,500 a year in fixed charges.

At present the company has a surplus of $4,275,573. With the new cash to be paid in the company would have $14,156,273 available to meet obligations. From this sum there would have to be paid $4,000,000 of receivership certificates, $2,000,000 of Suburban first mortgage bonds and $2,396,321 of back mill tax. This would leave a balance of $5,759,952 to provide for extensions, pay for improvements, meet reorganization costs, etc., and retire possibly $4,100,000 of underlying bonds.

$2,500,000 Bond Sale Authorized by California Commission

Key System Transit Company has been authorized by the California Railroad Commission to execute a deed of trust to secure the payment of $10,000,000, par value, of its first mortgage bonds, and to issue and sell $2,500,000 of the bonds due July 1, 1938, $1,000,000 to be sold for cash at not less than par and accrued interest and $1,500,000 at not less than 94 per cent of face value and accrued interest. The proceeds obtained from the sale of these bonds are to be used by the Key System Transit Company to finance or pay these obligations:

To finance part of purchase price of properties because of cash expended by trustees to acquire such properties at foreclosure sale	$283,561
To pay unpaid interest on Twenty-third Avenue Electric Railway first mortgage bonds and Oakland, San Leandro & Haywards Electric Railway first mortgage bonds to July 1, 1923	106,377
To pay notes to various banks covering moneys borrowed for bond interest	69,550
To pay notes payable to Realty Syndicate Company covering moneys borrowed for bond interest	10,530
To pay real estate mortgage against Stoer property No. 2, due March 17, 1923	22,500
To pay San Francisco-Oakland Terminal Railways equipment notes	50,000
To pay interest on above notes	1,000
To pay ferry equipment trust certificates	600,000
To pay interest on such ferry equipment trust certificates	3,850
To pay car equipment trust certificates fifteen Key coaches	175,000
To pay interest on such car equipment trust certificates	1,954
To repay loans from depreciation fund	439,250
To pay part of cost of fifty-five new traction division cars	646,426
Total	$2,410,000

The accrued interest may be used for general corporate purposes.

The bonds thus authorized have already been marketed.

Plan of Philadelphia Merger Revived

Banking interests in Philadelphia are studying the details in the plan proposed by Joseph Gilfillan, a member of the board of directors of the Union Traction Company, Philadelphia, for constructing an "enlarged P. R. T. Company" by consolidating the Electric Traction, People's Traction, Philadelphia Traction, Union Traction and Philadelphia Rapid Transit Companies.

The principal feature of the Gilfillan plan is the exchanging of securities of the new company for those of the companies merged, due consideration being given to priority. The issues of the new company would be of four kinds—first and refunding mortgage bonds, first preferred stock, second preferred stock and common stock.

The reorganization plan proposes the merging, not only of the five principal

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groups mentioned, but also of eight other railways, namely, the Catharine & Bainbridge Streets Passenger Railway, Darby & Yeadon Street Railway, Kessler Street Connecting Passenger Railway, Lehigh Avenue Passenger Railway, Market Street Elevated Passenger Railway, Philadelphia & Willow Grove Street Railway, Snyder Avenue Railway and Twenty-second Street & Allegheny Avenue Passenger Railway.

Authorizes Leasing of Shawnee Line.—The Oklahoma Corporation Commission has granted permission for the Oklahoma City-Ada-Atoka Railway to lease for a period of ten years the property of the Oklahoma City-Shawnee Interurban Company. The property to be leased includes the old branch line operated by the Missouri, Kansas & Texas Railway from Oklahoma City to Atoka. The line runs from Oklahoma City to Shawnee, thence south to Coalgate and Atoka. It is planned to electrify the entire line, it is announced, and operate it for transportation of both freight and passengers. Details of the electrification plans have not been announced.

Holding Company Chartered.—The Southwest Power Company has been organized under the laws of Delaware with a capitalization of $3,100,000. The company's president is Albert Emanuel, head of the firm of Albert Emanuel, Inc., which recently purchased the Choctaw Power & Light Company and the Pittsburgh County Railway, McAlester, Okla., serving Pittsburgh and Latimer Counties with light, power and transportation. The new corporation also controls the Coal District Power Company, which furnishes light and power to coal fields of Logan and Scott Counties, Arkansas, and to a number of smaller towns. An offering of $2,100,000 of first mortgage 6½ per cent sinking fund gold bonds of the new company was made on May 22 at 97¼ and accrued interest to yield 6.75 per cent.

Seeks Approval of Abandonment.—The Geneva, Seneca Falls & Auburn Railroad has asked the Public Service Commission to approve a declaration of abandonment of that part of its Pulteney Street line in Geneva, N. Y., between Jay and St. Clair Streets on the ground that operation of this part of its line is no longer a public necessity and convenience. The Geneva authorities have consented to the proposed abandonment.

Net Corporate Loss of $7,598.—The Glendale & Montrose Railway reports to the California Railroad Commission for the year 1923 that its operating revenue was $49,039 and operating expenses $53,845, giving a net operating loss of $4 806. The net corporate loss for the year was $7,598. The deficit at the beginning of the year amounted to $94,458. Miscellaneous additions to surplus for 1923 amounted to $21,366 and miscellaneous deductions were $426.

Elevated Reorganization Securities Ready.—The Chicago Elevated Railway reorganization committee has notified holders of certificates of deposits for secured gold notes and ten-year 6 per cent debentures that the plan dated July 14, 1923, for the reorganization of the Chicago Elevated Railways having been declared operative, the new securities deliverable by the reorganization committee to holders of certificates of deposit will be ready for delivery June 10. The distributable securities comprise first lien and refunding mortgage bonds and adjustment debenture bonds of the Chicago Rapid Transit Company and voting trust certificates for common stock. Until the close of business on June 5 the committee will continue to accept deposits of secured gold notes (extended or not extended) and of ten-year 6 per cent debentures of the Chicago Elevated Railways, subject to the terms of the plan and the reorganization agreement.

Consolidation Approved.—A merger of the Atlantic Coast Electric Railway and the Seashore Electric Railway, both in Asbury Park, N. J., into the Coast Cities Railway has been approved by the Board of Public Utility Commissioners. The application was made by the Eastern New Jersey Power Company. The consolidation is one of the steps intended to be carried out under the merger plan reviewed at length in the issue of the ELECTRIC RAILWAY JOURNAL for March 8, page 394.

Accumulated Surplus for 1923 $319,904.—The Tidewater Southern Railway, Stockton, reports to the California Railroad Commission for the year 1923 that its operating revenue was $236,049 and operating expenses $184,767, giving a net operating revenue of $51,282. The miscellaneous non-operating revenue amounted to $6,619. Interest, rent, taxes and other deductions totaled $52,853. The net corporate income for the year was $5,048. The deficit at the beginning of the year amounted to $286,053. Miscellaneous additions to surplus for 1923 amounted to $647,899 and miscellaneous deductions were $46,990. Accumulated surplus at the end of the year was $319,904.

Court Orders Interest to Be Paid.—At the request of the receiver of the New York Railways, Federal Judge Julius M. Mayer has ordered semi-annual interest on Broadway & Seventh Avenue Railway first consolidated mortgage bonds to be paid on June 1. The Broadway & Seventh Avenue Railway is one of the subsidiary companies of the New York Railways system and interest on the bonds has been regularly paid when due. Judge Mayer reserved decision on payment and interest on the Broadway Surface Railway first mortgage 5s due July 1, 1924.

Unassenting Minority Holders Entitled to Full Payment.—Judge Mullan in the New York State Supreme Court has ruled that minority stockholders of the Manhattan Elevated Railway are entitled to the full 7 per cent guaranteed dividend irrespective of the agreement by the majority to accept a smaller payment. Under the plan to which the majority of shareholders agreed the Interborough Rapid Transit Company, which operates the elevated lines under lease, paid 3 per cent last year, will pay 4 per cent this year and will pay 5 per cent next year. It is understood that the amount of stock held by unassenting or minority shareholders is about thirty thousand shares, or only 5 per cent of the total outstanding in the public's hands. The decision of Judge Mullan, it is said, does not affect the other 95 per cent of stock, as the holders of those shares agreed to accept smaller dividend payments than 7 per cent. The Interborough Rapid Transit Company is preparing to bring the case before the Appellate Division, and it is expected the matter will eventually get before the Court of Appeals.

"Listening In" Causes Railway Slump.—The deficit in the operating statement of the Cincinnati Traction Company, Cincinnati, Ohio, for April will necessitate an increase in the rate of fare from 9 to 9½ cents on July 1, W. Kesley Schoepf, president of the company, announced on May 17. A total of 353,582 fewer passengers were transported by the company in April than during the similar month of last year, and according to present figures the total for May will be 25 per cent less than for May, 1923. Receipts of the company have been decreasing for months, according to Mr. Schoepf in his monthly report to W. Jerome Kuertz, Director of Street Railroads. The higher fare, unseasonable weather, increase in unemployment, tendency of radio to keep people at home and the greater number of automobiles are among the causes assigned for the decrease in traffic.

Abandonment and Extension Sought.—The Birmingham Electric Company, Birmingham, Ala., has filed a petition with the Alabama Public Service Commission seeking a certificate of convenience and necessity of abandonment of operations over certain portions of the former Tidewater railway. The company also seeks permission to construct certain additional lines in the city of Birmingham. The petition states that these changes will make possible economies of operation through a consolidation of the Tidewater system with the lines formerly operated by the Birmingham Railway, Light & Power Company. This petition was set for a hearing June 25.

Preferred Stock on Market.—An issue of $101,000 of 8 per cent preferred stock of the Community Traction Company, Toledo, is now being placed on the market in Toledo to finance improvement of lines in West Toledo. Representatives of the security-selling division of Henry L. Doherty & Company, New York, are handling the sale of the stock at Toledo. The stock is required to be sold at par.

Railway Bought.—The Pennsylvania Power & Light Company recently purchased the Montoursville Passenger Railway and the Montoursville Electric Light Company, Montoursville, Pa. Both properties have been in continuous existence since their organization in the fall of 1897. No change in the names of the companies is contemplated. It is stated that the trolley line will be abandoned and a bus line substituted between Williamsport and Montoursville, the county court having recently authorized such action. The bus line, however, will be operated by a separate company.

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Personal Items

J. W. Glendening Appointed West Penn Comptroller

J. W. Glendening was appointed comptroller of the West Penn Railways and subsidiary companies, Pittsburgh, Pa., and of the West Penn Power Company and its subsidiaries, effective May 1.

Mr. Glendening started on his railway career in 1899 in the office of the Camden-Suburban Railway, Camden, N. J. At the time that property was leased to the Public Service Corporation of New Jersey he was assistant to the secretary. For three years he served with the Public Service Corporation as assistant to the accountant in the railway department. His next move was to Saginaw, Mich., to fill the position of accounting assistant to the vice-president and general manager of the public utility companies controlling and operating the railway, electric and gas companies serving the cities of Saginaw and Bay City. During most of this time he was also treasurer of these companies. Later he was transferred to Jackson, Mich., as treasurer and assistant to the vice-president and general manager of the Michigan Railway. In 1919 he became secretary of this company and for the two years previous to his going to the West Penn companies served as secretary and treasurer.

His broad experience included also association with the Grand Rapids, Holland & Chicago Railways as secretary and treasurer and the Saginaw Bay City Railways as secretary.

Farewell Banquet to Sam Greenland

Sam Greenland did not leave Fort Wayne without a "farewell' which took the form of a banquet at which business and professional men throughout the city grasped his hand and wished him "Good luck." A tangible expression of their feelings was a silver serving set which bore the inscription, "Presented to Sam W. Greenland in appreciation of his loyal service to Fort Wayne and its institutions. From his many friends, 1924." The speakers included Henry C. Paul, president of the Old National Bank. He said that the present efficient service in Fort Wayne was due largely to the management of Mr. Greenland. Robert M. Feustel, president of the Indiana Service Corporation, spoke of his business relations and associations with the "Big Swede," as he was familiarly termed by his close associates. Mr. Greenland recently resigned as general manager of the Indiana Service Corporation to go to St. Louis to assist in working out the details of the reorganization of the United Railways there.

H. C. Kellerman, after twenty-eight years of continuous service with the street railways of Kansas City, Mo., retired recently on a pension and removed to Los Angeles, Cal. He started his street car career in 1896 as a conductor on the Northeast Electric Company. Later he became cashier and auditor of that company. When the line was purchased by the Metropolitan, Mr. Kellerman became an assistant superintendent, but at his own request was transferred back to the platform of a street car. He then served as conductor for more than ten years. Later he went into the shops and took charge of the store room. More recently he has had charge of the stock at Ninth and Brighton. He is seventy-six years old.

R. A. Moore Elected Illinois Association Head

R. A. Moore, general manager of the Aurora, Plainfield & Joliet Railroad, Joliet, Ill., was elected president of the Illinois Electric Railway Association at the recent meeting held in Chicago. Mr. Moore entered the railway field in Spokane, Wash., where he spent five years with the Ledgerwood Electric Railway. His record today includes thirty-five years of active service in both the electric and steam branches of the railroad business. Following his connection with the Ledgerwood property he entered the train service of the Northern Pacific, a steam line, where he remained for a period of ten years. It was in May, 1916, that Mr. Moore joined the forces of the Aurora, Plainfield & Joliet Railroad as general manager. Prior to that date he had served with the Peninsular Railroad in San Jose, Cal., in the capacity of electric locomotive engineer, train dispatcher, equipment inspector and later as first assistant superintendent. The last-named position he held for six and one-half years.

R. A. Moore

Francis L. Searway, formerly of the staff of Dwight P. Robinson, New York, and more recently appraisal engineer with Morgan & Morgan, Boston, Mass., has joined the appraisal division of Stone & Webster, Inc., Boston.

Obituary

Thomas Commerford Martin

Thomas Commerford Martin, long prominent in the electrical field as an editor and publicist, died from pneumonia in his home town of Pittsfield on May 17. He was sixty-seven years old.

For the past fourteen years Mr. Martin had been connected with the N. E. L. A., being from 1910 to 1919 its executive secretary and for the last five years secretary emeritus. At its session on May 20 at Atlantic City the N. E. L. A. passed a resolution of appreciation of the very valuable services which Mr. Martin rendered the industry.

Mr. Martin was born in London, England, but came to this country as a very young man. From 1877 to 1879 he was associated with Thomas A. Edison. In 1883 he became editor of *Electrical World*, and through his writings he exercised a great and beneficial influence on electric railway development. An ardent advocate of electricity as a motive power, he urged its employment in place of horses and cable through the columns of the *Electrical World*, through articles in popular magazines and the daily press, through addresses at technical and popular meetings and through his published books. Mr. Martin possessed a very attractive literary style and was as well a finished speaker, and his services in these early days were of inestimable value in establishing the pre-eminence of electrical power for railway service.

After the McGraw Publishing Company acquired the *Electrical World* in 1899 and until Mr. Martin severed his connection with the paper in 1909, he was also a frequent contributor to the ELECTRIC RAILWAY JOURNAL. Some of his contributions were in the form of editorials, others as signed articles. He resigned as joint editor of the *Electrical World* in 1909 to become executive secretary of the N. E. L. A. For many years he served as special expert of the United States Census office and not only collaborated in the preparation of the census reports of 1902, 1907 and 1912, but wrote extended portions of them.

Mr. Martin's published volumes are numerous. In some cases written in collaboration with another author, they are: "The Electric Motor and Its Applications" (1886), "Inventions, Researches and Writings of Nikola Tesla" (1893), "Edison—His Life and Inventions" (1910) and "The Story of Electricity" (1919). Mr. Martin was engaged on other volumes at the time of his death.

Mr. Martin was a past-president and charter member of the A. I. E. E., a past-president of the Engineers' Club and of the New York Electrical Society and a member of many engineering and other organizations. In 1907 he received the decoration of officer of Public Instruction from the French government. A lover of his fellow men and social by instinct and training, he actively promoted and held office in many movements for public benefit both in America and abroad, particularly during the war.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

How Waste Reduction in Industry Is Being Effected

Definite progress is being made in the nation-wide movement to reduce waste in industry through the elimination of excess varieties, E. W. McCullough, manager of the department of manufacture of the Chamber of Commerce of the United States, told the American Iron, Steel and Heavy Hardware Association at a recent meeting at Rye, N. Y. Work in this direction is being done by manufacturers of the following commodities:

Reinforcing Bars — The war time specification program reducing varieties from twenty-four to eleven has been somewhat disregarded since, and renewed action is being evidenced by several manufacturers to again establish a simplified schedule.

Cold Rolled Steel—Through the American Society of Mechanical Engineers, in co-operation with manufacturers, diameters of cold rolled steel shafting were reduced from sixty to fourteen.

Forged Tools—At the request of the Forged Tool Society, a conference of manufacturers, dealers and others interested was held on Feb. 11, 1924, to establish a reduced schedule for such items as picks, mattocks, mauls, sledges, crowbars, wedges, hoes and blacksmith tools, comprising tongs, hammers, chisels, swages, headers and drifts. This action has made possible a reduction in varieties from 549 to 365 and is to become effective July, 1924, subject to annual review and revision.

Railroad Supplies—In addition to the items included in the forged tool simplification affecting the railroad field, the Association of Manufacturers of Chilled Car Wheels has reduced varieties and sizes of chilled car wheels from 175 to four, thus achieving a 98 per cent elimination.

New Railway Spring Plant

The W. G. Mitchell Spring Works of Johnstown, Pa., which has been engaged in the manufacture of helical springs for nearly twenty-five years, has been reorganized under the name of the Mitchell Spring & Manufacturing Company, Inc., and capitalized at $350,000. Fred A. Meckert, formerly general manager Fort Pitt Spring & Manufacturing Company, Pittsburgh, is president of the new company, which is now engaged in the construction of a modern plant in Johnstown.

In addition to its existing product of helical springs, the new company will begin production after Sept. 1 on a general line of railway springs, including elliptic as well as helical types. In planning its enlarged production program, the Mitchell Spring & Manufacturing Company will pay particular attention to railways. The Continental Railway Supply Company, with headquarters in the Peoples Gas Building, Chicago, will act as sales representatives throughout the central and western territory.

$16,125,302 Net for Westinghouse

Sales Billed in 1923 Exceeded Any Previous Year Except 1919—$63,738,702 of Unfilled Orders

The Westinghouse Electric & Manufacturing Company and proprietary companies report for the year ended March 31, 1924, net income of $16,125,302, after depreciation, inventory adjustments, interest, etc., equivalent to $8.98 a share on the combined 1,795,503 shares of preferred and common stock, as compared with net income of $12,263,485, or $8.19 a share, on the combined 1,496,253 shares of preferred and common stock in the year ended March 31, 1923.

Total current assets, including inventories of $80,000,000, were $153,209,401. after applying proceeds from sale of additional common stock, equal to more than six times total current liabilities. Net working capital was $127,478,988, as compared with $90,286,742 at close of the 1923 fiscal year. Inventories stood at $80,000,000, as compared with $68,971,104 as of March 31, 1923. Both issues share alike after $3.50 a share has been paid on each.

With exception of the year ended March 31, 1919, sales billed in the last fiscal year, totaling $154,412,918, exceeded those of any previous year in the history of the company. Notwithstanding a moderate recession in the volume of new orders booked during the last quarter of the fiscal year, the value of unfilled orders at the close of the fiscal year was $63,738,702, compared with $61,914,237 at the close of the previous fiscal year.

The charge in the profit and loss account for the adjustment of securities of European companies represents a reduction in book value of debentures of the former French and Italian Westinghouse companies to current rate of exchange as of March 31, 1924. Capital stocks of those companies were sold, as announced in previous reports, and the debentures owned by the company are the direct obligation of the present companies. Capital stocks of the Traction & Power Securities Company of London and its allied companies were sold during the year, so that the debentures now carried on the books at $396,535 are the only European investments owned by Westinghouse Electric. Interest thereon is being paid semi-annually, also sinking fund payments annually.

Property and plant account shows an increase over the previous year due chiefly to extensions of the plant at Sharon and to completion of two new plants at Pittsburgh and one at Belleville, N. J.

General Railway Signal Acquires Federal Company

The General Railway Signal Company, Rochester, N. Y., has completed arrangements to acquire the Federal Signal Company, Albany. The two companies manufacture railway signal devices and both have been in the business for nearly a quarter of a century installing block signals, automatic train stops and train control devices. Installations have been made in the United States, Japan, New Zealand and Australia.

Incident to the consolidation, there will be a new issue of bonds to consist of $2,000,000 General Railway Signal Company first mortgage twenty-year 6½ per cent convertible gold bonds, priced at 98½, yielding 6.65 per cent. The offering was by Merrill, Lynch & Company, New York; Schoellkopf, Hutton & Pomeroy, Inc., of Buffalo, Sage, Wolcott & Steele and Hibbard, Palmer & Kitchen, the latter two of Rochester. The bonds will be secured by a first closed mortgage on the real estate, plant and equipment of the company, appraised at $4,193,899.

Long Island Lets Contract

The Long Island Railroad has awarded a contract involving about $700,000 to the Westinghouse Electric & Manufacturing Company for apparatus to furnish additional power required for the extension of electrification eastward to Babylon. It is understood that equipment for new substations will be included in the order, in addition to new apparatus to be installed in the present substations.

$550,000 Value Placed on Barney & Smith Plant

An appraisement of $550,000 on the real estate of the Barney & Smith Car Company, Dayton, Ohio, has been filed in Common Pleas Court at Cincinnati, bringing total appraisement of the property, both personal and real, up to $960,511. Upon basis of this valuation the plant, originally appraised at more than $3,000,000, may be sold at public auction early in June for as low as $640,000, the law requiring that it bring at least two-thirds of the appraised value.

Metal, Coal and Material Prices

Metals—New York	May 20, 1924
Copper, electrolytic, cents per lb.	12.825
Copper wire base, cents per lb.	15.25
Lead, cents per lb.	7.125
Zinc, cents per lb.	6.10
Tin, Straits, cents per lb.	40.50
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.475
Somerset mine run, Boston, net tons	2.25
Pittsburgh mine run, Pittsburgh, net tons.	1.875
Franklin, Ill., screenings, Chicago, net tons	2.175
Central, Ill., screenings, Chicago, net tons.	1.90
Kansas screenings, Kansas City, net tons..	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.50
Weatherproof wire base, N.Y., cents per lb.	17.25
Cement, Chicago net prices, without bags.	$2.20
Linseed oil (5-bbl. lots) N. Y., per gal.	$0.97
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots.	12.25
Turpentine, (bbl. lots), N. Y., per gal.	$0.90

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Westinghouse Celebrates Birthday

The Westinghouse electric industries celebrated their fortieth birthday on May 20. This date was selected because on that day in 1884 George Westinghouse employed his first engineer to conduct electrical experiments for him. This was William Stanley, who invented the alternating-current transformer. Starting as a small plant located in Garrison Alley, Pittsburgh, Pa., in 1884, the Westinghouse company today has more than 50,000 employees and branch plants and offices are located in all parts of the world.

Some of the outstanding accomplishments of the Westinghouse company in its forty years of development follow: Adopted and perfected the alternating-current system of generation, transmission, transformation and application of electricity, brought out the first commercial induction motor, produced the first successful single-reduction street car motor, introduced into America the steam turbine and developed the high-speed turbine-generator for use with it, made the first commercially successful 60-cycle synchronous converter, and electrified the New York, New Haven & Hartford Railroad.

Rolling Stock

Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., has ordered a complete equipment of Economy watt-hour meters with inspection dials. These will be installed on its new 600-volt passenger and freight cars.

The Indianapolis Street Railway, Indianapolis, Ind., has ordered ten new city cars from the Cincinnati Car Company.

Pacific Electric Railway, Los Angeles, Cal., now has ninety buses in operation, the majority of which have been built in its own shops.

Department of Street Railways, Detroit, Mich., received two bids opened May 21 for furnishing ten 3-car articulated trains. The Cincinnati Car Company bid $25,420 and the St. Louis Car Company bid $26,995 each for trains complete according to department specifications f.o.b. Detroit Street Railway siding, Detroit. The contract had not yet been awarded on May 2, but the department recommends that the award be made to the Cincinnati Car Company.

Track and Line

Ohio Valley Electric Railway, Huntington, W. Va., is double-tracking its line between Twenty-ninth and Thirty-second Streets in Ashland. Construction work will be completed in about four weeks.

Wisconsin-Minnesota Light & Power Company, Eau Claire, Wis., proposes to spend $177,031 for extension work, $1,140,870 for plant and line improvements and $259,558 for new operating equipment.

Pacific Electric Railway, Los Angeles, Cal., recently awarded the contract for the construction of the new Pacific Electric tunnel to Twohy Brothers, Portland, Ore. The tunnel, built for the accommodation of the Hollywood, Glendale and San Fernando Valley lines, will cost about $3,500,000.

Kansas City Railways, Kansas City, Mo., plans to carry out this year the heaviest track replacement program that has been undertaken in some years. The reconstruction of 3,880 ft. of double track on Tenth Street has been completed. This work was started on April 14 and was completed on May 4, at a cost of about $72,000. Cars were diverted while the work was in progress. The reconstruction of Troost Street tracks from Thirty-seventh Street to Forty-eighth Street involves the rebuilding of 13,516 ft. of single track at a cost of $124,000. On Grand Avenue from Fifteenth to Twentieth Streets 2,230 ft. of double track will be replaced at a cost of $61,000, and 9,960 ft. of single track in Independence, Mo., 10 miles away, are to be rebuilt at an estimated cost of $91,000. In addition to the replacements, two new extensions will be built, one from Seventy-second Street to Seventy-fifth Street, with a loop in front of the entrance of Fairyland Park. This will be a complete park terminal when completed, with direct admission gates leading from the cars to the park, prepayment area, and an inside loop for car storage. The estimated cost of these improvements is $61,000, of which the park company will pay $25,000 in ten annual installments. The second piece of new construction will be the loop at Muehlebach Park, the grounds of the Kansas City Blues. Here a double-track loop is contemplated, with storage capacity for more than twenty cars, which can be routed out immediately in both north and south directions. It is the company's effort here to furnish a service that will enable people to visit the ball games and get to and from the park much more easily than they do in automobiles. This improvement will cost about $33,000.

Detroit United Railway, Detroit, Mich., through its directors, recently discussed financing to provide for extension of the system about 35 miles.

Power Houses, Shops and Buildings

Lehigh Traction Company, Hazleton, Pa., has started work on the erection of a new automatic substation at a point between Ebervale and West Oakdale.

New York, N. Y.—The Transit Commission has fixed June 2 as the date for the receipt of bids for the furnishing of the structural steel required for the framework of the new inspection shed at the 239th Street storage and inspection yard of the Interborough Rapid Transit Company. The shed will be for the inspection of subway cars. It will be 592 ft. long and 128 ft. wide. It will have eight inspection tracks with the requisite pits and will house eight trains of ten cars at once.

New York, N. Y.—The Transit Commission has opened bids for the furnishing and erecting of structural steel for the electrical repair shop in the Coney Island yard for the Brooklyn-Manhattan Transit System. The enterprise when complete will represent an expenditure of approximately $8,000,000.

Trade Notes

Continental Railway Supply Company, Chicago, Ill., has been organized, with headquarters in the Peoples Gas Building, Chicago, to handle the distribution of a general line of railway truck and car specialties. This will include continuous roller side bearings, Huntoon ball bearing center plates, elliptic and helical coil springs, double reversible sliding contact shoes and N. A. Petrie bus heating equipment. O. E. Quinton, formerly of the Burry Railway Supply Company, is president of the new company.

Pittsburgh Testing Laboratory, Pittsburgh, Pa., announces the occupancy of its new laboratories and office building on Stevenson Street at Locust, Pittsburgh.

Nic Le Grand, Inc., Rock Island, Ill., has recently booked among other business the following orders for the "Sutherland Positive Safety Features": Eighteen equipments for converted cars for the Knoxville Power & Light Company; seven equipments for the Illinois Power Company, Springfield, Ill., a repeat order; four equipments for the new cars for the Wisconsin Valley Electric Company, Wausau, Wis., and five equipments for the Dubuque Electric Company, Dubuque, Iowa, a repeat order.

Fred J. Mershon, for many years export sales manager of the Industrial Works, Bay City, Mich., has now taken entire charge of its Detroit branch office, located in the Book Building.

J. D. Wallace & Company, Chicago, Ill., have moved into their new factory on South California Avenue. The new Wallace plant is a model of modern manufacturing practice.

The National Ticket Company, Cleveland, Ohio, has acquired full rights to manufacture and sell the combination cash fare receipt and hat check recently adopted by the Indianapolis & Cincinnati Traction Company. A description of this ticket is published elsewhere in this issue.

New Advertising Literature

Crouse-Hinds Company, Syracuse, N. Y., has issued folder No. 10 on electric hand lanterns.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has recently issued a sixteen-page publication entitled "Westinghouse Precision Instruments" and devoted to the construction, operation and performance of precision voltmeters, ammeters and wattmeters manufactured by that company. The booklet, which is known as folder No. 4603, gives complete information for the connection, reading and adjustment of Westinghouse precision instruments and for their application as standards for the calibration of other instruments and meters.

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New York, May 31, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 63
Number 22

Traffic Relief Study Needs Railway Man's Counsel

SOME street railway men are taking the position that traffic relief measures inimical to the interest of the railway are less likely to be passed if they keep out of any active part in the considerations of this pressing question. It seems to the JOURNAL that this line of reasoning is very shallow and is indeed a desertion of the obligations to patrons and stockholders.

There are several reasons why railway men should take an active if not a leading part. From the standpoint of the number of people affected, the railway is four times as much concerned in traffic regulations as is any other interest. It is the railway man's responsibility to work for the best possible measures for the car riders, for the car riders are not organized in any way as are the automobile owners, the merchants, etc., each of which groups seeks to get that measure which most favors it. Furthermore, the railway man is better qualified by experience to suggest solutions and to point out the weaknesses of the many scatter-brain ideas that are put forth than almost any other person in the community. He knows the cost of putting the railway underground and of other extravagant proposals and the difficulty of financing such projects.

The facts the railway man can supply to show just how a bad measure would make ten thousand car riders suffer in delay and slow running in order to benefit two or three thousand autoists or fifteen or twenty merchants would seem to be convincing argument for giving preference to that other plan which would speed up the street cars and probably all other traffic too. Who else is there to bring out these facts if the railway man sits back and lets things take their course?

Early Attitude Toward the Bus Now a Handicap

IT IS BECOMING increasingly evident how unfortunate it was that electric railway men by their early attitude permitted the public to get the impression that railway and bus are essentially antagonists. The majority of railway men have now come around to the point of view that the bus is a useful ally, though obviously there are many injustices in its present use that remain to be worked out. But the large majority at first took a decidedly antagonistic view of the bus, inspired largely by the irresponsible and cut-throat jitney competition which in many instances was the forerunner of the bus as it is known today, and the idea of this clash continues in the public mind. Had they at first welcomed the bus as a new tool that could be experimented with, looking toward the possibility of increasing the range of service to the public, the battle of the bus and the railway would never have existed in the public conception of the situation.

Our problem now is to live down this reputation as rapidly as possible and to show the public that bus and railway are natural allies, by and large, not enemies, and that we as transportation men are ready to use anything that will aid in providing the complete transportation service of the community. We ought not to be waiting for demands for bus service. We should be trying out the bus to see if it can be effectively used in some types of service. It would be better to show by demonstration that it is not wanted, or is not practical, than simply to try to tell the public without an actual demonstration that the bus cannot do any better work or supply any improvements to the service. Whether true or not, the people generally think the bus is an improvement over the street car, and there is only one good way to prevent them from giving permits to bus competitors in carrying out this impression. That is for the railway itself to take the lead in the advent of the bus.

With the idea in mind of building the correct impression as of today in regard to the attitude of railway men toward the bus, it may be preferable to have the buses operated by and in the name of the railway rather than to form a bus subsidiary with the relation between the two somewhat obscure in the public mind.

What Kind of Meat Does Cæsar Eat?

ANOTHER Charles A. Coffin prize has been won by a company of which Britton I. Budd is president. Last October the Chicago, North Shore & Milwaukee Railroad won the prize at the electric railway convention. Now, at the electric light convention last week, the Public Service Company of Northern Illinois was presented with the gold medal for distinguished accomplishment in the light and power field. Surely there must be something of outstanding genius in this executive's ability to conduct the affairs of large utilities. What is it? What is this man's formula? What peculiar gift has he that brings him these honors?

No one thing could be pointed out as more nearly answering these questions than that it is his keen sense of what constitutes good service and how to sell it. Good service in itself begets good public relations. And then to know how to sell it is to insure success to the company.

Another attribute which contributes to the success of Mr. Budd's companies is his progressiveness. There is never a time in his official family that there is not some new development on foot, looking toward improvement of service, or enhancement of the company's ability to serve. Just now, for example, the Chicago Rapid Transit Company organization is attracting widespread interest in railway and financial circles by

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its campaign to sell $5,000,000 of 7.8 per cent prior preferred stock to employees and patrons. While the financial record of the elevated lines has not been attractive, this campaign will probably go "over the top." In the background of this effort, however, has been his program, long and difficult, of working out a new financial structure for the elevated lines, including a consolidation of them and a reduction in capitalization of the new company to an amount within the accepted present valuation.

Then again, while Mr. Budd is frequently referred to in the industry journals because of some new original idea that has been put into effect, proved practices developed anywhere for doing the job in any department better or with less expenditure are utilized and actively pushed in the Budd organizations. This, of course, reflects another principal reason for his success—his gift of surrounding himself with able assistants, who have the confidence in him and the ability to see all these things through. And it isn't all easy sailing, by any means. But the will and courage to keep progressing are building results that tell.

The Large City Is a Product of Transportation

THERE will be a population of 8½ millions of people in New York City in 1940, and 12½ millions in 1960, according to recent estimates of the engineers of the New York Telephone Company. It is staggering to think of these increases from the six millions living in the city in 1924. But the estimates of these engineers are noteworthy for their accuracy, and there seems no reason to doubt them.

In the case of New York, as of any other American city, the only thing that permits the congregation of such vast hordes within the confines of a small area is mass transportation of the most intensive type. Subway, elevated, surface car, bus, steam railroad—all are needed to bring the people together to the places where they work and where they live. Manifestly it is impossible, in the American type of city, to house so many people within walking distance of their work, and rapid transit lines must be prepared to carry them considerable distances.

To keep up the growth of the city a corresponding expansion of rapid transit facilities is essential. In many cities the transit facilities are now used to capacity, and further city growth is being stunted on account of this.

Transit can be provided only if it can be made self-sustaining, or else subsidized. With fares held to a point where the companies can barely make both ends meet, no new capital is forthcoming, and facilities cannot be extended. Obstructionist tactics on the part of misguided city governments that put politics and convenient issues above true effort toward relief for the public may help the officeholders temporarily, but in the long run they will only harm the cities they say they are so anxious to serve. Civic bodies and public-spirited men generally should get together and work to provide the transit facilities that are so essential to the growth and prosperity of the cities, and above all to see that the companies which struggle with these great transportation tasks are given a fair chance to work out their problems, for the benefit of the whole community as well as the railway.

After the Safety Parade—What?

A SPIRIT of carefulness, a sense of responsibility and a feeling for others are indissoluble and invaluable qualities, usually innate, but ofttimes acquired. The outside influences which have some bearing on the acquisition of the virtue of prudence are as great in number and diverse in character as are the patients in need of this cure. With these considerations in mind it is to be hoped that some of the irresponsibles were on Fifth Avenue, New York, Saturday, May 17, when a "Safety First" drama was enacted, under Barron Collier as grand marshal, unfolding the story of "taking a chance," "stepping on the gas" and "it's up to the other fellow," with the sickening results before the spectators' very eyes of wrecked property, maimed bodies and crushed spirits.

Such revolting pictures have been depicted for many years by safety organizations in various communities in an effort to bring home to those not naturally endowed with the doctrine of "Watch Your Step" that the high cost of heedlessness and carelessness is sometimes misery for those sinned against and often ruin for the sinners. Such influences as slogans, safety meetings and parades have without question brought more than satisfying results—a fact which is especially evidenced by the accident records of many railways.

However, the loss of life due to accidents continues so appalling that there must still remain in the ranks of the reckless many who view a parade in a detached way, hear the band with insensitive ears and find only humor in the harrowing scenes depicted on the floats. Although this type of offender, who willingly and unwittingly "carries on" in his rash way, is always a cause of solicitude, yet when he consistently and persistently follows a speed program he eventually eliminates himself from consideration. Rather are we concerned with the emotional lawbreaker who at least makes a resolve, weak though it be, to mend his careless practices. Here the outside influence in the form of a parade or a slogan finds a fitting subject to whom to impart the lesson of vigilance and discretion. If that subject, at the next psychological occasion, remembers the lesson of the safety spectacle, then all the time, energy and money expended are well rewarded.

The Old Idea About Salaries Is Passé

THERE used to prevail a fairly definite reason for the great disparity between the salary of the general manager of the electric railway and that of his principal assistants. The thought was general among holding company executives and boards of directors that if there were high salaried assistants, then there was not justification for as high a salary for the company head. So the manager held his subordinates down.

Whether for the same reason or not, this policy continues to be in evidence, though low pay is quite out of harmony with present-day thinking that the utility executive's best prospect of success is to surround himself with the ablest assistants available. The utility business these days is so difficult and involved that it calls for specialists of high calibre, and to retain such men requires better compensation than commonly prevails. What the industry is most in need of nowadays is more outstanding ability and less mediocrity.

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Kaw Valley Line Is Working Out Extensive Freight Facilities

Through the Purchase and Development of the Kansas City Terminal Property of the Orient Railway, the Kansas City, Kaw Valley & Western Railroad Is in a Strategic Position to Handle Freight Through the Kansas City District

Over 600,000 Cu.Yd. of Material Had Been Removed at the Summit of the Divide Between the Missouri and Kaw Valleys at the Time the New Right-of-Way Was Purchased

The cut is 65 ft. deep and extends for a maximum width of 400 ft. because of slides. The snow line at the left and the house at the right mark the limits of the excavation.

SINCE the purchase, in 1922, of the Kansas City terminal properties of the bankrupt Orient Railway by the Kansas City, Kaw Valley & Western Railroad, the latter has been making extensive developments on the new property which will ultimately put it into a strategic position in the Kansas City freight terminal district. A subsidiary organization, known as the Kansas & Missouri Railway and Terminal Company, has been organized to take over and develop the old right-of-way of the Kansas City, Mexico & Orient Railroad, connecting the valleys of the Missouri and Kaw Rivers through Kansas City, Kan. Approximately 250 acres of industrial sites is available along this route.

New Line Badly Needed

An appreciation of the value of the new right-of-way and connecting property is best given by a brief study of the freight terminal situation in the Kansas City district. Practically all the steam railroads entering the two Kansas Citys must interchange freight equipment through the Kansas City terminal. The large volume of freight movement resulting is limited to two heavily congested routes. The first of these is through the Union Station terminal trackage, and the second is through a very narrow right-of-way on the north of Kansas City which is known as the "Gooseneck." As a result of the limited facilities available the terminal trackage is subjected to extreme congestion and it frequently takes from two to five days to get carload shipments through this area.

The plan originally projected by the Orient Railway was to give a water level right-of-way from the Missouri Valley to the Kaw Valley for the purpose of providing an additional route through the Kansas City district. Approximately $1,800,000 was spent by the original owners in the physical improvement of the right-of-way, and the grades across the divide between the two river valleys through Kansas City, Kan., were reduced to a point where very little additional heavy construction work has been required.

Grading Was Almost Completed

The greater part of the $1,800,000 spent by the Orient Railway was consumed in putting through a single cut at the peak of the divide in which over 600,000 cu.yd. of material were removed. At the time the property was purchased by the Kaw Valley line bridges had been installed in the cut-off between the two rivers and the work of grading was approximately 80 per cent finished. Although the original plan to provide a water-level route with one-half of 1 per cent maximum grade has been temporarily abandoned, the grading as now completed includes only a 1½ per cent maximum grade for approximately 1,000 ft. in order to get over the hump in the center of the cut-off. The 2-mile extension at the southern end, which has been in operation for some time, connects the Kaw Valley line with the Rock Island, Kansas City Southern and the Kansas City terminal track.

Since the purchase of this terminal property, the new owners have completed the work of grading and have laid a single-track line with 85-lb. rail over the entire route. In addition, industrial siding trackage has been laid to serve a large portion of the industrial property along the right-of-way. This has made it possible actively to push the work of locatig new industries on the property.

Several large steam road terminal projects adjoin

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and connect with the Kaw Valley property. On the accompanying map is shown the new 1,600-acre terminal development of the Union Pacific Railway, located at 3. Application has been made for a franchise to enable the Kaw Valley line to reach this district. The new right-of-way also extends to 40 acres of land lying adjacent to the Burlington yards in the North Kansas City district, shown at 4 on the accompanying map, and the right is included to build a bridge across the Missouri River to connect to this property when the investment becomes justified.

Important Industrial Connections

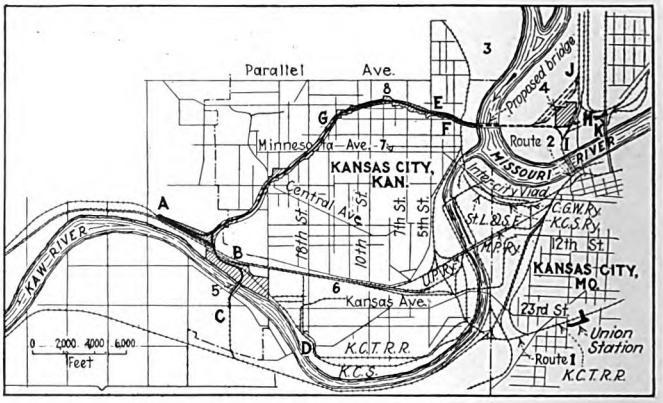
Contemplated plans call for the construction of a bridge at 5, across the Kaw River, to open up a connection with a 180-acre industrial tract now owned. The extension would connect with the Turner Bottoms district, which is a 1,300-acre tract in process of industrial development. This would reach the Santa Fé yards, which are the largest in the Kansas City district, and would also reach a number of important industries located in this district. Among these are the Armour elevators, with a capacity of more than 5,000,000 bushels of grain; the Sinclair Refining Company and the United Zinc & Chemical Company. The refining plant is expected to become the terminus of a new pipe line from the Wyoming oil fields, which will increase the importance of this location as an oil-distributing center.

An industrial district of considerable size, indicated at 6 on the map, is now served by the Kaw Valley line. The industries in this district develop approximately 100 cars of outgoing freight per day. In addition, many cars of raw material are delivered to these industries daily. From 24 hours to 5 days will be saved in moving freight through the Kansas City district by the new service offered.

Electric Operation Advantageous

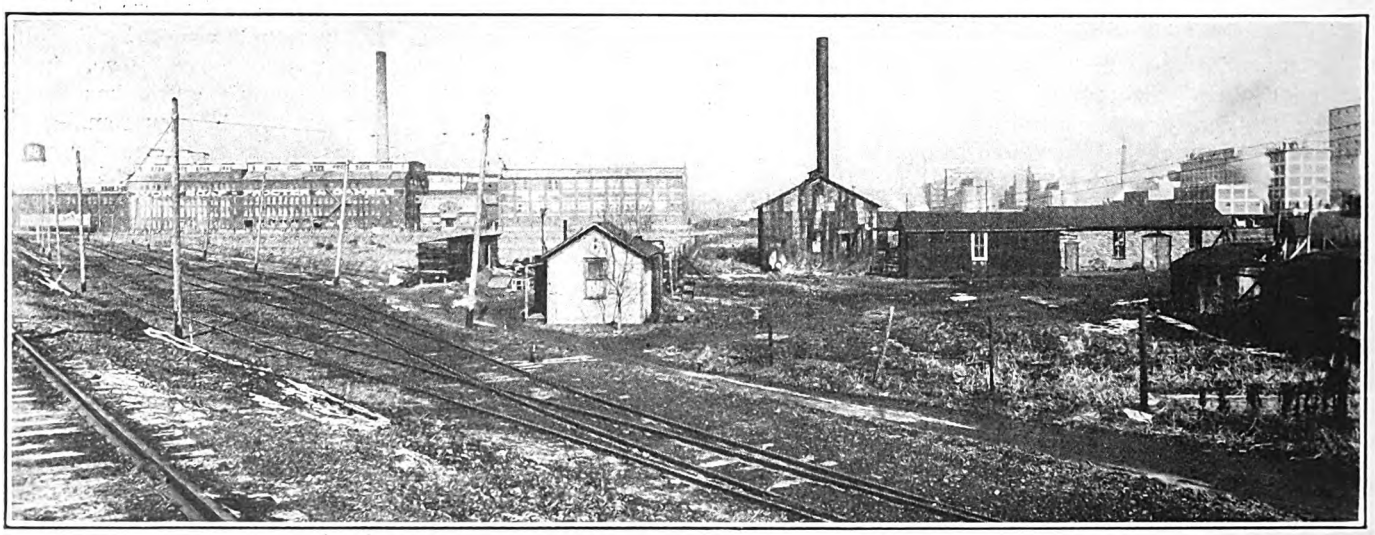
Electric operation of this new terminal line is particularly advantageous because of a number of conditions. In the first place, a residential section has been built up in Kansas City, Kan., to a point where it closely adjoins the right-of-way. This includes some of the best residential property in Kansas City, Kan. Electric operation makes possible the completion of the project and the development of freight business on a large scale with very much less opposition from surrounding property owners than would be the case with steam operation. Electric locomotives are able to work around short radius curves and make it a much simpler physical problem to obtain entry into some of the adjoining industrial sites. In addition, a considerable saving is made in switching cost, as this averages roughly between $16 and $22 per hour for a switch engine and crew in the Kansas City district.

There is an excellent prospect for the development of through freight business to and from the business district of Kansas City, Kan., which has a population of approximately 125,000. Minnesota Avenue is the main business street of this district and it is estimated that approximately 75,000 people trade on this street. Merchandise is now trucked from congested freight terminals in Kansas City, Mo. By the construction of a new freight terminal, which it is planned to locate at 8 on the map, it will be possible to bring in freight over any of the lines coming into Kansas City and to



The New Kaw Valley Freight Terminal Line Connects the Missouri and Kaw Valleys Through Kansas City, Kan.

Map shows strategic location relative to steam roads and industrial districts. Shaded areas represent industrial property owned by the line. **A**—Kansas City, Kaw Valley & Western Railway. **B**—Chicago, Rock Island & Pacific Railway, Union Pacific Railway. **C**—Atchison, Topeka & Santa Fé Railway. **D**—Kansas City Southern Railway, Kansas City Terminal Railway. **E**—Kansas City Northwestern Railway. **F**—Missouri Pacific Railway, Chicago Great Western Railway. **G**—Kansas City, Leavenworth & Western Railway. **H**—Kansas City, Clay County & St. Joseph Railroad, Chicago, Burlington & Quincy Railway, Chicago, Rock Island & Pacific Railway, Wabash Railroad, Union Depot Bridge & Terminal Railroad, Quincy, Omaha & Kansas City Railroad, Chicago, Milwaukee & St. Paul Railroad. **I**—Hannibal Bridge. **J**—Chicago, Burlington & Quincy Railroad. **K**—Armour-Swift-Burlington Railway Bridge.



A View of Some of the Large Industries Tributary to the Kaw Valley Line

A large Armour elevator is shown in the distance and the Procter & Gamble plant at the left. The triangular section in front of the soap plant is one of many attractive industrial sites owned by the Kaw Valley line.

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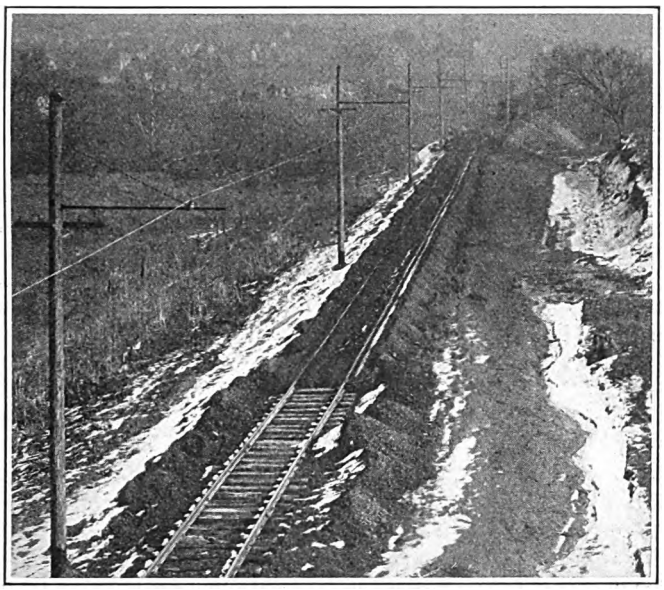


Heavily Ballasted Track and Flexible Overhead Suspension Are Designed Primarily to Handle Heavy Freight

consign it directly to the new terminal without passing through the congested freight section. Freight originating on the Chicago & Alton, Burlington, Wabash, Chicago Great Western, Chicago, Milwaukee & St. Paul, Rock Island, Missouri Pacific and Santa Fé from the north and east can be handled over the new line. From the south and west direct shipments can be routed over the Kansas City Southern, Frisco, M, K. & T., Santa Fé, Rock Island and Union Pacific.

New Industries Being Located on Line

There are 8 miles of line in the newly acquired right-of-way and 4 miles of siding now under construction. An industrial agent with a corps of assistants is actively engaged in locating industries along the right-of-way. The practice in leasing land for industrial sites under the Interstate Commerce Commission rulings has been to use the minimum rate of 6 per cent of the fair valuation of the land as an annual charge. In most cases these leases are being made to material yards and other industries requiring small investment in permanent buildings but moving heavy carload freight. Most of the leases are made on a one-year term, but in some cases longer terms are being written with factories and other permanently located industries. The primary idea has been to encourage the location of new industries as rapidly as possible, making the rental rate low in order to accomplish this result and limiting the profits of the property to those obtained from handling the freight business to and from the new industries.

The strategic position in which the Kaw Valley line now finds itself has materially improved its relations with surrounding steam lines. When this road first went into the freight business, six or eight years ago, considerable trouble was encountered in obtaining recognition for interline agreements from the steam roads. Now, however, such agreements are effected with no difficulty, as the Kaw Valley line is in an exceedingly favorable position to facilitate the movement of freight between all of the incoming steam lines in the Kansas City district.

Interest Charges Slightly Lower than in 1922

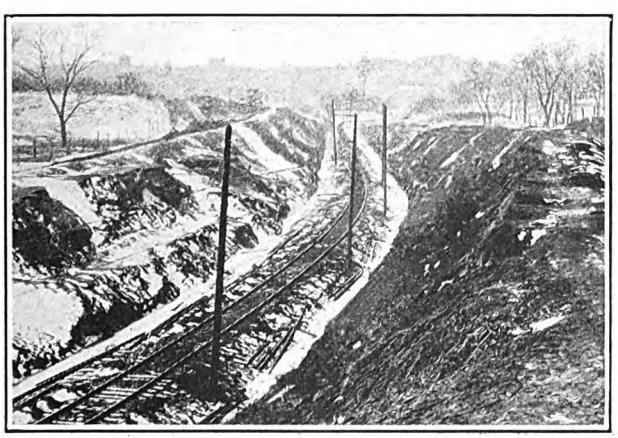
AN ANALYSIS of the interest rates required for public utility financing during 1923 has been made by H. B. Dorau of the Institute for Research in Land Economics and Public Utilities, Madison, Wis. The results are published in "Institute News." The analysis, based on $866,964,300 par value of securities, shows a weighted average rate, based on offering price, to be 6.06 per cent, compared with the figure on a similar basis of 6.16 per cent in 1922. The total public utilities securities issued in 1923 were in excess of $1,000,000,000. It was possible to obtain the necessary facts as to offering price, amount at maturity, however, for only the par value given above, after the common and preferred stocks were excluded.

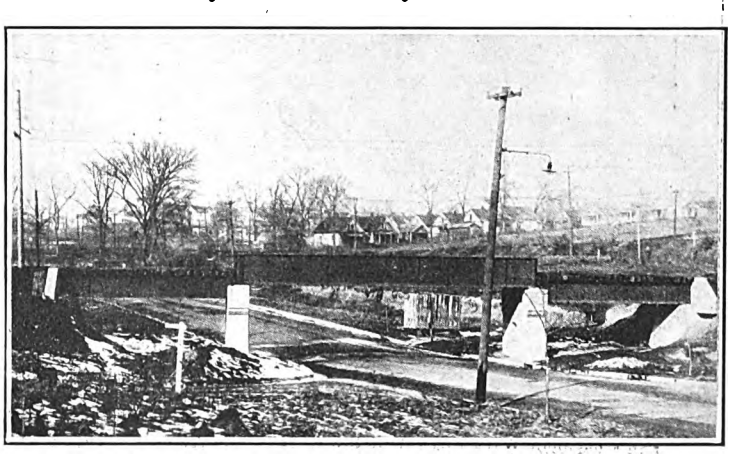
In addition to the four classes of securities mentioned in the table the statistics included equipment certificates issued by the electric railways only. The weighted average rate for these certificates was 5.62 per cent. This low figure had a considerable influence on reducing the weighted average in the table for all the securities issued by electric railways.

WEIGHTED AVERAGE RATE (IN PER CENT) OF UTILITY SECURITIES ISSUED DURING 1923*

	All Securities	Bonds	Notes	Debentures
All utilities	6.06	6.05	6.59	5.95
Light and power†	6.18	6.15	6.54	6.57
Gas and electric	6.20	6.20	....	....
Railway and electric	6.34	6.25	6.62	6.73
Gas utilities†	6.41	6.36	7.57	....
Telephone and telegraph	5.43	5.21	....	5.62
Electric railways†	6.21	6.52	6.42	6.90
Water utilities	5.40	5.40	....	....

* Yield based on offering price to maturity.
† Exclusively.





At Left, the Summit Cut Is About a Mile Long and the Line as Completed Has a 1½ per Cent Grade for About 1,000 Ft. At Right, Bridges Over Streets Avoid Grade Crossings. This View Shows Type of Construction Over Washington Boulevard

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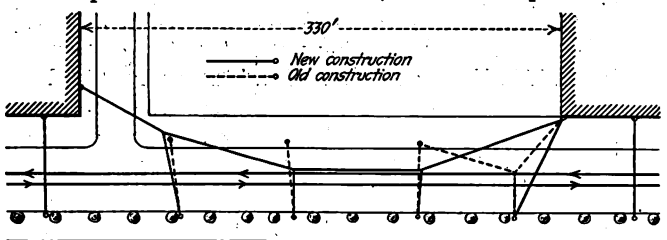
Supporting Trolley Wire Without Poles

Special Studies of Municipal Lines of Munich, Germany, Have Shown that Attachments to Buildings Can Be Used to Replace Poles in Many Cases

THE overhead construction at a number of intersections and special layouts is being supported directly from the abutting buildings on the trolley lines of the Munich, Germany, municipal street railways. This has been made possible by a careful study that has resulted in considerable simplification in the layouts, and has contributed materially to freedom from wire troubles, according to an article in *Verkehrstechnik*.

Just prior to the world war, the free span of the



Special Overhead Construction Permitted Removal of Poles on Orleans Street in Munich

trolley wires was 25 to 27 m., and the cross-section of the grooved contact was 80 sq.mm. on approximately 185 km. single-track length.

The war forced the replacement of practically all the installed copper wires by iron wires, and necessitated that the management reduce as far as possible the use of further bolts, hooks, wires of any kind, insulators, etc. Considerable simplification was found possible with a more efficient use of the most expensive element, the steel tubular poles, of which at least 20 per cent could be eliminated.

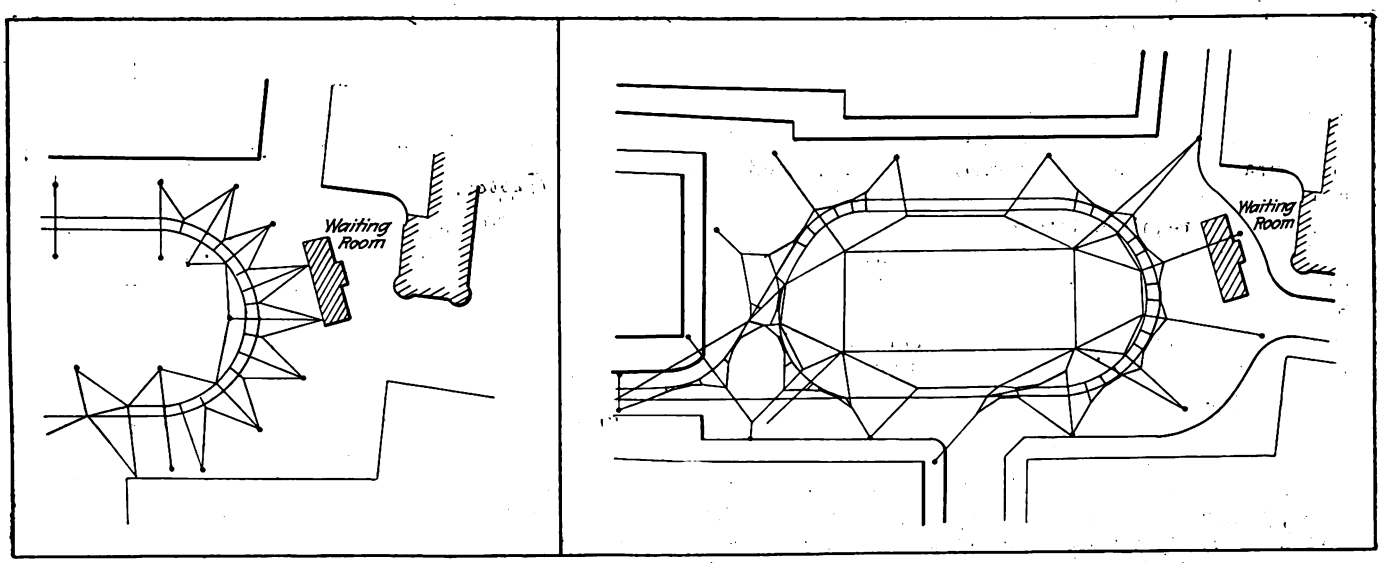
A number of conditions had to be met to obtain this result. First of all the landlords had to be persuaded to permit fastening the trolley wire construction to their houses. As this was for a time impossible of attainment, only partial success was obtained in this respect.

Longer free spans had to be used. At first there was some hesitation on the use of long spans for the suspension wires, but soon it was found that such long suspension wires gave the overhead an elasticity which diminished considerably the hammer blows at the ears. Today free spans of up to 100 meters are nothing unusual. The higher the wires are fastened the less the disturbance. A location of the attachment rosettes on houses as high up as 20 m. and more is not unusual, with a standard trolley wire height of only 6½ m. above the rail. In streets not built up, or where the houses were too low, the gaps had to be bridged. This was done without great difficulties.

Complicated Layouts Were Difficult of Solution

The two points that caused the greatest trouble were complicated layouts in large open squares with loops or special trackwork, and in rebuilding older parts of the system that had been constructed with little heed to modern practice. It was found that the construction of the overhead work involved a theoretical problem of design which, as experience showed, could be solved in all gradations between good and bad. These preliminary calculations required great patience, and detailed investigations of the stresses could not be avoided. A good solution could, however, always be found. On loops and in large squares the poles on the inside could be avoided best by bringing all the guy wires to one point or at the corners of a triangle, a rectangle, or other polygon, and from these points suitable span wires were carried to interlock the construction.

In such complicated cases the solution of the problem was found only by a cut-and-try calculation. It was always desirable to use the smallest possible number of guy wires because of the saving of material. In general, steel wires of 5, 6, 7 and 8 mm. diameter were used, corresponding to pulls of 400, 600, 800 and 1,000 kg. Care had to be taken, of course, to investigate the quality of the wall to which the suspension rosette was to be attached. It had to be decided whether a large or a small rosette was to be used, or whether a wall hook or a stone screw would be better. The steel wires had to be tested, and it was found desirable to take from each reel of wire a test piece before using it. Frequently large differences were found in the same kind of wire.



The Overhead Wire Layout at the Grünwald. At Left, Part of Old Construction Supported Entirely on Poles. At Right, New Construction with All Poles Removed from Center and Minimum Number of Poles on Outside

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Similar experience was had with insulators. The best insulator is the stirrup type, which is made in different sizes corresponding to pulls of 250, 500, 750 and 1,000 kg. All insulators whose metal is not completely surrounded by insulating material were discarded, because such insulators start rusting where there is an open space between metal and insulator, and this rusting will break the insulator. Very good results have been had with an egg-shaped porcelain insulator. It can be used very nicely on all standard carrying wires, and has a permanent insulation with a safety factor of about 5. The porcelain egg withstands a pull of 900 to 1,000 kg.

It was also found possible to make great savings in the number of insulators. Previously a great number of insulators had been used in curves, because the strain wires were carried individually to the anchor poles, causing a great waste of insulators. Better results have been had with three insulators in series between trolley and ground (pole or building). The first insulator is that built into the trolley wire hanger. A second insulator is placed about 75 cm. away from the wire, and the third one is placed immediately before the wall rosette or the pole. Then it is impossible that in case of a break of a suspension wire, any part of the span wire could possibly be under electric tension.

How the Poles Are Eliminated

The change of the overhead line construction in Orleans Street is shown in an accompanying diagram. The old overhead construction is shown in dotted lines, and the new construction in full lines. It can be seen from these how it was possible to improve the aspect of the street. The contact wires are installed at the same height, and the safety has not been impaired. A slightly larger amount of steel wire permitted the elimination of three poles.

The loop in the Grünwald square before and after the change is shown in two other diagrams. With the old arrangement 38 poles were required, while with the new plan 15 poles serve the same purpose. Thus it was possible to save in this one single case 23 structural steel poles and to omit all poles from the inside of the loop. Although in making this change the trolley wire was laid out to conform much more closely to the track curves, a smaller number of insulators was used. All wires are taut and give the whole arrangement a very neat appearance. Within the loop the suspension wires are brought together to four points which are connected together to equalize the pull. The four points themselves are carried by heavy steel wires to the outside of the loop and are fastened to structural steel poles in symmetrical arrangement and proper height.

The work requires intelligent men, great precision and good training. The height of the wall rosettes has to be determined exactly to correspond with required height of the wires, the weight of the supporting construction and the resulting mechanical pull. These points are essentially to obtain a uniform height of the trolley wire.

Cost of Line Work Reduced

Changes in the method of suspension, such as those described, have shown that it is not difficult to simplify and to cheapen overhead line work for street railways as much as 50 per cent. The number of poles may be greatly reduced and savings may be realized on attachments and insulators. These simplifications of the overhead will further mean considerable reduction of operating expenses, especially if care is taken to locate the trolley wire properly with respect to the rails. And last but not least, the esthetic aspect of the city will be greatly enhanced.

Schedules for Patrons

FOR the use of its inspectors, the Portland Railway, Light & Power Company, Portland, Ore., issues, in blueprint form, small schedules of individual lines. These are provided with a margin so that they can be held in a memorandum book, if desired. They show in tabular form the numbers of the different trains and the times

Alberta - Saturday - Outbound #33 - June 23rd 1923.

3rd & Alder		3rd & Alder		3rd & Alder		3rd & Alder		3rd & Alder	
Train	Time	Train	Time	Train	Time	Train	Time	Train	Time
1	6 00	4	8.27	5	12.45	4	4.44½	- 3	7.54
3	12	T.11	32	6	54	†.9	54	4	8.01
4	24	T.2	34	1	1 03	2	57½	5	12
5	36	T.4	38½	2	12	T.10	5.01	6	24
6	43	5	40½	3	21	5	04	1	36
°T.4	50	T.5	45	T.1	30	†.11	08	2	48
T3	52	6	47	4	39	6	11½	4	9.00
°T.5	57	T6	52	5	48	†4	16	5	12
1	700	T.3	54	6	57	T3	19	6	24
°T6	05	T.7	59	1	2.06	†5	24	1	36
2	07	1	9.02	2	15	1	27	2	48
°T7	12	T8	09	3	24	†6	31	4	10.00
3	14	2	12	T.1	33	2	34½	5	12
°T.8	18½	3	20	4	42	†7	39	6	24
T.1	20½	4	30	5	51	3	42	1	36
°T.9	25	5	40	6	3.00	†.8	46	2	48
4	27	6	50	1	09	T1	49½	4	11.00
°T.10	32	1	10.00	2	18	†.9	54	5	12
T.2	34	2	10	3	27	4	57	6	24
°T.11	38½	3	20	T1	34½	†10	6.01	1	36
5	40½	4	30	4	43	T.2	04	2	48
°T.4	45	5	40	T.2	49½	†.11	08	4	12.00
6	47	6	50	5	57	5	12	5	12
°T.5	51½	1	11 00	6	4 04½	6	19	6	24
T.3	53½	2	10	T.3	12	T.3	26	1	36
°T.6	58	3	20	†.4	16	1	33		
1	8.00	4	30	1	19½	2	42	~ OWL. ~	
°T.7	05	5	40	†.5	23	3	51	One-Man Car	
2	07	6	50	2	27	4	7.00	3rd & Alder.	
°T.8	12	1	12.00	†.6	31	5	10	3rd-T.L.	1.00
3	14	2	09	3	34½	6	20	3rd-T.L.	2.00
T.9	18½	3	18	T.7	39½	T.3	29	3rd-T.L.	3.00
T.1	20½	T.1	27	T1	42	1	38	3rd-T.L.	4.00
T.10	25	4	36	†.8	46	2	48	3rd-T.L.	5.00

° = To 30th & Alberta Sts. only.
T = Tripper.
- = To Barn.
GE.

Form of Inspector's Time-Table Given to Patrons When Exact Information on Schedules Is Needed

they should arrive at the terminals, or other points in the case of turn-back cars.

While these small time-tables are not intended for public use, the company has found them useful, at times, to give a person asking for definite information about the schedules of a particular car line or of several car lines. In this case the company does not hesitate to give out an inspector's time-table. One of these time-tables, actual size, is reproduced.

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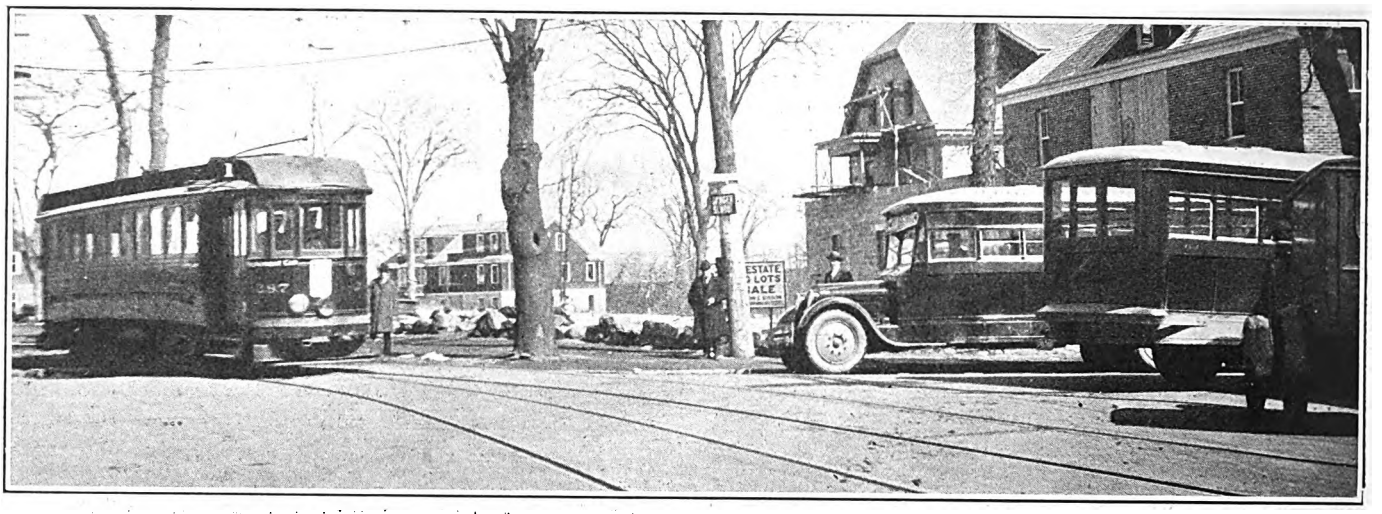

Buses and Cars of the Union Street Railway, New Bedford, Mass., Connect at Lunds Corner

Bus Line Connects Rail Termini

Route Operated by Union Street Railway, New Bedford, Carries Three Distinct Loads on Each Half Trip

ALMOST exactly thirty years after the inauguration of electric car service in the city of New Bedford, Mass., the Union Street Railway commenced bus operation. On Dec. 18, 1923, service was started on a route beginning at the terminus of the North Fairhaven car line proceeding north to a point known as the Parting Ways, and then turning west toward Lunds Corner. At this point the bus line makes connection with another railway line. From Lunds Corner the bus route continues west to Acushnet railroad station. Half-hourly service is provided throughout the day between North Fairhaven and Acushnet. During the morning rush hour, at noontime, and after 5 p.m. all trips continue beyond Acushnet to Shawmut Avenue.

An interesting feature of this route is that the buses carry three distinct loads on each half trip. Leaving North Fairhaven, the first load is composed of people who have come out from the city on the North Fairhaven car line. They take the bus to continue to points beyond the rail terminus. Such riding constitutes the bulk of the traffic between this point and Parting Ways. From the latter place to Lunds Corner the traffic is composed of people inbound to the city who wish to transfer to the trolley at that point. After passing Lunds Corner the character of the riding changes again, people who have come out from New Bedford on the Purchase Street car line using the buses to proceed to points west of Lunds Corner.

The Union Street Railway now has three buses, two Whites and one Mack. Only two are required for operation. The exterior color scheme of the buses is similar to that of the street cars. The interiors are provided with leather upholstered cross-seats, electric lights, ventilators, buzzers, and Hunter signs. The doors are manually operated. The seating capacity is twenty-five passengers. A Rooke automatic register is used for fare collection, but instead of being held by the operator it is placed in a specially designed stand, similar to that described in ELECTRIC RAILWAY JOURNAL for June 23, 1923, page 1048. The fare on the bus is 5 cents as on the street car, and no transfers are interchanged between buses and cars.

Bus operation is in charge of one of the company's most experienced trainmen. Under his instruction a number of other trainmen have learned to run these vehicles. Bus drivers wear the same uniforms as motormen and conductors on the cars.

The Bus Route Begins Where the Rail Route Ends at North Fairhaven

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What Railway Operators Can Do to Improve Traffic Conditions*

Various Suggestions Made for Speeding Up Movement of Cars, Such as More Effective Mechanical Equipment and Faster Interchange of Passengers—Both from Business Interest and for Ability to Help, Railway Men Should Take Part in Traffic Relief Study

By Howard F. Fritch
Assistant General Manager Eastern Massachusetts Street Railway, Boston

GENERALLY speaking, every large city in broad districts, every moderate sized city in and about the center, every town at least on Main Street and even every village at the crossroads has a traffic problem these days. Fundamentally, as I see it, the first and most important problem is to get the most benefit possible for the maximum number of people from the existing streets and, second, to arrange for additional street space if the existing space is inadequate or to plan for it if indications are that present facilities will become inadequate. I do not intend even to touch upon the second phase of the problem, the existence of which has resulted in the consideration and building of subways, elevated lines, double decking of streets, street widening, cutting of new streets and other very expensive projects.

The first phase is one which is of greater interest to those of us who operate in towns and in cities of up to about 250,000 population. In view of the fact that the greater part of our business is carried on in the streets, and that it is absolutely essential to the proper performance of our service that we carry our passengers through the streets with safety and dispatch, we not only should but must give heed to the problem of traffic regulation.

The character of the traffic has almost entirely changed in the last fifteen years. The relative volume of the various kinds of traffic varies considerably in different cities, but some counts taken in a large Eastern city show the following percentages of each type in and out of the business district: Pleasure automobiles were 50 per cent of the total; commercial automobiles, 24 per cent; street cars, 14 per cent; buses and taxicabs, 3 per cent; horse-drawn vehicles, 9 per cent; or in all 77 per cent of the total were motor vehicles. The 14 per cent which was street cars is probably not very different from the number of street car movements in the same streets fifteen years ago, and the cars themselves, while they have been improved, have not changed radically in many of their essential characteristics. This should cause the operator of street cars to consider carefully whether he is doing everything he can to adjust his methods of operation to the changed traffic conditions with which he is surrounded.

There has been a great change in the speed of vehicles relative to the speed of the street car in the last 15 or 20 years. Then, our companion vehicles in the street were the horse-drawn buggy, express wagon, tip cart and dray. Now there are a few of the last three, but many more auto trucks and seemingly countless passenger automobiles. Not only has the number of vehicles increased, but where formerly the speed was less than that of the street car, now for many of the units it is greater. This condition presents new problems with respect to safety and method of operation.

The quickly moving automobile has brought about a very serious accident problem for us. The speed with which it can come out from an intersecting street, turn out from the curb, swing over into the path of a car or stop calls for the utmost of alertness on the part of the car operator, efficient brakes and proper apparatus for warning signals.

Attention to Safety a Necessary Preliminary

Much good can be done by informing motormen of the dangerous street intersections by spotting accidents on a map. New employees and old employees both should be carefully instructed in the proper method of handling their cars in traffic so as not only to avoid hitting other vehicles, but to try in every reasonable way to anticipate the movements of automobiles and keep out of accidents which might be entirely the fault of the other party. The adequate use of the bell and whistle should be insisted upon, and whatever device is used should be suited to present-day conditions, having in mind that the motor vehicle is probably traveling something like three times as fast as the former horse-drawn vehicle.

The present-day traffic conditions require new methods for protecting persons who desire to board our cars and for passengers after they leave the cars. It is our duty to make the movement between the sidewalk and the car as safe and convenient for our passengers as possible. With this purpose in mind we should try to arrange our stopping places on the side of the intersecting street which will be most convenient, where necessary should have cross-walks striped or marked and safety zones marked or set apart by barriers where conditions warrant.

I believe that one of the greatest hazards in traffic today is the automobile driver who is inadequately trained or who is physically or mentally not equipped to handle a motor vehicle. I believe it would be very much to the advantage of all users of the highway if periodical examinations were required of all drivers of vehicles to make certain that they were proper persons to be operating a vehicle.

The street car, compared with other vehicles, is a very efficient user of street space, considered upon the

*Paper presented before New England Street Railway Club, Boston, May 22, 1924.

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basis of space in the street occupied per passenger. On the same basis, the passenger automobile is extremely inefficient, and this fact is one of the large reasons for our present-day traffic congestion. As the two vehicles are ordinarily loaded in the rush hour, the passenger in the automobile takes up something like ten times the street space that the car passenger requires. This is not realized or perhaps even thought of generally by the public, and in fact, common impression is that the street car slows up and interferes with traffic. It is slower moving than the passenger automobile, which has something like 20 hp. per passenger compared with 2 hp. per passenger in the rush-hour street car, and the car stops frequently for interchange of passengers, while the automobile is running express from one end of its run to the other. However, the fact that our cars are moving in such company makes it very desirable, in order to reduce traffic congestion and at the same time to promote our own business, that we speed up our operation in every way possible consistent with safety.

Modern Mechanical Equipment Needed

To this end our cars should be equipped with brakes capable of giving a quick stop. We have had "four-wheel brakes," in fact eight, for several decades. Our cars should be motored and geared to accelerate rapidly with other traffic. The doors and steps should be designed so that passengers may board and alight quickly. Passageways on the platform and in the car should be carefully laid out so as to facilitate passenger interchange. This is an especially important and difficult problem on the one-man car, where ordinarily the interchange is at one door. In some instances the rear door has been used successfully to expedite the interchange of passengers on one-man cars, especially at transfer points. This practice requires the use of remote control of the rear door, and consequently great care on the part of the operator to make sure that passengers are clear of the door before it is closed. However, experience has shown that it is practicable and safe and also aids in getting passengers better distributed through the car. In some cases the use of the rear door has been in conjunction with turnstile control of the flow of passengers.

Fare Collection Can Be Simplified to Save Time

The method of fare collection should be so devised as to minimize the standing time. In this connection pay-as-you-enter on inbound trips and pay-as-you-leave on outbound trips have been found to be very successful, particularly with one-man operation. Through this plan fares are collected as small groups of passengers board on inbound trips and leave the car on outbound trips, and no fares are collected while the heavy interchange is taking place in the center of the city and where delay is usually the most to be avoided. Much standing time can be eliminated by the selection of the proper form of fare so as to eliminate unnecessary delay in making change or selling tickets. Generally the collection of odd penny fares from the majority of passengers is to be avoided and the collection of a ticket or token to be preferred. However, it is desirable that the tickets be sold, if they are to be sold on the cars as is usually the case, in as large a unit quantity as possible so that the sales transaction will not have to take place too often.

Our schedules should be so arranged that crews will relieve one another at times and places where it can be done quickly and so as not to delay other street traffic or our own passengers.

Above all, we should not have a car standing still unnecessarily in traffic with the folding doors open and so hold back the automobile driver who is a respecter of the 10-ft. clearance law. This practice does much to destroy good will and promotes a strong inclination to ignore the law and run by.

Experience in many cities has shown that changes in the routing of cars may be made not only to the advantage of the street car service, but also in such a way that general traffic conditions will be improved. Elimination of left-hand turns through traffic, unnecessary crossing of heavy streams of traffic and the elimination of unnecessary movements of empty cars should be given study.

Up to this point I have been speaking of the things we can do ourselves to expedite the movement of our cars to the general benefit of traffic and to the improvement of our service, independent of any traffic regulations which may be imposed by the local authorities. Most every city has some traffic regulations. It is not only fitting, but desirable, that the street railway men take an active interest in their formulation. We should go about this in a diplomatic and helpful attitude and should try to consider reasonably all the users of the street. Usually the local authorities welcome assistance in these matters if we can demonstrate that we are not entirely interested from self-serving motives. We are experts in street transportation and should be able to help. Traffic regulation is a relatively new subject, still in the developmental stage, and before practices detrimental to our interests become crystallized, it is desirable for us to give the matter our attention.

After traffic regulations are established we should do everything in our power to see that they are enforced. Altogether too often rules are established and traffic signs posted only to be entirely ignored by those who are supposed to be regulated and by those who are supposed to enforce them. Such regulation is, of course, no regulation and only promotes disrespect for all rules and laws. Regulations should mean every word they say and should be enforced accordingly.

My attention was called only the other day to a rule in a certain city requiring vehicles to come to a full stop before making an important street crossing. It is seldom that any one stops, and the officer usually stationed at the crossing does not expect a stop to be made. Of the same character is the common "Street closed, no passing" sign. A good part of the time it does not mean what it says, so it is too often disregarded and encourages disregard of other signs.

The commonest and one of the most important traffic regulations is that regarding parking. Just recently I saw it stated in the press that as long ago as 1880, Schenectady, N. Y., had traffic regulations which imposed a six-hour parking limit. Some of our communities have not advanced far beyond this stage, much to the detriment of traffic in general.

Keep the Street Clear for Moving Vehicles

A street is intended fundamentally as a means of communication and not for storage. There is no more reason why the street should be used for storing vehicles than for any other private purpose. Private property can be used for the storage of vehicles, but cannot ordinarily be used as a substitute for the

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traveled way. Therefore, when the street becomes congested through the presence of parked or stored vehicles, the cure should be obvious. Experience shows, however, that much opposition is likely to develop from the merchants along the street where it is proposed to restrict or eliminate parking. The merchant's attitude is that the parking regulation should apply to every other place of business, but his customers must be allowed to park at the door. It is obvious that such a policy carried to its conclusion would permit unrestricted parking and completely tie up traffic, much to the detriment of all merchants. We recently had a case where it was necessary to stop street cars outside the retail shopping district on the day of a big sale, as a result of a previous experience when unrestricted parking had been permitted during a similar sale and traffic was completely paralyzed.

Street Car Is Most Efficient User of Streets

All statistics I have ever seen show a much larger number of people carried in and out of the business district in the street cars than in automobiles. Such statistics for a given city should be very helpful in persuading merchants of the desirability of reasonable parking regulations for the good of their own business. We are interested, particularly, in having parking so regulated as to allow room for a stream of vehicles alongside our tracks rather than confined to our tracks. In some of our narrow New England streets this is impossible. I know of a case where the street is so narrow that unless the vehicle is stopped very close to the curb, it is impossible for a street car to pass. In one such case a line was painted on the paving parallel with the curb within which vehicles must stand. This was of great help to the street railway in avoiding accidents and speeding up car movements, and all traffic was benefited. An interesting experiment has recently been tried in Philadelphia where on certain streets with heavy street car traffic all other traffic has been barred from the track zone as an aid to speeding up car traffic.

The establishment of one-way streets is often helpful, and when we can so arrange our operation as to conform to this, it is likely to be to our advantage.

The segregation of traffic by types is not often practiced except in the larger cities. This is only possible where parallel streets are available. It is obvious that the movement of the faster vehicles will be speeded up if they can be put on one street and the slower moving commercial vehicles limited to others. If segregation on different streets cannot be practiced it is highly desirable and feasible to insist that the slower moving vehicles keep closest to the curb where there is room for more than one stream of traffic in either direction. The old custom has been, at least in the medium-sized cities, to route all street cars by a given point. As general traffic increases this becomes undesirable, and the splitting up of traffic movements on to a number of streets will do much to relieve congestion at the most critical point.

Traffic Signals Must Be Employed with Judgment

It is only in the last few years that the general use of traffic policemen has been necessary at important street intersections. All sorts of lighting and semaphore control apparatus is being experimented with to supplement or replace the officers, but so far such devices have not come into general use in the cities such as we operate in. However, the proper functioning of the traffic officers and the co-ordination of the acts of a number of them along the length of an important street are of great importance for the satisfactory movement of our cars.

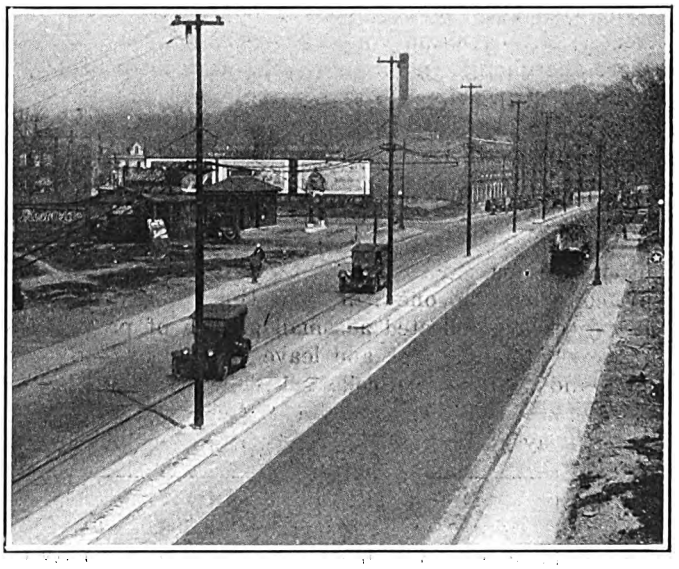
Arbitrary automatic control by signals seems to be inefficient as it must of necessity disregard the conditions at any particular crossing at a given moment. This results in unnecessary waits at crossings which are clear. Control by an individual at the particular point seems so far to be the most satisfactory except in some very special cases. Much thought and study are being given by experts to the matter of proper time intervals of stop and go in order to get the maximum traffic by in each direction in a given time. It seems that short intervals between change are more efficient than long periods. We should see that our car crews pay strict attention to the orders of the traffic squad, and when their method of control does not seem to us to be the best we should suggest corrections to the proper authorities. Again, as I have said before, we have a right to be interested, and our views if carefully thought out are worthy of attention.

In conclusion, we should first make certain that we are doing everything possible to eliminate delays caused by our cars and use our ingenuity to expedite their movements. We should then also enter actively into local activities for regulating traffic, and as experts in street transportation matters our views can be of great benefit to the community and to our industry.

Center Poles for Narrow Street

Cleveland Railway Puts 6-In. Curbing 30 In. Wide in the Middle of a Street to Protect Center Pole Bases from Automobiles

THE Cleveland Railway had recently to solve a novel problem in street planning. Vehicular traffic had increased greatly on Superior Avenue in East Cleveland, a suburb of Cleveland, and it became imperative to widen the roadway. The only way that this could be done was to take the desired width from the sidewalks on each side. This the authorities decided to do, and by taking 4 ft. off each sidewalk 8 ft. was added to the roadway, increasing it from 40 ft. to 48 ft.



A Center Curbing 30 In. Wide and 6 In. High Is Placed Between the Tracks

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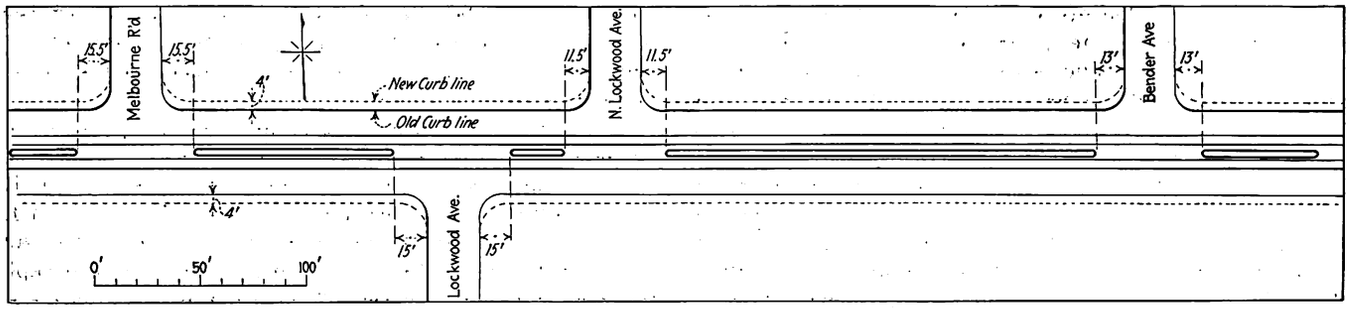
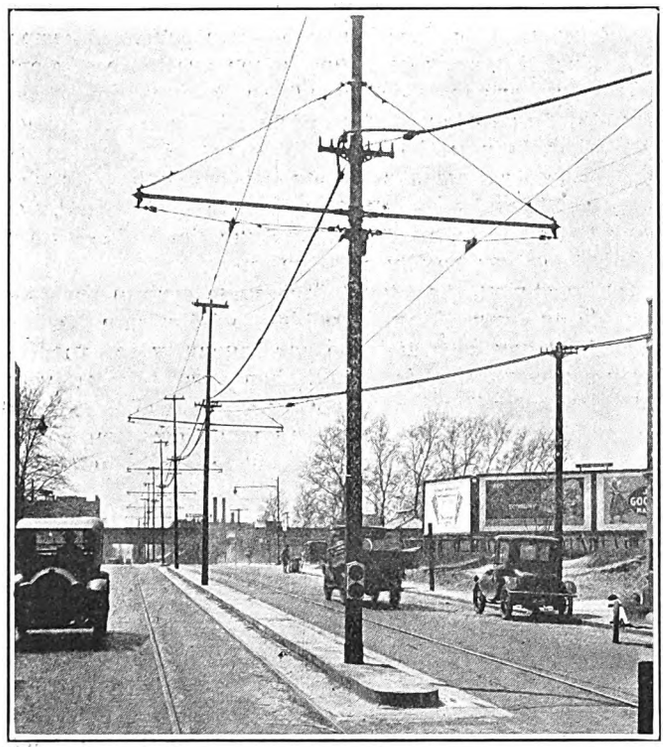


Plan of Portion of Superior Avenue, Showing How the Street Was Widened and Center Curbing Installed



Appearance of Superior Avenue, East Cleveland, After the Roadway Was Widened and Center Poles Installed

The Cleveland Railway has a double track on the street. The overhead contact wires for these tracks, before the change in street width, were suspended by means of span wires from side poles set in the sidewalks. The change in the curb line made necessary a change in overhead construction. The simplest plan, of course, would have been a relocation of the poles 4 ft. nearer the building line on each side, but this appeared objectionable on account of the narrowness of the sidewalk.

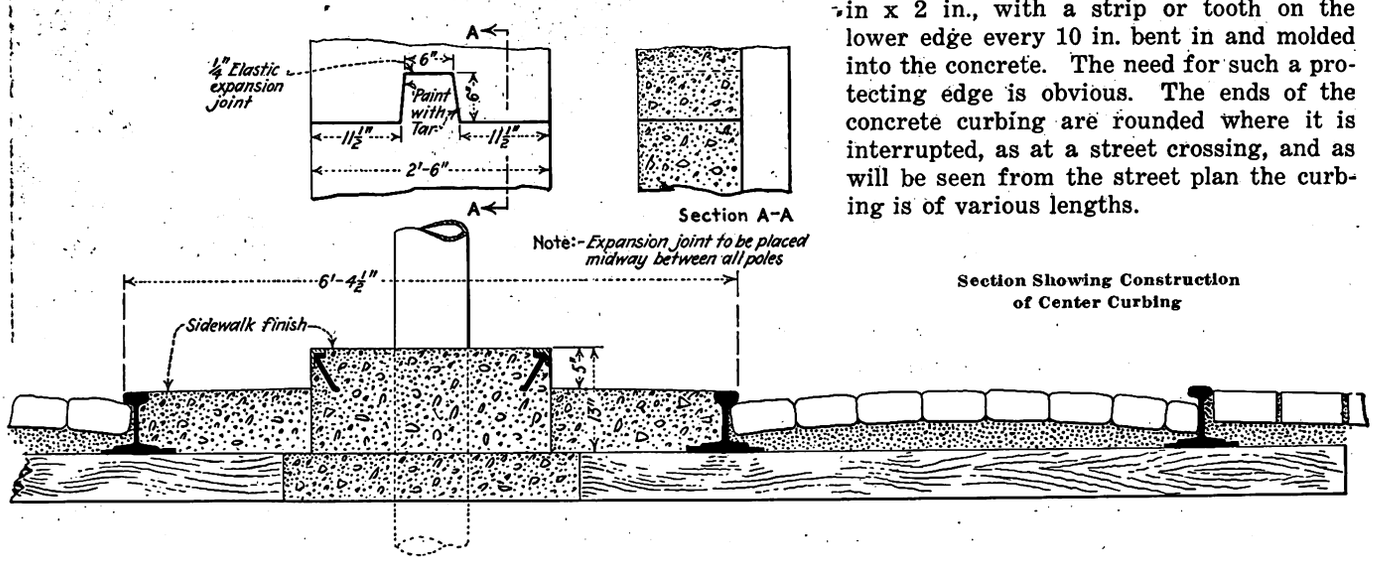
The only other possible plan was a line of center poles. It was figured that with the gain of 8 ft. in street width sufficient space in the center of the street might be taken for such a line of poles, and the spacing of the tracks was sufficient to permit their installation. It was, however, feared that a line of center poles would be dangerous to automobile traffic. Automobiles passing each other might collide directly with these poles, or if this did not occur it was feared that some drivers, believing themselves at a safe distance from the poles, would nevertheless hit them with their mud guards or axle caps. If this was done, the automobile might be swerved from its course and a serious accident occur.

Center Poles with Guard Curbing Adopted

The company finally thought of the expedient of carrying a guard curbing 30 in. wide from pole to pole except at cross streets. With a pole base 8 in. wide and the center curbing or platform 30 in. wide there is no danger of the poles being hit by projecting parts of passing automobiles. At the same time a space 30 in. wide and 6 in. high in the center of the street does not take up any useful space because the space between the wheels of two lines of automobiles going in opposite directions should be at least this distance apart. Six inches was selected as the height of the curbing as being high enough to keep wheels from mounting it, but low enough to be cleared by fenders and mud guards.

Edges Are Protected

This curbing is of concrete with steel protected edges. The protection consists of a steel channel, 2 in x 2 in., with a strip or tooth on the lower edge every 10 in. bent in and molded into the concrete. The need for such a protecting edge is obvious. The ends of the concrete curbing are rounded where it is interrupted, as at a street crossing, and as will be seen from the street plan the curbing is of various lengths.



Section Showing Construction of Center Curbing

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Shop and Storage for Eighth Avenue Road

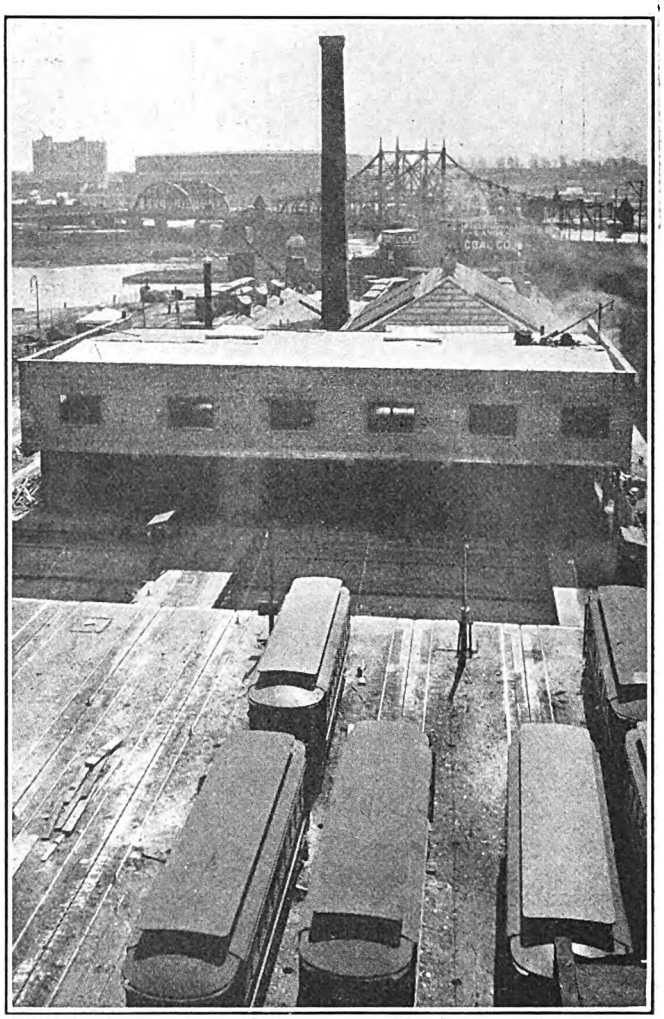
New York City Line Rebuilds Old Foundry for Repair and Inspection Shops—Storage Yard for Cars Is Without Special Trackwork on Account of Expensive Conduit Construction—Transfer Tables Used as Substitute—New Type of Slot Track Construction

MODERN storage and maintenance facilities have been provided at the new shops and yard of the Eighth Avenue Railroad, New York, at 155th Street and Eighth Avenue, on a plot of ground 200 ft. x 625 ft. An old foundry on the property has been remodeled by constructing a new roof, a floor with tracks and pits, and two additions to the building. The adjoining space has been converted into a car and materials storage yard with transfer tables at each end of the shop building for serving the twelve tracks. Four of the tracks pass through the building, where pits are located for inspection and repair work. Three tracks pass to the north of the building and extend practically the full length of the yard. Two inspection pits are located under the two yard lead tracks in front of the shop. The track and layout have been designed with a view toward construction economy, transfer tables being used instead of special trackwork, and a reinforced concrete track construction for the underground conduit system rather than the usual cast-steel yoke construction.

The two old foundry buildings had low walls, one of which was common to both, and high gable roofs covered with slate. Due to the condition of the roofs, the slate was replaced with a plank roof and covered with roofing paper. Openings suitable for admitting cars were cut in each end of the larger building opposite four of the tracks and provided with swinging wooden doors. The portion of the larger building occupied by tracks 1 and 2, which are used for inspection purposes, was given a concrete floor laid with the surface 9 in. below the top of the rail, and with ramps at each end of the building. The pits extend under each track the entire length of the building and are 5 ft. deep. Tracks 3 and 4 are separated from 1 and 2 by a partition and are used for overhaul work. The concrete floor of this portion of the building is laid even with the rail. At the west end of track No. 3 a Columbia car hoist has been provided. Directly opposite on track No. 4 are two armature pits with hydraulic lifts, while at the other end of the building two transverse pits 15 ft. apart connect the service pits under the tracks.

The pit construction is of concrete with the track carried on a shoulder which projects into the pit. This shoulder slopes back into the wall, leaving the base of the pit as wide as the track gage. Lamp recesses spaced every 5 ft. are located in the shoulder under the rail. At the ends of each pit are receptacles for attaching a double-conductor jumper cable for supplying the car with power, while it is over the pit. A receptacle on each side of the car receives the other end of this cable. A similar arrangement is used in the front yard for supplying the cars on storage tracks with power for lighting and operation. In this case one end of the cable is attached to a hand plow which is inserted in the slot of either yard lead track. Each pit has a drain trough which leads into a sump. This pit construction cost approximately $30 per linear foot.

In the smaller building partitions divide the area into three parts, providing for a machine shop, blacksmith shop and carpenter shop. A wood block floor, skylights and ventilators in the long gable roof help to make the place suitable for this class of work.



Rebuilt Foundry and Additions Form New Shop for Eighth Avenue Line, New York

As the old buildings were too small, a two-story building has been added to the front of the smaller building, extending between it and the transfer pit. The second floor of the addition has been extended over the four shop tracks in front of the larger building. The lower floor is used as a truck repair shop, while the entire second floor is occupied by the storeroom. A freight elevator serves this upper floor. Two tracks, without power facilities, enter the truck shop from the transfer pit and are used for wheels and trucks. A wheel lathe and wheel press are mounted along the north wall of the building. A concrete floor with the surface 18 in. below the top of the rail facilitates truck repair work.

Another addition has been made to the rear of the small original building. This is of one-story brick construction with arched truss roof. Two tracks, without

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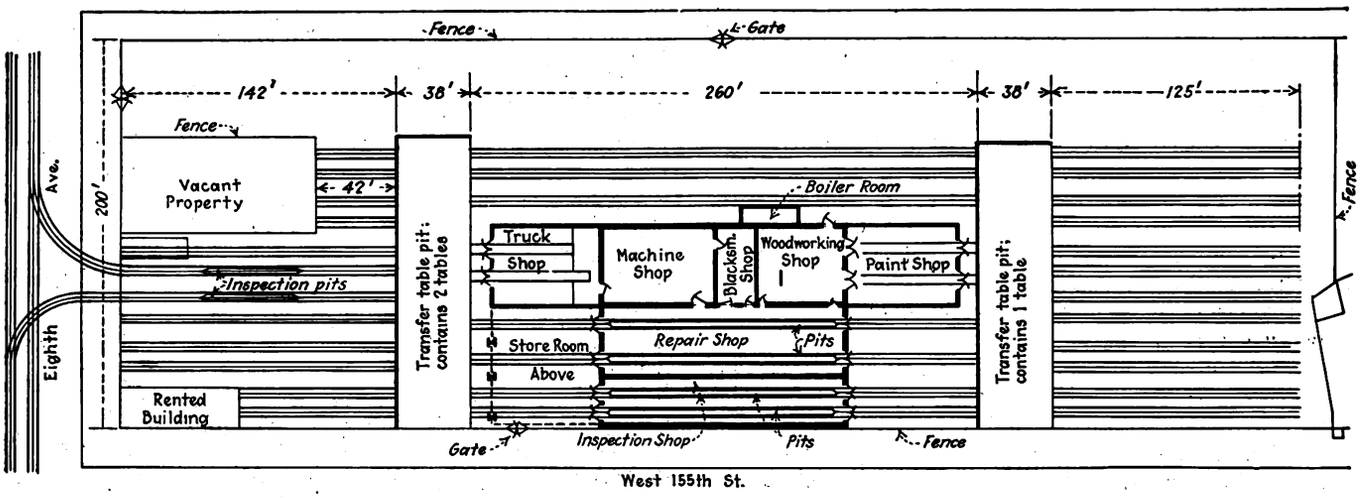
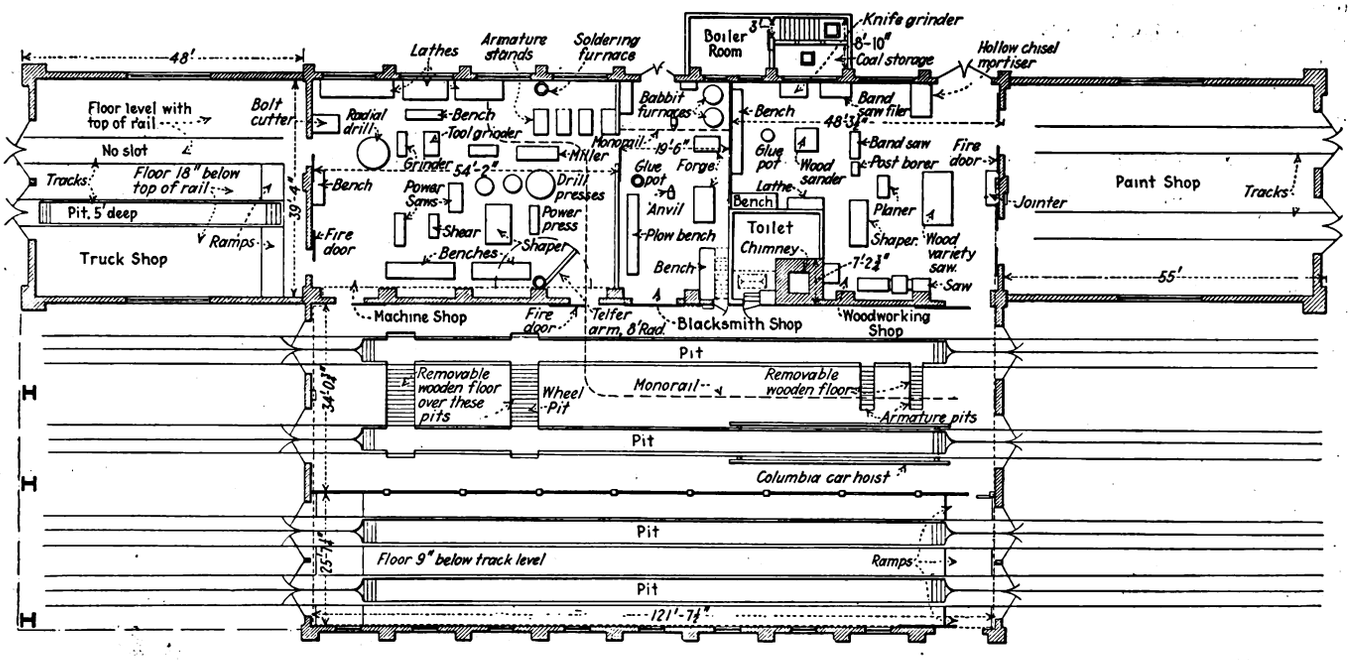
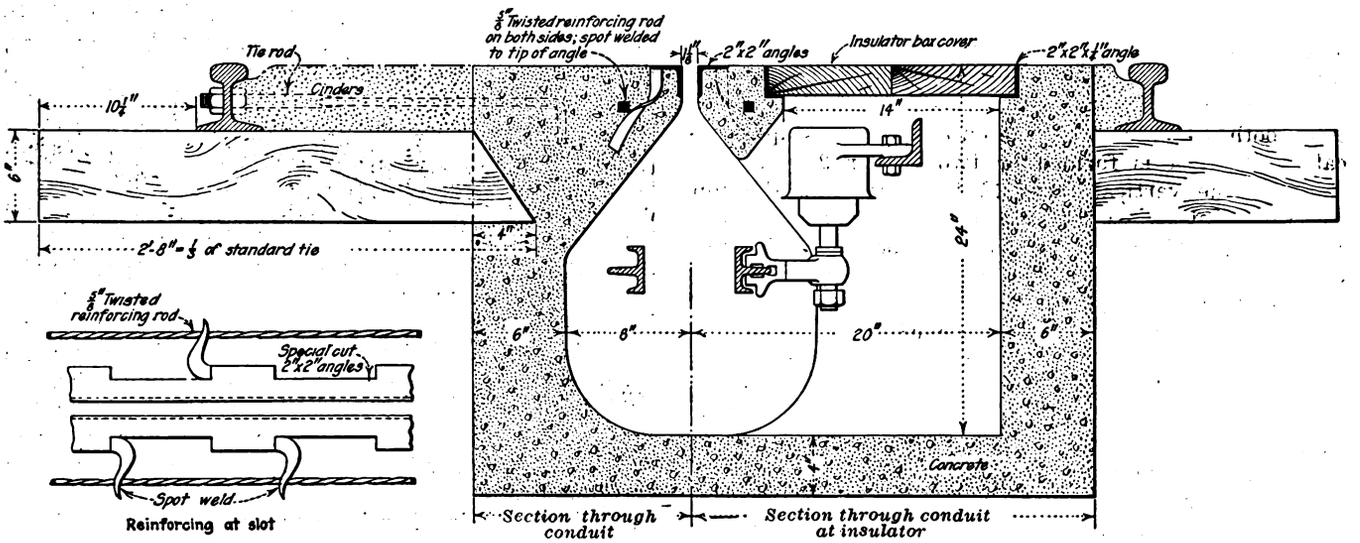


Track Layout at Shop and Storage Yard of Eighth Avenue Line, New York. Use of Two Transfer Tables Eliminates Expensive Special Trackwork



Layout of Machine Tools and Equipment in Eighth Avenue Shop Made with a View Toward Grouping the Machines for a Particular Class of Work



Design of Yard Track Which Is of Reinforced Concrete and Costs Approximately One-fifth That of Standard Road Track for the Conduit System

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conduits, enter this building from the rear transfer pit. This addition is long enough to house one car on each track and is used as the paint shop. A concrete floor with drain has been provided.

The general layout of the buildings, showing the location of machine tools and other equipment, is shown in an accompanying illustration. Where possible the machines were placed to simplify the handling and to expedite repair work. Machine tools were grouped according to the class of work to be done. A monorail with two electric hoists serves those machines to which heavy work is assigned. This monorail extends into the general overhaul section and aids in moving armatures from the cars to the machine tools used in armature work.

Six Baetz patent heaters are used for heating the shops. These contain steam coils over which air is blown by a belt-driven blower. The air is taken in at the top and discharged at the bottom through two discharge ducts. Each heater is located so that the discharge ducts are approximately 7 ft. above the floor. By placing the heater adjacent to a dividing wall and making an opening in the wall for one discharge duct, it is possible to heat two sections of the shop with one heater.

New Type of Track Construction Used

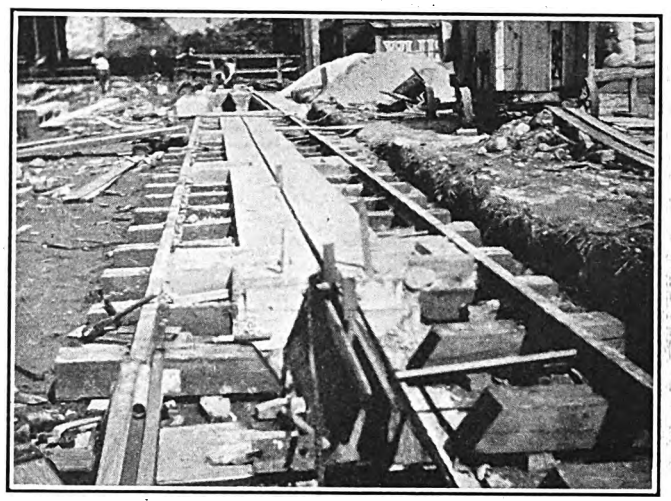
A type of track construction is used throughout the yard which differs from that employed in street construction. The usual construction consists of cast-iron yokes every 5 ft. with a steel guide for each side of the slot. It costs approximately $386,000 per mile. This type of construction was not necessary in the yard, where there is no vehicular traffic. The substitute type, while permanent and sufficiently strong, is unsuited for street construction because it cannot be repaired with satisfactory results, but it is entirely suitable for use on the company's private property.

The yard underground conduit construction is of solid concrete, reinforced at the slot by a special cut angle and a twisted reinforcing rod. The lower part of the conduit is poured in the shape of an open trough with a width of 16 in. and a depth of 8¼ in. The bottom is 4 in. thick and has a slope toward the transfer pits of 1 per cent. This permits draining into the transfer table pits, doing away with the necessity for frequent cleaning of the conduit.

After the open trough concrete has set, a triangular wooden form is mounted above the trough on temporary pins so that the base of the form is at the top of the open trough. Concrete is filled in against this form from both sides, bringing the outer side walls up vertically. The slot is formed by two 2-in. x 2-in. angles set with the vertical faces 1⅛ in. apart and the top faces exposed. Lips 1 ft. apart are cut out of the top face of the angle and are twisted and bent laterally and downward to form an anchorage in the concrete. Near the end of this lip a ⅝ in. reinforcing rod is spot-welded. This construction makes the edge of the slot a reinforced concrete beam of the cantilever type, capable of carrying all loads which may be imposed in the yard.

The short ties and tie rods are placed before the final pour of concrete is made and are held in position by the concrete. The inside ends of the ties are chamfered so that any movement of the tie caused by the weight of the rail and car will not break away the concrete.

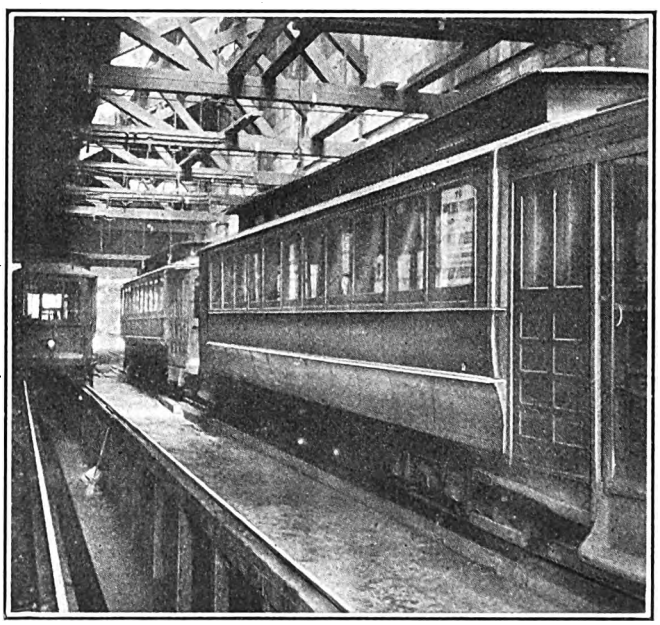
This type of construction costs $13 per foot or approximately $68,640 per mile, if figured on a mileage basis. The entire track laid in this instance, including pits, was only 3,500 ft.



Conduit Track in Yard in Course of Construction. The Triangular Form Is Mounted Above the Open Trough and Holds the Specially Cut Angles at Its Upper Edge. Chamfered Ties Prevent Breaking Away of Concrete

For the transfer tables, two pits 150 ft. long with three rails are provided. These pits have a concrete floor with a longitudinal "hill and valley" construction for drainage purposes. The rails are supported on the ridges and the floor slopes to the trough between the rails, allowing snow to be pushed into the valleys if it should rise above the 9 in. rails. Two tables have been provided in the front pit, while there is one in the rear pit.

In this track layout, all tracks, with the exception of the two leads from the street into the yard, are without power. However, a track may be given power by aligning the transfer table with it and closing two circuit breakers located on the table. The conductor rails on the transfer table are "alive" at all times. When the transfer table is aligned with a track, two shoes at the end of the table connect with the conductor rails of the station track. The shoes may be energized by closing the circuit breakers on the table. These two



The Surface of the Floor in Inspection Shop Is Laid 9 In. Below the Top of the Rail, with Ramps at Each End of the Building

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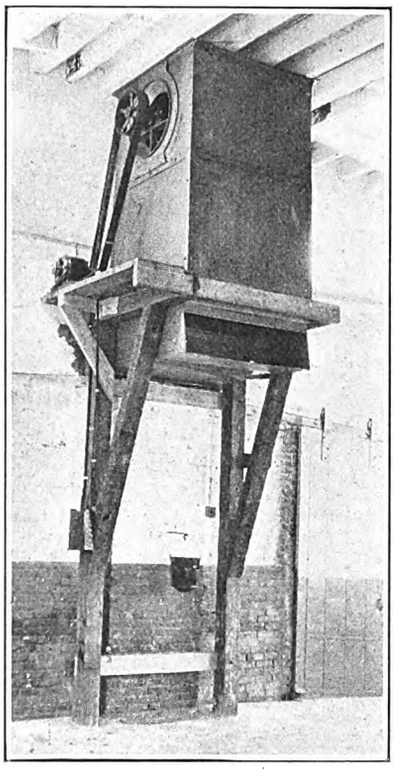
breakers, one for positive and one for negative, are tripped when the table is moved, preventing power being applied to the conductor rails of a track as the table passes by. The practice of having the rail dead at times when not in use is in compliance with the National Bureau of Fire Underwriters' ruling. According to its insurance regulations, cars in storage are not to be connected to the power conductor. As it is impracticable to remove the collecting device from the conductor rail in an underground conduit system, it was necessary to cut off the power from the rail.



Six Heaters of This Type Are Used to Heat the Shops. Air Is Drawn In at the Top and Blown Over Steam Coils and Discharged at the Bottom

A portion of the yard and the blacksmith shop will be used by the way and structures department. Supplies will be stored and the general work connected with that department done at this location.

The entire rebuilding program for the yard and shops represents an expenditure of approximately $120,000, exclusive of property cost.

Improving Voltage with a Booster

The Bangor Railway & Electric Company Installs Semi-Automatic Booster for One Long Suburban Route at Less Cost than for Extension of High, Tension Power Line and Construction of Automatic Substation

BY A. L. DAVIS
Electrical Engineer Bangor Railway & Electric Company, Bangor, Me.

THE booster, which formerly was used quite widely on electric railway lines for improving voltage on long feeders, has fallen into disuse since the development of the automatic substation, operating directly on the high-tension power system. Occasionally, however, a machine of this type can be installed to considerable advantage. A case of this sort is that of the Bangor Railway & Electric Company, which operates a long suburban line with relatively infrequent service and in territory where high-tension transmission lines have not been installed. Using a compound-wound direct-current generator connected in the feeder line has improved voltage conditions so that schedules are maintained better and no difficulty is experienced in plowing the heavy snows.

The company's Hampden division runs from Bangor to the town of Hampden, a distance of 7 miles between terminals. It has numerous grades, the heaviest, of 9 per cent, being about 900 ft. long at a distance of 5.4 miles from the city railway substation. The round trip consumes 1½ hours and normally two cars are used, each weighing 30,000 lb. During rush hours a third car, weighing 48,500 lb., is operated on this line. The numerous grades, and especially the one of 9 per cent, caused considerable difficulty in making schedule time For snow removal in winter it was practically impossible to transmit sufficient power to operate the plows.

The substation from which this line is for the most part fed is located near the city terminus. The voltage carried on the substation bus is 600. From the substation there are four No. 0000 feeders serving the Hampden division. These extend about 5 miles, and taper off to two No. 00 wires at the outer end of the line. The trolley conductor is No. 00 copper, with feed taps every ten poles except on grades, where the number is increased.

No power lines of sufficient capacity paralleled the railroad and the nearest transmission line was some distance away. It would have been necessary, had constant-potential conversion equipment been installed at the proper point on the line, to build a new transmission line to this point. The receipts of the division were not sufficient to warrant the expense of building the line, along with the structure and conversion equipment.

After a thorough analysis of the situation, it was decided that the installation of a booster set was most suitable for our purpose. If this booster had been placed at the most advantageous location on this division, it would have been necessary to purchase land and erect a structure for the protection of the equipment. Furthermore, full-automatic equipment would have been required. As the carhouse is located on the outskirts of the city, approximately 1 mile out on this division, it was decided that although the equipment would not be exactly at the desired point, this would be the most advantageous location, particularly as a spare room was available and some one always on duty.

The booster installed is a General Electric 75-kw. direct-current generator, driven by a three-phase 2,300-volt, squirrel-cage induction motor, operated by energy from the power line feeding the car shop. The use of alternating-current supply was decided upon so as not to subject the motor end to fluctuating voltage, as would have been the case had the trolley supply been used. The generator field is compound wound. A shunt winding excited directly by the full trolley voltage gives a constant boost to the voltage, adjustable by means of the field rheostat from zero to 50 volts. The series winding is designed to add 100 volts to the line at full load, making the total full-load boost with both windings in use 150 volts.

Since there is always some one on duty at the car house, semi-automatic control was installed. The scheme of control of this set, designed by the writer and manufactured by the Cutler-Hammer Manufacturing Company, is shown in the accompanying diagram. All operations of the booster may be controlled from one position, the only apparatus operated being the motor starting compensator, a push button controlling the contactors, and the occasional use of the field rheostat for changing the constant boost voltage.

The set is started and brought up to speed in the usual manner by means of the compensator. When the running position is reached the potential transformer for the no-voltage release coil of the compensator is

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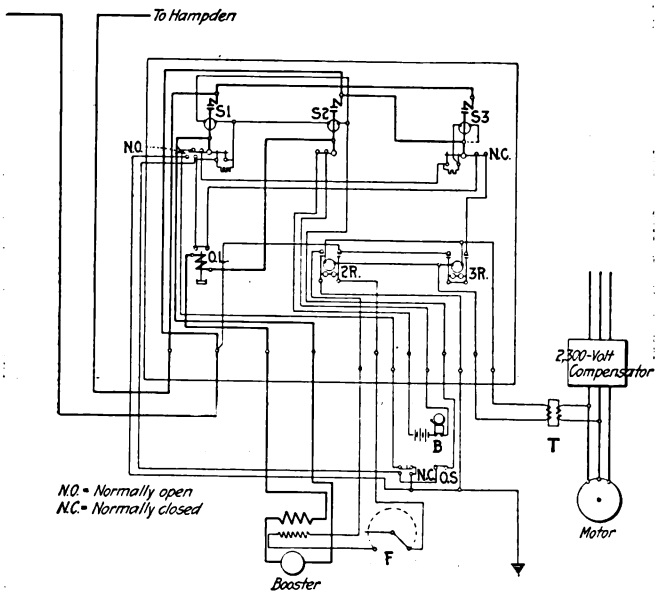
excited and two alternating-current contactors on the control board, 2*R* and 3*R*, close as shown in the diagram. Contactor 2*R* applies the excitation to the shunt field while 3*R* is for the purpose of cutting out the set upon failure of the alternating-current supply. Next, pushing the button *NO* opens the contactor *S*3 on the right of the board which shunts the booster when the set is shut down, and closes the two left-hand contactors, *S*1 and *S*2, cutting the booster into circuit. To shut the set down, all that is necessary is to trip the compensator, which drops out the two main booster contactors, *S*1 and *S*2, and closes the shunting contactor *S*3.

The set is protected from overload by means of an overload trip coil *OL*, which upon operation cuts the booster away from the line and closes the shunting con-



Wiring Diagram of the Semi-Automatic Booster Installation of the Bangor Railway & Electric Company

*S*1, *S*2—Booster armature contactors.
*S*3—Short-circuiting contactor.
OL—Overload trip coil.
2*R*—Shunt field contactor.
3*R*—A-C no voltage contactor.
NC—Push button to stop set.
OS—Overspeed device.
T—Potential transformer.
B—Bell alarm.
F—Shunt field rheostat.
NO—Push button to connect booster in circuit.

tactor *S*3, leaving the set running idle and ringing an alarm bell, *B*. The set can again be placed in service by merely pressing the button *NO*. It is also protected against loss of alternating-current supply voltage, overspeed or reversal, which might be caused by the loss of alternating-current supply. An inspection of the wiring diagram will render apparent the various operations. Contactors *S*1 and *S*2 are mechanically interlocked with *S*3 to prevent simultaneously opening or closing.

It will be noted that in any of the above operations the division is never without current from the main substation, as upon the booster set tripping out from any cause or when the set is not in use the shunting contactor allows current from the main substation to pass directly through the control panel and out upon the line.

By use of the booster method, it was possible to throw the major part of the load back to the main substation with a small amount of supply energy, the capacity of the power line feeding the car shop being ample for this purpose. The total installed cost of this equipment was $4,247.55, and it was completed Oct. 1, 1922. It has been in daily use since that time and has given no trouble.

Fewer Accidents with One-Man Cars

Recent Statistics from Stone & Webster Show Greater Safety with the One-Man Car and Confirm Earlier Experience

IN THE early days of the one-man car its use on a large scale was confined largely to Stone & Webster properties. During this time very important statistics on the greater safety of the Birney safety were made public through addresses and papers by members of the Stone & Webster organization, notably Henry G. Bradlee, W. H. Burke and others. These statistics showed greater safety for the one-man car, not only on the basis of passengers carried but also on that of car-miles run in spite of the less carrying capacity of the car, and were of great help in establishing the one-man car principle in other cities.

Recent statistics from the Stone & Webster organization submitted at a hearing of the Massachusetts

ACCIDENT STATISTICS

	One-Man Car	Two-Man Car
1 Revenue car-miles operated	74,561,600	66,717,300
2 Revenue passengers carried, including transfers	388,299,400	487,758,500
3 Total accidents	27,919	37,258
4 Total accidents per 10,000 car-miles	3.7	5.5
5 Total accidents per 100,000 passengers carried	7.2	7.7
6 Thousands of passengers carried per person injured or killed	75.4	54.1
7 Tens of thousands of passengers carried per passenger accident	7.1	3.4

legislative committee in Boston on one-man cars and based on nearly four years' experience of the Stone & Webster organization confirm the record of greater safety. These data were submitted by J. W. Gale and are based on city operation of twenty-two Stone & Webster companies and cover, with one exception, the period 1920, 1921, 1922 and nine months of 1923. The exception is in the injured and killed information, which is based on 1921 and 1922, 1923 data not having been compiled in this form.

In the accompanying table line 4, obtained from the accident and car-mile-figures given above, shows that the two-man car has 48.6 per cent more accidents on the car-mile basis than the one-man car. The next item, that of total accidents per 100,000 passengers carried shows that the two-man car has 6.9 per cent more accidents than the one-man car on the basis of passengers carried. If figured on the returns for 1921, 1922 and nine months of 1923, the ratio would be even higher, or 8.3 per cent against the two-man car.

The next item gives the thousands of passengers carried for each person injured or killed. The figures show that with the one-man cars 39.3 per cent more passengers are carried for each such accident than with the two-man car.

The next figure relates to passenger accidents, such as boarding, alighting, falling from cars, doors, gates, etc., and all inside car accidents except collisions. This shows that on an average 111 per cent more passengers are carried on the one-man car for every such accident than the two-man car.

Stone & Webster also report that on the roads in question the cost per accident with one-man cars has decreased 25.5 per cent within the last three years, whereas the cost per accident with the two-man car has increased 13.5 per cent in the same period.

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Union Recognition Sought Through Court Action

Hearings Being Held This Week in Detroit on Plea of Detroit Union for a Mandamus to Compel Municipal Railway to Arbitrate Wages and Working Conditions

THE hope of the International local in Detroit for recognition by the Street Railway Commission hinges on the result of the hearings this week before Judge T. A. Richter in the Circuit Court. The case of the men, which has been mentioned in the news columns of this paper, was presented to the court at a hearing on the afternoon of May 20. The petitioners based their claim for a mandamus on a clause in the charter of the street railway department requiring arbitration in labor disputes, but to this the commission has replied that the clause does not declare that the commission should arbitrate with the existing union.

The commission's position, as so far made public, seems to be that it is anxious to have a definite understanding in regard to wages and working conditions with its employees, but that it ought not to be compelled to negotiate with a union that it has never recognized. The management feels it is in charge of a trust; that it has no authority or right to permit non-employees (possibly non-residents of Detroit) to dictate the city policies of Detroit, either directly or indirectly, and that its duties, as directors of a self-supporting city department, are to return to the public in improved facilities or decreased fares whatever it can after paying fair wages to the employees. In other words, the men must not profiteer at the expense of the citizens of Detroit. It also feels that if the men understand the situation, they will be fair in what they want in wages and working conditions and will not press their demand for a 14 per cent increase at the present time.

When the D.S.R. took over the property from the D.U.R. in May, 1922, there was a local of the Amalgamated Association on the road. After taking the property over, the Street Railway Commission voted to continue the same wages and working conditions as existed in May, 1922. This fact is put forth as a claim of recognition by the union, but the commission declares that what the union claims as a resolution was merely a recital before the board of wages and working conditions, that this recital was never incorporated in the minutes of the meeting and that if all the union claimed for it were true, it was for a year only and was never renewed. Last summer an arbitration board granted to the men an increase averaging about 10 per cent.

Co-operative Committee of Men Sought

While these negotiations and court proceedings are being held, the D.S.R. management has been endeavoring to establish an organization within the system with which it can discuss wages, operating conditions and other pertinent subjects. It wants a body to which and through which it can submit to the men statements of earnings of the property and statements on labor conditions, such as the fact that during April of this year the department received more than 2,000 applications for employment. From such a body also the department could obtain much valuable help in revising schedules and otherwise improving the service.

ST. JEAN
LINE

W. J. VORHOFF — Senior High Rate Man
A. F. WILSON — Senior Low Rate Man

Selected merely because they are the senior men of the highest and lowest grades, we have asked the above men to meet with us today.

Through these men and any committees they may appoint, we wish to lay before the whole body of employes suggestions for greater co-operation, as well as plans for handling wage and working conditions on all the lines.

The result of this meeting will be posted in this car house.

No final action will be taken until all employes have been advised.

Board of Street Railway Commissioners

April 24, 1924.

Notice of Appointment of Representatives of Election Board

As a first step in the obtaining of this committee the department organized an election board among the platform men. This was done by appointing the senior high rate man and the senior low rate man in each division, as shown in the bulletin reproduced. It was under the direction of these men that the primary election of May 13 took place.

Prior to the time of the primary election it was announced that any platform man who desired to be a candidate for the committee could get his name on the ticket by speaking to his division superintendent and getting five indorsers. The names and the numbers were posted in the carhouse and the men voted by number. The three highest on each line got their names on

Employes' Representative No. 6642

Election Ballot
FOR
Employes Representative

INSTRUCTIONS:
To vote for the candidate you favor, make an (X) in the square at the left of their number. Candidate's number will appear opposite his name on the bulletin boards. These names are listed according to number of votes received by said candidates in primary election.

VOTE FOR ONLY ONE CANDIDATE

☐ ONE
☐ TWO
☐ THREE

Sample Ballot at Election of May 22

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the ballot for the regular election on May 22. A typical ballot used in the May 22 election is reproduced. Up to the present, the plan for a representative committee has been confined to trainmen.

At the primary on May 13, seventy-eight nominees were named in a vote at which about 32 per cent of the trainmen voted, and the result was accepted by the D.S.R. Among the nominees was Herbert Meeker, president of Division 26 of the street car men's union, and two other members of the union board. The rank and file of the men were asked by the union heads to ignore the election, and since the primary nearly half of the election board and approximately 25 per cent of the candidates named are said to have sent in their resignations to the board as board members and candidates. The reason given for the resignations was that in the opinion of these men the primary election showed that those elected would not be representative of the majority.

Offer of Life Insurance

Coincident with the statement that the department wanted a co-operative committee of its employees, it announced a life, accident and sickness insurance for all employees of six months or more of service. Briefly, the amount of the life policy is $2,000, payable in event of death or permanent total disability of the holder before the age of sixty. The accident and sickness insurance carries a weekly indemnity for $15 for total disability, resulting from accident occurring away from work or from any sickness. No payment is made for the first seven days or for more than twenty-six consecutive weeks. This insurance is without cost to the men from April 26 to May 26, but after May 26 it will apply only to those employees who make written application for its extension and authorize a deduction of $1.25 semi-monthly for it from their pay, and then only if at least 75 per cent of all of the employees who have completed six months or more of service apply for the insurance.

Mayor Backs Commission

The present Mayor of Detroit is F. E. Doremus, who was elected in April, 1923, but he has been prevented by illness from performing the duties of Mayor almost from the time when he was elected. Acting Mayor Joseph A. Martin has upheld the street railway commission in its stand from the beginning and has notified the men that in event of a strike police would be put on every car.

As a future policy, civil service has been suggested by William B. Mayo, general manager of the street railway department, in behalf of the commission, as one way of determining the status of the car men as city employees and possibly eliminating further controversy with the union over wages and working conditions. Other city officials have expressed strong approval of the proposal. It was pointed out that while undoubtedly it would work a hardship on many men on the system who virtually had grown up operating Detroit cars and who because of lack of schooling might be unable to pass civil service examinations and would be forced out of their jobs, it possibly would be beneficial to others, as under civil service hours of labor are restricted, and this regulation might eliminate one of the principal complaints of the men.

Association News & Discussions

Secretary Hoover Warns Against Bureaucracy*

Says No Greater Disaster Could Come to Workers of Electrical Industry than to Place Their Fate in Hands of Political Jobbery

"FEDERAL regulation is not the road to solution of these problems of interstate movement of power. I would regard any federal regulation such as has been found necessary in transportation as a disaster to the development of our power resources. The fact is slowly emerging that the United States will eventually divide itself into several power districts each with its own problems—problems relating to the origin of power, problems of climate, problems relating to the character of industries and uses. No national regulation can supply that intimate knowledge of local problems which this industry requires. I believe that power development and distribution would find its greatest solution in co-ordinated state regulation among groups of states, perhaps with voluntary assistance from the federal government in securing this co-ordination. We need interconnection between state utility commissions where conflicting questions arise. . . .

"We have some persons who insist that the federal government should now undertake wide superpower development. Not being a socialist, I am not for it. Much of this discussion comes from lack of understanding of the practical aspect of the industry. We find many people enthralled with the notions of 'superpower' or 'giant power' who conceive it a superimposed financial and industrial structure over all existing systems. At once they envisage a gigantic and grinding trust in the background. As a matter of fact no superstructure of this sort is possible. Superpower means interconnection of systems and larger central stations, coal or water, scattered over the whole Union. It is in daily progress before our very eyes.

"Interconnection does not imply capital consolidation or the building up of great trusts. It implies the sale and resale of power from one utility distribution system to another, and it implies co-operative action between utilities in the erection of central stations. It must embrace municipal plants as well as corporation plants. It implies no gigantic exploitation, for that is impossible under state regulation of rates and profits.

Effect of Bureaucracy on Initiative

"But there are objections of more fundamental importance than this. As one who believes that the progress of our nation can come only by preserving on one hand the vital initiative and enterprise of our people and on the other an equality of opportunity to all, I necessarily do not favor the strangulation of both by the hand of bureaucracy and politics. No bureaucracy with a board of directors of 580 Congressmen and Senators would have made the electrical discoveries of the last fifty years or pioneered their ap-

*Extracts from the outstanding address of the Secretary of Commerce made over the telephone from Washington to the Atlantic City Convention of the National Electric Light Association on May 21, 1924, on the subject, "Superpower and Interconnection."

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plication. Our political system has not yet developed, and will not for generations to come, to a point where it will have either the capacity to choose skill or the assured probity to operate these implements. Our institutions will break down if we impose such burdens.

"We have seen nothing in our history to warrant us in the risk of stopping all progress by the deadening hand of the government. I know of no greater disaster that could come to the workers in this industry than to place their fate in the hands of political jobbery or stifle their individual opportunities through the leveling of bureaucracy which all this would bring about. At the same time the regulation of natural monopolies by the government is a vital part of the preservation of this fundamental equality of opportunity to our citizens, for if the use of this great weapon of power were to fall unrestrained into the hands of dominant groups, then equality of opportuniy would also disappear. If we have not the capacity to regulate these great tools in public interest, we much less possess the capacity to operate them on behalf of the federal government."

High Points from N.E.L.A. Convention of Interest to Railway Men

THE National Electric Light Association held its 47th annual convention at Atlantic City on May 19 to 23, with a record attendance and with the general comment of delegates that it was distinctly the greatest convention of the association. The gist of the entire proceedings is published in the issue of ELECTRICAL WORLD for May 24. A few high points of particular interest to railway men are briefly noted here.

Charles A. Coffin, for many years head of the General Electric Company, in a talk before the association, strongly recommended that the principles and practice of direct employee-employer counsel-table methods be wholeheartedly engaged in as the best basis for maintaining satisfactory industrial relations.

Secretary Hoover's address, made by telephone from Washington, was clearly the outstanding contribution to the meeting. A portion of this, which deals with the subject of private versus governmental ownership, is presented in this issue under a separate heading.

The public policy committee of the association, among several other questions, discussed the agitation in some states for the abolition of public service commissions as a result of appeals to the courts by public utility companies against the rulings of the commission. The committee made this comment: "While we should certainly not recede from our right of appeal, still, wherever possible, it would seem good public as well as business policy to do everything within our power to settle our differences with the commissions and to appeal to the courts only as an extreme resort."

James T. Williams of the Boston *Transcript* made an address in which he said that the press and public utilities are engaged in a common endeavor of serving the public. Aside from advertising, however, public utilities have another relation with the press. They are themselves the sources of news of interest to the public—information having a real news value. Making this information available ought to be regarded as a normal function to be exercised with the same intelligence and with the same will to be fair to all concerned as in the case of advertising, but not by the same agents that place advertising. The two functions are different; their purposes are different; they call for skill of a different sort. To attempt to combine them is to put the press on its guard and to confuse the public. They ought to be as separate as in the conduct of the news, editorial and advertising departments of a well ordered newspaper.

H. G. Taylor, president National Association of Railway and Utilities Commissioners, in an address in which he found much praise for the enterprise and business conduct of the electric utilities, had this to say about the campaign for customer ownership of securities: "To my mind, the fine benefit from customer ownership will not come from the opening up of a hitherto untouched mine of capital, nor is the plan likely to be an alibi for ignorant and incompetent operation, nor will it make arrogance in management any more popular than it has been in the past. Customer ownership, if sincerely and honestly fostered, will revolutionize the industry through the introduction of higher moral values in the relations between the utility and its customers. If conducted on sound principles, it will have all the mutual advantages that flow from a satisfactory and successful partnership in an essential enterprise.

"But woe be to the utility that ever violates the obligations which it thus assumes! All of the results from the time and money expended in cultivating satisfactory public relations can be sacrificed over night through the failure of one or two large electric corporations by unwise and extravagant financing."

The rate research committee noted that during the year three important decisions were rendered on valuation, namely, the Southwestern Bell Telephone case, the Blue Field Water Works & Improvement case, and the Georgia Railway & Power case. In the opinion of the committee, these decisions boil down into the fact that the reproduction value of a public utility property, or at least what it would cost to replace it with property to give equal service as of the date of the proceedings, must be considered in fixing the value of property as a preliminary to the fixing of just and reasonable rates. That is all that needs to be decided. The committee urged that in rate cases particularly the word "depreciation" should be used with a great deal of hesitation, and in its place the phrase "renewals and replacements" should be substituted.

Speaking of the trend of court decisions and legislation, Carl D. Jackson, special counsel for the N.E.L.A., said that the outstanding fact is that courts and commissions continue in their decisions to repeat and reaffirm the principles of common law established centuries ago and of American law developed in the early days of this republic. Recent decisions have, in line with these long-established principles, continued to hold their value, and that thought is the true basis of determining a rate basis upon which earnings should in justice and in the interest of the continued stability of the utility industry be based. To do otherwise, they have held, would be in contravention of the Fifth and Fourteenth Amendments to the Constitution. "Going value" as a distinct element is still generally supported, being recognized by practically all the federal courts and by 22 state commissions. Only two commissions have either criticised it or failed to give it consideration in fixing values.

In the report of the insurance committee, it was brought out that turbine insurance, electrical breakdown insurance and engine breakdown insurance were considered during the year, and that a decision was reached that the lightning and electrical apparatus clause of the fire insurance policies was most valuable in this connection, and that it was very doubtful that there would be damages from electrical breakdowns which would require special protection other than the protection provided by this clause. The report also stated that most of the companies are self-insurers for both workmen's compensation and public liability, and results show this to be good practice and that there is no demand for reduction in rates charged.

Among the officers elected at this convention are the following railway men:

Franklin T. Griffith, president Portland Railway, Light & Power Co., Portland, Ore., was elected president. P. S. Arkwright, president Georgia Railway & Power Co., Atlanta, was elected fourth vice-president. H. C. Abell, Electric Bond & Share Co.; Gerard Swope, General Electric Co.; E. M. Herr, Westinghouse Electric & Mfg. Co., and Harry Reid, Interstate Public Service Co., are members of the executive committee.

The committee on co-operation with educational institutions reported that it now has in production an authoritative text book on public utility problems. which is the joint effort of an eminent professor of economics and one of the leading executives in the central station industry. The book will be available within a year. The committee recommended the establishment of a graduate department for the study of public utility problems at the School of Business Administration of Harvard University. The plan has received the indorsement of the public relations section of the association and the executive committee, and waits now upon the raising of a fund of $30,000 a year for three years for the maintenance of the course, which will be under Prof. Theodore Howard Dillon.

The basis on which this course will be carried on was outlined by Assistant

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Dean Donald K. David, who explained that it would be conducted entirely as a graduate school. No claim is made to develop executives, but with the two years of instruction which will be given, the opinion was expressed that men will be provided who can start at the bottom of the industry with basic principles and sufficient orientation, so that they will be better prepared to develop into executives than if they had not attended the courses. The case method of instruction, which has been employed in law schools, will be used to develop straight thinking in arriving at decisions. The social, legal and economic aspects of business administration will be considered chiefly during the first year, and management, rates, service and customer relations during the second year. In preparing the case book, it is expected to spend $175,000.

CUSTOMERS FURNISHED 33 PER CENT OF CAPITAL LAST YEAR

M. R. Bump, chairman of the customer ownership committee, reported that out of a total of $750,000,000 which has been raised for financing the construction programs of the central station industry, approximately $250,000,000, or 33 per cent, has been raised this past year through the sale of securities to customers. The committee presented an elaborate detailed report of the customer ownership activities of 185 central station companies. The cost of selling securities to customers still engages the attention of the industry, but the results in the last two years have shown that it is possible gradually to reduce the cost of selling to levels that are entirely conservative and satisfactory.

C.E.R.A. Committees Announced

THE committee appointments of the Central Electric Railway Association for the year 1924 are announced with the issue of the Association's "Brown Book." The personnel of the committees is as follows:

Auditing: Tudor W. Jones, chairman, auditor Union Traction Company of Indiana, Anderson, Ind.; Ira E. Guthrie and L. T. Hixson.

Constitution and By-Laws: Charles L. Henry, chairman, president Indianapolis & Cincinnati Traction Company, Indianapolis; C. N. Wilcoxon, F. D. Carpenter, W. S. Rodger and Samuel Riddle.

Finance: R. I. Todd, chairman, president Indianapolis Street Railway, Indianapolis, Ind.; S. W. Greenland and H. A. Nicholl.

Hotel and Arrangements: S. D. Hutchins, chairman, Westinghouse Traction Brake Company, Columbus, Ohio; Harry L. Brown, John Benham, James H. Drew, J. A. Donahey, C. Dorticos and L. P. Morris.

Safety: Charles B. Scott, chairman, manager Bureau of Safety, Interstate Public Service Company, 72 West Adams Street, Chicago; Neil Funk, J. H. Alexander, L. C. Bewsey, G. S. Wills, J. B. Stewart, E. M. Walker and James Harmon.

Program: M. Ackerman, chairman, general manager Cincinnati & Dayton Traction Company, Dayton, Ohio; I. W. Hansen, J. C. Schade, W. S. Rodger and C. T. Dehore.

Policy Committee: C. L. Henry, chairman, president Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.; A. W. Brady, James P. Barnes, E. J. Burdick, J. W. Collins, F. W. Coen and A. C. Blinn.

Publicity: E. F. Wickwire, chairman, Ohio Brass Company, Mansfield, Ohio; Harry L. Brown, H. J. Kenfield, J. A. Greenland, H. A. Nicholl, Robert G. Tucker and H. R. Biery.

Resolutions: Joseph A. McGowan, chairman, secretary Indianapolis Street Railway, Indianapolis; R. A. Crume, J. F. Starkey, Walter Shroyer and Gus Muhlhausen.

Rules Covering Interchange of Equipment: G. K. Jeffries, chairman, general superintendent Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis; C. S. Keiver, L. M. Brown, E. B. Gunn, P. L. Radcliffe and C. C. Fast.

Transportation: L. M. Brown, chairman, superintendent Interstate Public Service Company, Indianapolis; G. K. Jeffries, J. A. Greenland, C. S. Keever, F. W. Brown, R. N. Graham and H. R. Biery.

Supply Men: Myles B. Lambert, chairman, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.; W. D. Hamer, H. H. Buckman, E. H. Farr, C. L. Van Auken, G. A. Wright, E. S. Gunn, W. McK. White, C. W. Ketteman, L. E. Gould and A. C. Olberding.

Uniform Charges for Repairs to Interchanged Equipment: A. Schlesinger, chairman, superintendent of distribution Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis; T. H. Nicholl, E. B. Gunn, J. W. Osborn, H. Savage, P. V. C. See and G. H. Kelsay.

Membership: S. W. Greenland, chairman, general manager Indiana Service Corporation, Fort Wayne, Ind.; F. D. Carpenter, C. J. Laney, Myles B. Lambert and J. F. Collins.

Annual Transportation: L. M. Brown, chairman, superintendent Interstate Public Service Company, Indianapolis; G. K. Jeffries, J. A. Greenland, C. S. Keever, F. W. Brown, R. N. Graham and H. R. Biery.

Track Removal Will Not Relieve Congestion*

Engineers at A.S.C.E. Meeting Discuss Traffic Relief Measures—The Usual Proposal to Remove Car Tracks Was Answered by Several Who Had More than a Superficial Idea of the Subject

CONVINCING arguments to show that the removal of railway tracks from congested streets is not the way to solve the traffic problem were made by a number of prominent engineers at a recent meeting of the City Planning Division of the American Society of Civil Engineers.

In a paper presented by Arthur S. Tuttle, chief engineer Board of Estimate and Apportionment, New York City, it was stated that the economic advantages of the surface car over the bus and taxicab, in capacity used, have been to a considerable extent lost in the crowded sections of the city by reason of the slowing down of speed. Harvey W. Corbett, architect, New York City, advocated the separation of rail, wheel and foot traffic, with the rail traffic being placed underground. Other engineers who had studied traffic problems in St. Louis, Mo., Pittsburgh, Pa., and Providence, R. I., differed with these ideas and argued strongly to show that the surface car lines must be retained as the most efficient users of the street.

Assuming that a city might find itself fortunate enough to accomplish and finance such a separation of street traffic, Harland Bartholomew, engineer City Plan Commission, St. Louis, Mo., asked what problem would have been solved. More traffic would be accommodated, but it would be just a question of time before one, if not all, of the several street levels would be congested What could then be done? More levels to accommodate more traffic? What would be the end? A different solution of the problem must be found. No city has sufficient streets in its business district to accommodate all its traffic. The volume of use is increasing, making the percentage of traffic that can be accommodated in the streets of business districts continually less. Even though a saturation point of motor car ownership might be assumed, it would be financially impossible to provide for unlimited accommodations of all kinds of traffic.

The first step toward a solution of this problem is the reduction or elimination of unnecessary traffic movements. Studies recently made in several cities, Mr. Bartholomew said, had shown that from 20 per cent to 40 per cent of the vehicular movement was commercial in character. The remainder consisted of individual pleasure cars, a small proportion of which conceivably might be engaged in strictly commercial use. Certainly a large percentage of present street traffic bears little relation to the business development of the community. Such traffic should either be eliminated entirely from the congested areas or at least confined to a limited number of streets.

The second step toward a solution of this problem is to correct existing street widths and arrange them so as to permit the greatest possible freedom and circulation of traffic movement without inviting prohibitive expense. The third and last step will be the decentralization of congested areas either by enlarging the areas of the central nuclei or the establishment of outlying sub-centers or both.

George S. Davidson, member of a committee to study the problem of street congestion in Pittsburgh, Pa.,

*Abstract of a paper and discussions published in the proceedings of the American Society of Civil Engineers for May, 1924.

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said that it would appear at present that Pittsburgh cannot afford to have rapid transit subways. The best it can do would be to build subway loops for trolley cars in the congested part of the city. Building such loops would relieve the congestion of traffic in a small area known as "the golden triangle," but even then only by a few hundred street cars every 24 hours. This would not materially reduce the congestion, which arises through the use of streets by thousands of pleasure automobiles and commercial trucks.

Private Automobiles Wasteful of Space

Not the least of the difficulties arises from the parking of cars in double lines along narrow streets, thus retarding the flow of traffic on such sections of the roadway as are not occupied by these standing vehicles. The large department stores are located within this area and the lady of the house adds her share of confusion by causing her car which may represent only herself or at most a family of three or four to occupy 100 sq.ft. of space for an hour at a time. Meanwhile the street car carrying 40 or 50 people is occupying a moving area of not exceeding 400 sq.ft.

There is an economic question involved in this whole matter, according to Mr. Davidson. The large sums of money which it may be necessary to expend for underground loops for street cars must have their interest payments carried for many years and eventually be amortized. Who shall be burdened with these payments? Surely not the street car rider because he is now complaining, and with some reason, that he is paying too much at present. It is not his vehicle that is the primary cause of the congestion. If not he, then, it must be the taxpayer. Arriving at this conclusion it must be considered that comparatively few of the tax-paying class are involved in the reduction of congestion. These few are the automobile owners. It would seem that there are two general plans on which to work. One would be to formulate better regulations for controlling the automobile and truck traffic, in order that the occupation of the streets might be greatly reduced, and the other to plan street improvements for by-passing purposes, the automobile and truck owners carrying the cost.

Cars Carry Bulk of Traffic

The trolley car is used to move about 80 per cent of the population that does business in the congested areas, according to George T. Seabury, member of a committee to study the traffic problem in Providence, R. I. The remaining 20 per cent is moved by automobile. It appears that one trolley renders service to approximately 40 people, where one automobile serves only about two people. In other words, a trolley is equivalent in average use of carrying capacity to 20 automobiles. The space needed by a moving trolley is something like 100 lineal feet, whereas the space on the same street needed for a moving automobile is from 20 to 25 ft. Therefore, the use of street space for transportation of people by trolley is more efficient than that by automobile in a ratio of at least four to one. It is admitted that subways for trolleys would be advantageous, but subways are an impracticable solution on account both of the time to build and cost.

It has been shown that as between the trolley and the passenger automobile, the latter must yield. This conclusion is strengthened by the necessity for the use of the pavement by automobiles engaged in other than passenger traffic. It would inflict an almost impossible burden on the transaction of business to exclude commercial vehicles from the use of the streets not only for purposes of transit but for loading and unloading. The elimination of the parked passenger automobile seems the logical immediate solution. It is admitted that the commercial vehicle abuses its logical pre-eminence. Trucks and delivery automobiles all loiter along and too frequently stand unused in front of a business house for long periods. In the main, however, the city is for business and the means of doing business must be given preference.

Mr. Budd's Power Company Wins Coffin Medal

THE second annual award of the Charles A. Coffin prize for distinguished accomplishment in the electric light field was awarded to the Public Service Company of Northern Illinois, of which Britton I. Budd is president. Some of the things which were noted as standing out among the company's accomplishments were that in a widely scattered territory with a population of only half a million, it has promoted company development, public relations and customer ownership with particular success. The company showed an increase in net revenue of nearly $600,000 in its fiscal year compared with the previous year. Some 25,000 new customers were added to the lines during the year and the number of customer owners of its securities was increased 35 per cent. They now number 21,409, as against 15,864 at the end of the previous year. Two rate reductions marked developments during the year and in addition transmission lines were extended throughout the territory and generation station equipment installed to meet the growing needs for electrical energy.

The company organized a department of public relations with a vice-president in charge, and every effort is made to have staff men answer complaints by personal call instead of by letter. A policy of aggressive advertising which succeeded notably was followed. Newspaper advertising, painted highway bulletins, colored posters, descriptive folders, motion pictures and the publication of a very attractive yearbook constituted some of the public activities of the company which benefited it greatly.

The same broad policy has been adhered to with employees. They have a saving fund with a total enrollment of 1,769 subscribers, or 85 per cent of those eligible. A safety organization is in operation and an employees' co-operative council represents the employees in their relations with the management. A very attractive vacation resort was purchased for their benefit.

The committee pointed out that the award to this company was a fitting tribute to the practical realization of the possibilities of development in utilities serving many small and scattered communities.

American Association News

Hoover Conference on Highway Safety

PRESIDENT Budd of the American Electric Railway Association, at the invitation of Herbert Hoover, Secretary of Commerce, has appointed a committee to represent the association at the joint conference on street and highway safety which has been called by the Secretary. The object of this conference is to study from every viewpoint causes of accidents and ways and means of reducing the number. There will be representatives of life insurance companies, motor vehicle interests, manufacturers and others. The members to represent the electric railway association are as follows: J. P. Barnes, Louisville; C. E. Morgan, Brooklyn, and Charles B. Scott, Chicago. The association was also invited to appoint one of its staff members of the committee on statistics. E. J. Murphy, statistician of the association, will act on this committee.

The first meeting has been called for June 6 at Washington.

Wood Preservation

DISCUSSIONS preparatory to the making of final recommendations by the various sub-committees were held at a meeting of the committee on wood preservation in New York on May 26. The circumstances under which the full cell treatment of poles is preferable to the empty cell treatment were outlined. It was decided to recommend the specification of a given amount of oil to be used in treatment rather than a definite depth of penetration. Along with this it will be recommended that railways have inspectors on hand during the application of the pressure treatment.

Plans for the installation of open-tank pole treating plants suitable for medium sized or smaller companies were considered. It was decided to embody two sets of plans in the final report of the committee. Methods of treating poles in place were also discussed.

The committee decided to make no report on the subject of conductivity of treated poles. In an appendix it is planned to give information concerning the use of blight-killed chestnut for poles.

Those present were A. P. Way, chairman; M. B. Rosevear, sponsor; M. J. Curtin, W. L. Harwood, J. L. Fritsch, W. H. Fulweiler, E. F. Hartman and E. L. Morier.

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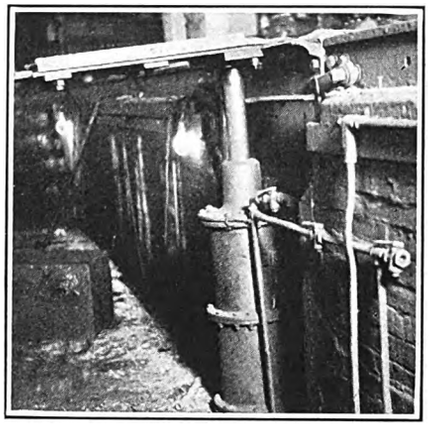
Maintenance of Equipment

Device for Removing Air Compressors

A HANDY device has been worked out in the shops of the Pittsburgh Railways for expediting the removal of car air compressors. A narrow platform which can be raised and lowered is mounted in a shop pit. This small elevator receives the compressor from the car after the bolts have been removed and lowers it to a position where it may be slid sideways onto a cart.

The platform is mounted on one end of a piston rod which travels in

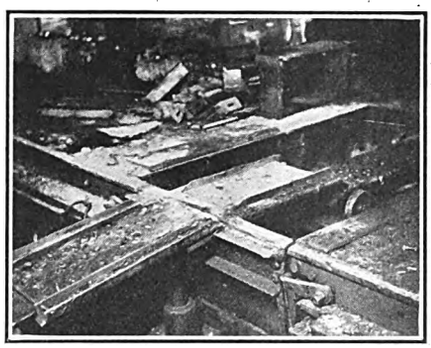


Two 10-In. x 12-In. Brake Cylinders Form the Cylinder in Which the Piston of the Platform Elevating Device Operates

two 10-in. x 12-in. brake cylinders bolted together in order to give sufficient travel to the platform. Air is used to move the platform and is admitted to either side of the piston through straight control valves.

The cylinder is installed in a recess in the wall of the pit, while the platform includes a short section of rail and extends over a small adjacent pit as well as the main pit. The platform is locked in the raised position when not in use, the section of rail forming a part of the pit track.

In operation, the car is run over the pit so that the compressor is directly above the platform. A small cart is run onto the platform and the platform raised to take the load off the fastening bolts. After these have been removed the platform is lowered so that the compressor may be moved to the side under the car



Platform Extends Over Inspection Pit and Shallow Pit. A Section of Rail Is Part of the Platform Which Is Locked in Raised Position When Not in Use

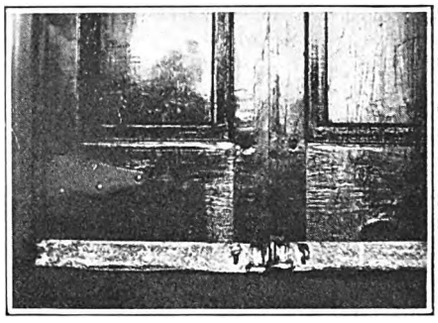
framework. A ramp connects the shallow pit with the floor and permits the cart to be hauled out of the pit by hand.

Keeping Walls of Oil House Clean

AS A part of its program to impress upon workmen the necessity of keeping lubricating oils clean, the Philadelphia & Western Railway has painted the inside walls of its oil house white. In order to assist in removing finger marks or dirt from the walls and thus keep them in a clean condition, a washable water paint is used. This is a product furnished by the Maxwell Paint Company, Philadelphia, Pa., and is put up in paste form to be reduced with equal portions of cold water.

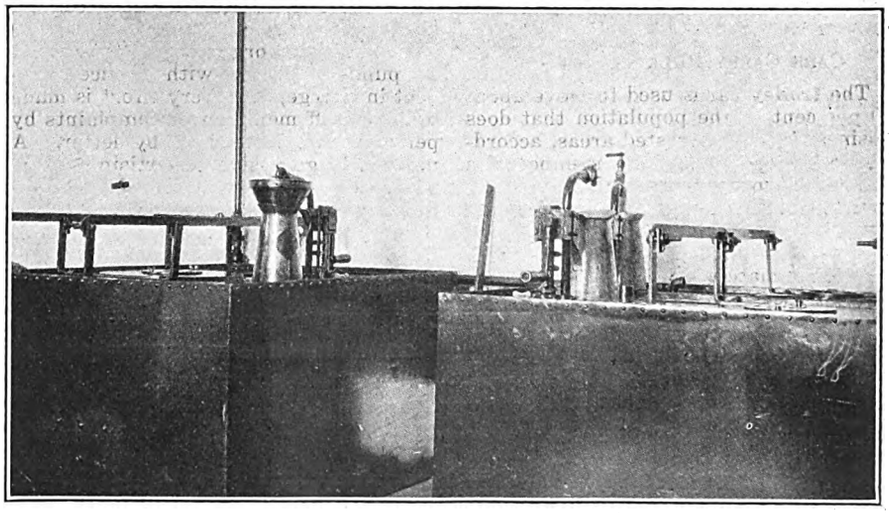
Slotted Bar Stops Drafts Under Door

A SIMPLE device has been designed by W. L. Harwood, engineer power and equipment Worcester Consolidated Street Railway, Worcester, Mass., to prevent drafts under platform doors. This consists of a flat piece of iron with two slotted holes. The bar is fastened to the bottom of the door by two round head screws driven in just far enough to allow it to slide up and down to take care of the irregularities of the platform floor.



Slotted Bar Closes the Gap Between the Platform Door and the Floor

To give a better bearing for the flat edge and allow the bar to ride over rough places in the floor, such as safety treads, two split rivets were placed over the bars used on the experimental model. The rivet was welded to the bar and the round head was ground off slightly to bear on



Washable Walls Assist in Keeping Oil House Clean

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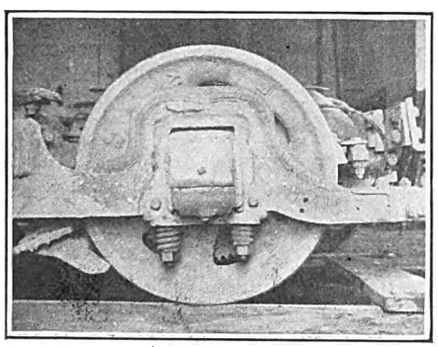
the floor. Later it is planned to make a casting to serve this purpose.

The device works very well and is particularly useful on old cars which are being converted for one-man operation. In the conversion the bulkheads are removed, and because in many cases the platforms have sagged slightly there is an opening under the platform door which would allow cold air to enter.

Reinforcing Journal Box Pedestals

LEAKS or cracks in truck side frames occur most frequently in the corners of the journal box pedestals. The Long Island Electric Railway, New York, N. Y., has had considerable breakage of side frames at this point, and in order to reduce these breakages it is reinforcing the frames at the top and sides of the pedestal. The accompanying illustration shows the method followed.



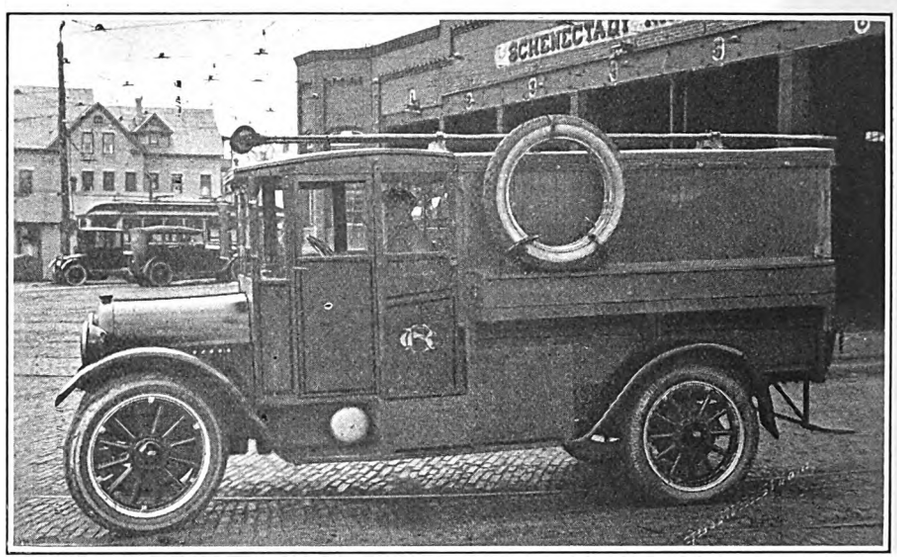
Truck Pedestal Reinforced with Forged Bar to Prevent Breakage

A bar of mild steel is forged to a shape that will fit accurately over the top of the pedestal and extend down along the top of the frame on either side. The edges of the bar and truck frame are scarfed where they join and metal is added by electric welding, so as to weld the bars in place along the edges. Some broken frames repaired in this manner have now been in service for several years and are giving excellent results.

Emergency Truck for Rolling Stock Department

PRACTICALLY every electric railway of any size whatsoever has at least one motorized emergency wagon for the line department and possibly for the track department. But their use for the rolling stock and shops department is infrequent. The Reo Speed Wagon chassis, shown in the illustration, has been equipped completely by the shop department of the Schenectady Railway Company for emergency attention to failures that occur on cars in service. Two spare trolley poles and wheels are seen fastened on top of the truck. Inside is a full complement of tools, equipment and materials to meet almost any emergency or repair requirements of a car which may become disabled while in service. Jacks of various sizes, crowbars, hammers, wrenches, pliers, saws, spare drawbars, etc., are carried. A stock of fuses, incandescent lamps, all sizes of wire and numerous other small parts are carried in this wagon. It is also equipped with heavy tools such as shovels, crosscut saws, axes, etc., in order to co-operate with the road department.

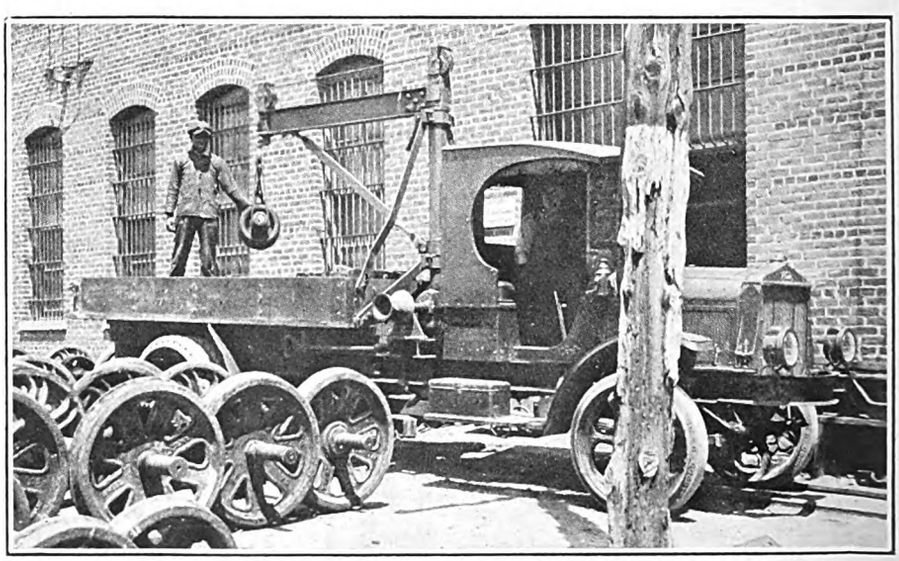
Niles Persons, master mechanic, is responsible for the use and equipment of this wagon.



Trouble Truck Used by Rolling Stock Department in Schenectady

Truck Replaces Car for Transporting Armatures

A 5-TON White truck, shown in the accompanying illustration, is being used by the Georgia Railway & Power Company, Atlanta, Ga., for carrying armatures and other heavy parts from the various carhouses to the company's Fulton County plant, where they are repaired. The winch with which this truck is equipped is part of the standard equipment of the White truck, while the crane arm and the body were built by the railway. The truck weighs 12,000 lb. and has a capacity of 10,000 lb., making a total weight of 22,000 lb. Compressors, motors, wheels and axles and other heavy material, which were formerly carried to and from the shops by a work car, are now handled quickly and easily by this truck.



White Truck Used by Georgia Railway & Power Company Unloading Armatures at the Repair Shops

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New Equipment Available

New Series of Shop Trucks

FIVE new types of industrial trucks are being marketed by the Yale & Towne Manufacturing Company, Stamford, Conn. These are designated as K-20 to K-24, inclusive. Three of the types particularly suited to electric railway use are illustrated. The K-20 model is a high platform truck for moving material and handles miscellaneous units which can be placed on the platform by hand and by chain blocks or hoists. Auxiliary equipment designed for these trucks includes a gravity dump for handling loose material and an electrically operated swinging boom crane for lifting heavy equipment parts.

Large wheels and full spring suspensions give smooth operation over rough surfaces. Steel frames, heat-treated alloy steel axles, with ball bearings, are used in the construction. The controlling mechanism is especially designed to facilitate handling in narrow aisles and congested places. The truck has a rated carrying capacity of 4,000 lb. and can be turned in a radius of 91 ft. The wheelbase is 58 in. and the over-all length is 102¼ in., with over-all width of 38 in.

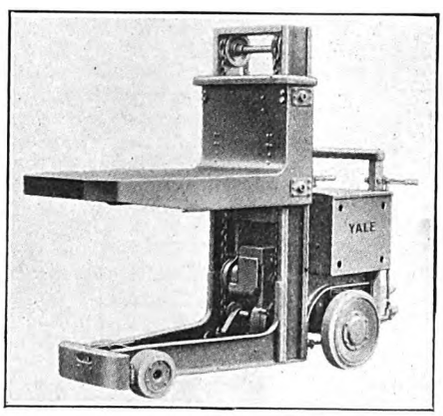
The K-21 model is similar in form to the K-20, but is equipped with a wider platform.

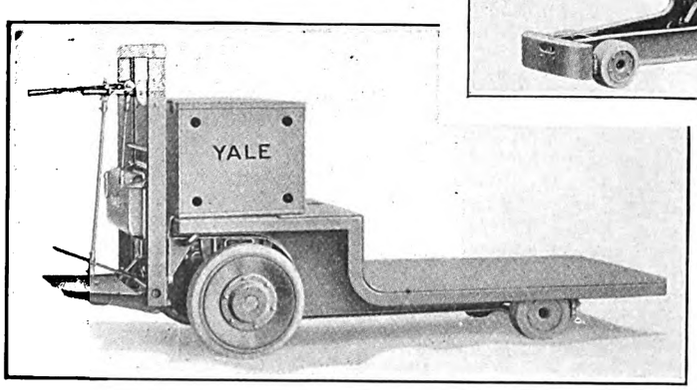
The K-22 model is particularly convenient for electric railway shops. This is a self-loading transportation unit with an elevating platform. It can be used to lift loaded skids from the floor, or can take equipment directly from cars and transport it to places on a bench for overhauling. The truck has a low center of gravity and pressed steel one-piece longitudinal frame members. This truck also has a carrying capacity of 4,000 lb.

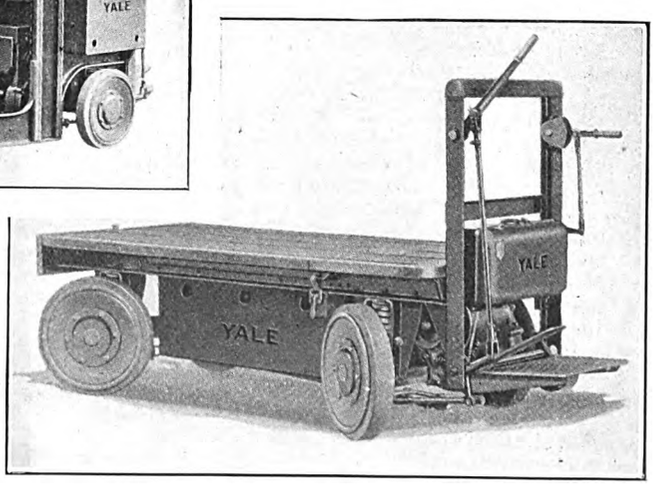
The lifting mechanism is of the triple, spur-geared reduction type. The platform is raised through two Yale steel chains of 2 ton capacity each. Mechanical lowering, speed control and automatic upper and lower limit stops are provided. The wheelbase of this truck is 55 in. and the over-all length 105 in. It can be turned in a radius of 84 in. and will travel at a speed of 6 miles per hour on a level floor, with a load of 4,000 lb.

The model K-23 is a general utility truck, designed with a low platform to reduce lifting. It is built for heavy duty and for operation where the road surface is in good condition. Its over-all length is 110¾ in. with a wheelbase of 55¼ in. It can be turned in a radius of 89 in.

The company has also placed on the market a type known as K-24. This is a three-wheel tractor truck and is particularly efficient as a small load carrying truck and for use in hauling a trailer. The truck has a particularly low center of gravity, which insures safe operation without danger of overturning or tipping sidewise.





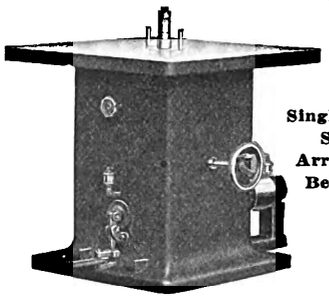


Three New Trucks Suitable for Electric Railway Shops
At left, K-23 low platform general utility truck. In center, Model K-22 with elevating platform. At right, the model K-20 high platform general utility truck

Reversible Wood Shaper

A RECENT addition to the woodworking machinery marketed by the Crescent Machine Company, Leetonia, Ohio, consists of a reversible single spindle wood shaper. The machine is adapted for use on irregular molding operations.

The base is a strong rigid hollow casting, with heavy supporting cross-ribs. The table is also of cast iron, securely bolted to the base. The spindle is mounted on two SKF self-aligning ball bearings. It is given additional support at the lower end by passing through the vertical hollow shaft that carries the cone pulley. This shaft is also mounted on ball bearings that provide for both radial and end thrust. The spindle may be raised 7 in. above the table or dropped entirely below it. By removing the driveshaft and its supporting bracket a motor base may be substituted, on which can be mounted any standard motor running at approximately 800 r.p.m.



Single Spindle Shaper Arranged for Belt Drive

The floor space required with motor mounting is 36 in. x 50 in. The table is 36 in. square and the top is 36 in. above the floor. Regular equipment furnished with these shapers includes a pair of 2-in. straight knives, two guide pins, collars to fill the spindle, two throat collars, a wrench and slotted collars.

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The News of the Industry

One-Man Permits Revoked

Question of Availability of New Equipment Reopened by Accident at Berkeley

The permit to operate one-man cars in the city of Berkeley, Cal., has been revoked, after the cars had run just thirty days of a six months' probationary period. This drastic action was taken at the demand of improvement clubs following a crash between a one-man car on the Ashby Avenue line and a Southern Pacific electric train at Ashby Avenue and Adeline Street, on the sixth day of the probationary period. No one was hurt in the accident, but passengers were shaken up and one girl claimed that nervous prostration had resulted from the shock.

A series of mass meetings was held after the crash and the demand for the removal of the cars from the streets of the city became so insistent that the Council voted seven to two to rescind the permit. Under the provisions of the revocation the railway may, at a later date, apply for permission to operate one-man cars in Berkeley on other lines where there are fewer grade crossings. It is understood that such an application will be made.

The one-man cars have not entirely ceased to be run in the East Bay cities. At present they are operated on six lines in Oakland, small feeder lines for the most part; on one in Alameda, one line in Emeryville and one in San Lorenzo. No objection has ever been raised to the cars on these routes as they are short-haul lines and do not cross railroad tracks.

The Key System Transit Company has eighty cars of the one-man type, twenty-five of which were purchased in 1920 with the permission of the State Railroad Commission at a cost of $162,500 and fifty-five in the summer of 1923 at a cost of $797,000. The cars purchased in 1920 are of the single-truck type, while the others are of the newer, one-man, two-man type.

It is pointed out by the Key System in a report made to the Mayor and the Berkeley City Council that in nearly four years of operation in the East Bay cities these one-man cars have traveled 3,103,336 miles of more or less congested city streets and have carried 16,354,764 passengers without a single fatality to passengers or pedestrians and "with an entire elimination of the dreaded step accidents, so common on all other types of cars." It is further related that the cars have passed in safely 2,687,590 steam and interurban and street railroad crossings, traveling 10,000 miles of track. The company also asserts that the California State Railroad Commission has repeatedly expressed the official opinion that the operation of one-man cars is safe and economical, and has readily consented to their purchase by the company.

Chicago Purchase Negotiations Drawing to Close

The end of the present negotiations between the city and officials of the surface and elevated roads in Chicago looking toward the purchase of the lines by the city has almost been reached. Mayor William E. Dever so admitted recently after the tenth conference called to discuss ways and means for the municipalization of the properties. A statement by Mayor Dever shed no real light on the progress made. He said:

> I expect we will be able to agree or disagree at our next meeting. More than that I will not say.

If the Mayor's comment can be interpreted to mean that a working agreement as to price has been reached, the entire project will be rushed to the voters for their approval. Thus far, the owners of the properties have agreed to accept the Schwartz certificates in payment, and the operation of the lines, it has been agreed, will be in the hands of a joint board.

At the tenth conference John J. Mitchell, chairman of the board of directors of the Illinois Merchants Bank, who has been out of the city, was present. This is the first time he has attended since the conference began.

The other conferees were the same as those who had appeared at previous meetings, with the exception of Samuel Insull, who was represented by former Attorney-General Patrick J. Lucey. The Surface Lines were represented by Henry A. Blair and Leonard A. Busby. Attorneys and officials, of the First Trust & Savings Bank, the First National Bank, the Harris Trust & Savings Company and the banks of the Illinois Merchants group were present.

Conferences on Bus Franchise for Buffalo

Herbert G. Tulley, president of the International Railway, Buffalo, N. Y., and Mayor Frank X. Schwab have been holding a series of conferences in reference to a proposed franchise which would authorize the International Bus Corporation, a subsidiary of the traction company, to operate buses in Delaware Avenue from McKinley Square to the Buffalo-Kenmore city line. Mayor Schwab asks the company to consent to a 7-cent fare with free transfers to connecting car lines, but the International asks the right to charge a 10-cent fare with an extra 3-cent charge for transfers to connecting car lines. Enlargement of the Bailey Avenue bus line of the company also is sought by the municipal authorities.

Fares Up in Baltimore

Rate to Be Advanced from Seven to Seven and One-Half Cents by Ticket—Eight Cents Cash

An increase in fare from 7 cents to 7½ cents has been granted the United Railways & Electric Company, Baltimore, by the Maryland Public Service Commission, effective June 1, 1924, until April 30, 1925, unless changed by the commission. This new rate is provided when tickets or checks are sold, but in cases of cash fare the rate will be 8 cents for all persons more than twelve years of age. At the same time the commission ordered numerous zone extensions requested by the public and also ordered a valuation of the property. Bus service is to be established between the northern and the southern ends of the city east of Patterson Park. The three members of the commission were not a unit in the decision, the majority consisting of Chairman Ezra B. Whitman and Commissioner Harold E. West. Commissioner J. Frank Harper filed a minority opinion.

The order filed by the majority fixes the rate for children between the ages of four and twelve years at 4 cents. It further requires that transfers be issued without charge to and from the Curtis Bay line. Heretofore, there has been a charge of 3 cents for these transfers. A special rate is ordered for school children. The company is to place on sale school tickets at a rate of 5 cents each, which are to be honored when presented by children more than twelve years old who attend public, parochial and private schools, including the high schools. This sale, however, is to be subject to such reasonable restrictions as the company shall prescribe, subject to the approval of the commission.

The company is ordered to sell tickets or checks at the rate of 7½ cents each on its cars, at its offices and waiting rooms, those sold on the cars being given to the public in quantities of two or more.

Even under favorable prospects for 1924, with a normal increase in riding in Baltimore, it is clear to the Commission that, with the 7-cent fare maintained, the company could make no zone extensions or other service improvements, maintain its property and preserve its credit. The majority report pointed out the great increase in the expenses the railway was under due to the increased cost of labor and materials. It stated that the increase in the cost of the user of transportation in Baltimore had been only 40 per cent, while the operating costs of the railway had increased from $4,102,766 in 1915 to $9,799,312 in 1923. For the same period taxes increased from $904,675 to $1,800,335.

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At the hearing before the commission there was considerable agitation for a lower fare, some urging a 5-cent rate. In dealing with this subject the majority report says that even a superficial examination of the figures should convince any reasonable man of the absurdity of this request at this time, or for any marked reduction in the present rate. Such agitation is termed either dishonest or ignorant. Furthermore, the opinion says, a material reduction in the fare rate would raise the question of confiscation.

The maintenance estimate of the company for 1924 is increased by $25,760, due to added labor costs, and the power service shows an increase from $1,312,-621 to $1,315,081, also due to extra labor costs. Platform labor has increased in cost from $3,995,475 to $4,075,385 and other transportation expenses are increased from $1,069,610 to $1,089,110. The sum of $567,967 set aside for accidents and damages is the same for 1924 as in 1923. The general and miscellaneous item was increased from $865,286 to $873,786, due to the advance in labor costs.

The opinion states that the total operating expenses will increase $136,-276 in labor costs if there is no increase in the car riding. These costs will increase from $9,799,312 in 1923 to $9,935,588 in 1924. The depreciation fund for 1924 is figured as the same as the depreciation in 1923.

In its conclusions the majority opinion of the commission says there was nothing to indicate there would be any increase in the number of revenue passengers in 1924 over 1923; there was no testimony which would lead the commission to believe that the operating expenses would be decreased unless the service was cut to a greater extent than it had already been cut; the Commission was convinced that the company's depreciation allowance should be sufficient to permit it to retire a number of cars each year; the company estimates that its income for 1924 will be $756,687, or $219,579 less than in 1923 if the 7-cent fare is maintained, and in order to increase this income so as to approximate the $1,000,000, which the commission believes is necessary properly to maintain the credit position of the company, it would be necessary to make drastic cuts in the present service; it is agreed that it would be impossible to require the company to make the extensions and other improvements ordered if the 7-cent fare were maintained; on the basis of an 8-cent single fare, or two tokens for 15 cents, the gross income of the company, it is estimated, would be increased by $1,168,212. From this would be taken $588,631 for zone extensions and readjustments and reduced fares for school children and $373,705 for increased labor costs, taxes and fixed charges. This would leave the company but $205,876 of the increased fare. This sum, added to $976,266 net income in 1923 before payment of dividends, would bring the net income for 1924 to $1,182,142. This would make the gross income approximately one and one-third times its fixed charges.

The report concludes that the property of the United Railways should be valued for rate-making purposes, and that when the rate is fixed for 1925 it should be based upon the fair valuation of the company's property used and useful in the public service.

Commissioner Harper in his minority dissenting opinion, said the rate should not be increased unless the right of the company to such increase is shown to be clear and conclusive. He said that the evidence in this case showed that in 1923 the company did earn substantially a balance to surplus, and in his judgment it might reasonably be expected to earn in 1924 a balance approximately equal thereto in amount under the present rate of fare.

The bus lines of the company are not affected by the decision. The fare on the buses will continue at 10 cents.

Suburban Line on Long Island Rezoned

Passengers on the lines of the New York & Long Island Traction Company from Mineola to Valley Stream were subjected to an increase in fare on May 25. The company decided that by cutting in two the distance which a passenger may ride for 5 cents, thus, in effect, zoning the line, the increase of revenue will equal that which could be obtained by doubling the fare itself.

The change was brought about by the action of the governing authorities of each municipality through which the line passes. Each granted a temporary amendment of franchise, by suspending the fare requirements, and permitting the adoption of the new schedule. Permission was then obtained by the receiver, Gen. Lincoln C. Andrews, from the Public Service Commission to put the change into effect on one day's notice.

Arbitration of Wages in Cleveland Concluded

Arbitration hearings over the demand of Cleveland trainmen for a wage increase and changes in their working conditions were concluded on May 27. In an effort to substantiate their demand for 85 cents an hour for the first three months of service, 87 cents an hour for the next nine months and 90 cents an hour after the first year, instead of the present rates of 55, 57 and 60 cents an hour, the men placed on the witness stand William Polk, president of their local union, and William Rea, the union's financial secretary, in addition to other trainmen.

Mr. Rea testified that it required an income of $2,442.72 properiy to support a family of five in Cleveland and that this budget did not include savings of $300 a year, which he felt a man earning approximately $2,500 a year should set aside.

Mr. Polk said he had been a conductor twenty-six years and had a wife and six children whom he has been supporting on an income of approximately $1,400 a year; that he was not able to set aside any savings or indulge in any amusements or books, or see any movies or ball games. Another witness for the men, an extra man, said he was making $1,200 a year, while a motorman in the service fourteen years said his earnings were approximately $2,000 a year, working seven days a week.

Paul E. Wilson, secretary of the Cleveland Railway, testified that an investigation of the home conditions of the company's 2,892 platform employees showed that 536 owned their own homes and also owned automobiles, and that of 1,117 employees who lived in rented houses, 162 owned autos. He also testified that the wages of the car men had gone up 100 per cent in the last ten years, while living costs advanced only 63.4 per cent. He added that the men were asking now for 15 cents an hour more than they got in the so-called "peak price." Mr. Wilson said that the family budget submitted by Mr. Rea was too high and that $1,988 was sufficient instead of the $2,442 testified to by Mr. Rea.

Both John J. Stanley, president of the company, and Mr. Wilson asserted on the witness stand that the financial condition of the Cleveland Railway would not permit any such increase of wages as demanded by the men. Responding to an inquiry as to whether or not it would be possible to reduce the company's maintenance allowance below 12 cents a car-mile, Mr. Stanley said there should be an increase in the maintenance allowance.

Ralph W. Emerson, general manager of the railway, testified that to meet the men's demands the company's expenses would be increased by $4,934,466, divided this way:

$2,466,728 would be the cost of the wage increase.
$1,036,580 would be the cost of granting one day off in eight.
$429,038 would be the cost of increasing layover time at the end of each run from four minutes to ten minutes.
$378,747 would be the cost of paying time-and-a-half for Sundays and holidays.
$361,638 would be the cost of two weeks' vacation asked for by the men.

James W. Holcomb, former city street railway commissioner, is chairman of the board of arbitration, while United States District Attorney A. E. Bernsteen and Max S. Hayes, editor of a Cleveland labor publication, are arbiters representing the union, and Attorney Charles Higley and Thomas P. Schmidt, a director of the railway, represent the company.

The demands of the men were summarized in the issue of the ELECTRIC RAILWAY JOURNAL on April 19, page 632.

Seeks Permission for Trackless Trolley in Albany

In the city of Albany a solution may be reached for the improvement of Western Avenue adjacent to which the United Traction Company owns a private right-of-way. The railway has suggested that it be allowed to remove its tracks and substitute trackless trolleys. Any such operation, it is said, would have to be conducted by the recently incorporated holding company as there is some legal question of the right of a street railway corporation to operate trackless trolleys. The Mayor of Albany has named a citizens' committee to confer with the traction officials.

Anticipated bus competition with the traction company in the south end of the city failed to materialize when the parties interested failed to make formal the tentative application they had advanced for permission to operate such service.

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200,000 Bus-Miles Without an Accident

Operatives of the Kentucky Carriers, Inc., along with the carmen of the Okolona interurban line, of the Louisville & Interurban Railroad, and car men of the Bardstown Road city line, of the Louisville Railway, the two former being subsidiaries of the latter company, heard at a recent dinner that the bus men had operated the equivalent mileage of eight times around the world without an accident. The Interurban carmen had no accidents, and the Bardstown Road car men operated the equivalent of 25,156 miles per accident, as against an average of 5,914 miles per accident for all lines. Each month a dinner is given for the men with the lowest percentage of accidents, based on the number of miles covered during the previous month.

New Aurora Company Would Operate Buses

The Western Coach Company, Aurora, Ill., of which Attorney B. P. Alshuler, Aurora, is president, has filed an application with the Illinois Commerce Commission for permission to operate buses from Chicago to the Aurora, Elgin and Geneva stations of the Chicago, Aurora & Elgin Railroad. It is the plan of the company to carry both passengers and freight.

The company is capitalized at $100,000. It was recently granted a charter to "own and operate motor coaches, buses and trucks." L. J. Miller, attorney; Ralph C. Putnam and Attorney Alshuler are named as the incorporators. Mr. Miller is secretary of the company.

A petition was filed with the Illinois Commerce Commission some time ago by the Aurora, Elgin & Fox River Electric Company, for which Mr. Alshuler is attorney, for a certificate of convenience and necessity to operate motor buses and trucks between Aurora and Elgin and intervening points for the carrying of passengers and freight. The commission has not acted on this petition.

Automatic Change-Making Device in New York Subway

As a means of still further lessening delays for the public in subway stations in New York, Frank Hedley, president of the Interborough Rapid Transit Company, and James S. Doyle, assistant to the general manager, have been experimenting for the last two years on an automatic change-making device to increase the speed with which patrons can get change for dimes, quarters or fifty-cent pieces. As a result of their work a device has been perfected which is both a change maker and a bad coin detector.

A demonstration of the operation of one of the machines was made on May 22 at the uptown Seventy-seventh Street station of the Lexington Avenue subway. The operation of the machine in providing the exact change is practically instantaneous. It is expected that within a few days these machines will be in operation for use by the public at the uptown side of the Seventy-seventh Street station of the Lexington Avenue subway line. Further installations at other stations will proceed gradually.

More Railway Buses Proposed for Use in Houston

The Houston Electric Company, Houston, Tex., recently requested the City Council to grant it permission to operate two additional bus lines in territory that is not served by its present railway system. Both sections are in well developed territory.

Several former jitney operators also petitioned the Council for permits to operate over the same routes, but were refused, due to the recent elimination of all jitneys and the Houston Electric Company's willingness to serve these two sections of the city.

The line to serve the section known as Eastwood has been approved by the Council and the other will no doubt be approved.

The Houston Electric Company expects to purchase ten additional buses to operate on these routes. The new buses will each seat twenty-nine passengers, the same as the ones now in operation.

Puget Sound Seeks Temporary Restraining Injunction

Upon the failure of the Puget Sound Power & Light Company, Seattle, Wash., to meet the demands of W. W. Shields, county treasurer, for payment of the 1919 taxes on Seattle's Municipal Railway system, the company has been served with notices of distraint of the major portion of the physical properties of the company. In an effort to stay confiscation and sale of its property the company promptly asked the Federal court for a temporary restraining injunction until after a hearing. The suit charges the city and county officials with fraudulent and oppressive action. Mayor Brown states he will suggest in his annual message to the Council that the city acquire by purchase or condemnation transmission lines and other equipment of the company. President Leonard states that the properties are not for sale. The sheriff has levied on $2,000,000 of Seattle property, including executive offices, central stations and substations on which the sale has been ordered June 10.

The city purchased the railway property in March, 1919, and it has been determined in the courts that the power company is liable for the tax for the first quarter of the year 1919, or until the purchase date, and the city for the remaining period of the year.

The situation was brought to a climax when President A. W. Leonard informed the treasurer that the company was determined to pay only its share, or one-fourth of approximately $690,000. Mr. Leonard offered to pay the company's one-fourth share direct to the county, or to the city, which then could pay its taxes in whole.

The county takes the stand that the company is listed on the 1919 tax roll as owner of the railway property, and that, in view of this fact, the company alone is responsible to the county for payment of taxes, that any agreement between the company and the city for payment is foreign to the question. Since the company no longer holds title to the railway property, the county treasurer declares that distraint proceedings can only be instituted against the present property of the company.

The failure of the city to fulfill its contract with the company regarding the shearing of the 1919 tax was the result of an opinion furnished by Corporation Counsel T. J. L. Kennedy, who held that the City Council was without authority to appropriate the necessary funds. Moreover, the corporation counsel asserted, the Council exceeded its authority when, in drawing the terms of purchase of the railway, it agreed to share the 1919 tax. Mr. Kennedy held that neither the general fund nor the street railway revenue fund might be tapped to provide the money, and that a bond issue to meet the demand would not be legal.

Corporation Counsel Kennedy denies the statement made that the city, through failure to pay three-fourths of the tax, has abrogated the entire railway purchase contract.

Inquiry Into Indiana Wreck Completed

Federal, state and county officials brought their investigation into the fatal traction wreck at Roanoke, Ind., to a close at Fort Wayne on the afternoon of May 27 after questioning about fifty persons, including members of the executive staff of the Indiana Service Corporation, members of the train crews, train dispatchers, maintenance officials and passengers on the ill-fated cars.

While federal and state agents refused on May 27 to indicate the nature of reports which they would submit after a final examination of all evidence taken, coroner J. W. Good, who had charge of the county investigation, intimated that his verdict to be returned in two or three days would include the Indiana Service Corporation as jointly responsible for the crash with members of the train crew of the eastbound flier, the traction company being held responsible merely as a formality and by the fact that the officers of the company were responsible for the actions of their agents.

The joint probe brought out the facts clearly that the crew on the eastbound train failed to take into account the schedule of the fast Wabash Valley Flier, the crack Fort Wayne-Indianapolis Limited train, and left a siding at Mahon, a mile west of Roanoke, without allowing the ordered "five-minute clearance of all regular trains" which is duly prescribed.

President Feustel said on May 27 that this failure probably resulted from the negligence on the part of the east bound crew to observe the time expended in rearranging a trolley pole, after backing from the Mahon siding, eight minutes before the schedule time the limited flier was due to arrive in Roanoke.

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Milwaukee Railway Receives Bus Permit for City Operation

The Milwaukee motor bus war finally ended recently when the new Common Council approved by a vote of twenty-four to one the Milwaukee Electric Railway & Light Company's application to operate buses in the city of Milwaukee. By a vote of fourteen to eleven the Council denied the application for a similar permit sought by the Milwaukee & Suburban Motor Coach line. This action ends a controversy that has existed in the Common Council for more than a year.

The bus fight in Milwaukee is the outgrowth of applications made to the city by competitive bus companies for permission to operate in the city over practically the same routes. Recently the new public utilities committee of the Common Council recommended that the Milwaukee Electric Railway & Light Company should be granted the permit and refused at the same time a similar application of the Milwaukee & Suburban Motor Coach Company. The chairman of the public utilities committee pointed out that he did not believe the Milwaukee & Suburban was so well qualified adequately to serve the public as was the local company.

Ten-Cent Bus Fare in Rome

The new tariff of the Utica Co-ordinated Bus Lines, Inc., for Rome, N. Y., filed with the Public Service Commission has been approved. The company operates a new bus line in Rome, starting at the corner of Whitesboro and South James Streets, north to East Dominick, thence east on East Dominick Street to First Street, thence over First Street to Mill Street to the passenger station of the New York Central Railroad, returning over the same route. The tariff was filed to become effective on May 24. It provides a one-way fare of 10 cents between any point in the city of Rome served by the bus company or Rome city line of the New York State Railways, to and including the New York Central passenger station; also a one-way fare of 7 cents between Whitesboro and James Streets corner, in the city of Rome, to and including entrance to the plant of the Rome Wire Company. Transfers issued by the New York State Railways (Rome city lines) will be accepted by the bus line at full value of 7 cents. Transfers will be issued by the bus line to the New York State Railways, at points indicated on the transfer, for destinations reached by the Rome City lines.

Buffalo Company Seeks Higher Fares

Application has been made to the Public Service Commission by the International Railway, Buffalo, for a higher rate of fare in Buffalo so as to finance improvements and extensions to its local car service. The company now charges 7 cents, or four metal tokens for 25 cents, with free transfers. The International has filed with the commission a 500-page brief setting forth its reasons for higher fares. About $150,000 was spent by the company in the preparation of its case. It was reported that if the state utilities board rejects the application of the International the case will be taken into the courts.

That the International must increase its rate of fare for the protection of service is the main argument advanced in the brief. The company contends that improvements in local service will far outweigh the slight increase in fares and car riders will be satisfied to pay a little more for better accommodations. In the brief the company points to the heavy losses sustained during the car strike of 1923, claiming the strike was justified, despite its heavy cost, and it has brought an end to union domination, with the result that economy and efficiency have been encouraged.

The company asks that a fair return be allowed on a reproduction value of $97,000,000 fixed by company engineers. The city authorities have announced that they intend to oppose the increased fare asked by the company.

331 Twenty-five-Year Employees at Baltimore Honored

The organization meeting of the Twenty-five-Year Club of the United Railways & Electric Company, Baltimore, Md., was held at the Hotel Emerson, on the evening of April 23. Heads of departments and members of the U. R. A. general committee constituted themselves a reception committee and greeted the 331 twenty-five-year employees as they reached the hotel.

Lively music by the United Railways Band under direction of Bandmaster Belt guided the club members to the banquet hall. There was an attractive menu folder at every plate, which contained the list of speakers and the toasts to which they were to respond, and a list of those who were members of the Twenty-five-Year Club. Here and there, too, was a bit of poetry, or an axiom that was appropriate to the particular place it occupied in the folder.

A reproduction of the badge or button was also printed on the menu, as well as the anniversary slogan—"25th-65th"—indicating the 25th year of the organization of the United Railways and the sixty-fifth year since horse cars started running in Baltimore.

At the head table sat Mayor Jackson, President Emmons, Vice-President T. A. Cross, Vice-President and General Manager L. H. Palmer, Superintendent of Transportation W. C. Ludwig, Assistant to the President H. B. Potter, and the seven fifty-year men employees. The lady members of the club occupied tables immediately at the front and adjacent to the press table.

During the repast President Emmons, accompanied by Vice-President Palmer, went through the entire hall, shaking hands with each person present, and to each of those who had been with the railways twenty-five years or more he presented a beautiful gold button. At this time buttons were not presented to the fifty-year employees, these presentations being made a later feature of the program. To each woman member a bouquet was given by Mr. Emmons. After dinner came the speeches.

Baltimore Veterans Who Participated in Recent Service Celebration

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$300,000 for Improvement of Rochester Amusement Resort

The New York State Railways is building at its amusement park on Irondequoit Bay, Sea Breeze, near Rochester, probably the largest swimming pool in the United States, as well as the only pool of its kind in America using salt water. The pool is being constructed by the Natatorium Company, New York, builders of the Madison Square Garden Pool.

It will have a water surface of 38,000 sq.ft. and its dimensions will be 300 ft. x 175 ft. A modern pavilion and bathing houses also are on the company's building program.

The utility plans to place Sea Breeze Park on a high standard as a lakeside amusement park and the new pool is said to be only the first step in a comprehensive program of improvement that eventually will involve the expenditure of $300,000.

De Luxe Limited Service Between Detroit and Flint

Two de luxe parlor cars just completed in the company's own shops will be placed in limited service on or about June 1 between Detroit and Flint by the Detroit United Railway. The cars will operate three times daily out of each city and carry only thirty passengers. All chairs will be subject to reservation at a charge of 50 cents in addition to the regular or commuter fare.

The new cars, for the present, will leave Flint at 8:20 a.m., 12:20 p.m., and 4:20 p.m., and will leave Detroit at 8:10 a.m., 12:10 p.m., and 4:10 p.m. daily. Arrangements are being made so that it will be possible to make reservations in advance at the company's waiting rooms. Any seats remaining unsold when the car starts may be secured through the conductor in charge.

If popularity is established through patronage, it is the company's intention to increase the number of such cars on the division and extend similar service to other interurban lines.

First-Class Motor Tours Arranged by Wisconsin Motor Bus Lines

To give the vacationists an opportunity of "Seeing Wisconsin First," the Wisconsin Motor Bus Lines during the coming summer will conduct tours of two, three, four and seven days' duration, operating principally from Milwaukee. The tours will be made in "parlor car buses" with a minimum of ten passengers required for each trip. The tours are characterized as "The Dells" tour, "Cherry Land" tour, "Big Woods and Wisconsin Valley" and "Around Wisconsin and Mississippi River" tour. These tours will be personally conducted and all expenses incident to each will be included in one fare. All tours will be in charge of carefully selected and trained operators.

Pleasant day trips in the Land o' Lakes are being arranged by the Wisconsin Motor Bus Lines, in connection with the electric lines of the Milwaukee Electric Railway & Light Company and the Milwaukee Northern Railway and with the boat lines on the inland lakes and on Lake Michigan.

The Wisconsin Motor Bus Lines has issued a descriptive pamphlet on its loop trips in the Land o' Lakes, giving some detail on the historic and other notable features of places visited en route.

Bus Lines in Louisville Rearranged

The Louisville bus service as handled by the Kentucky Carriers, subsidiary of the Louisville Railway, has undergone a number of important changes recently. The company announced that it was discontinuing the Third Street line because after a trial of almost a year this line had shown it could not be operated except at a loss. The other line to the Highlands has been extended several blocks, and whereas eleven coaches were used in operating the two lines, the entire fleet of eleven cars, with one reserve car, making twelve, will now be used on the line to the Highlands. Another important change has been made by routing buses over the busiest sections of the downtown portion of the city. Fourth Street, the most important retail street, is now used.

Seven-Cent Fare Asked on Niagara Falls Line

The International Railway, Buffalo, N. Y., is seeking an order allowing it to raise the fares on the Niagara Falls local lines from 5 cents to 7 cents with four metal tokens for 25 cents, the same rate as the company charges in the city of Buffalo. Abandonment of the Sugar Street line and the operation of trackless trolleys on several of the local lines in Niagara Falls also is asked by the International. Herbert G. Tulley, president of the International, has informed the City Council at Niagara Falls that the Sugar Street line cannot be made to pay.

The City Council there is opposing the raising of local fares and the abandonment of the Sugar Street line and it asks the International to restore two-man crews to the Main Street line. Since one-man cars have been introduced on many of the Niagara Falls local lines more frequent service has been maintained than formerly.

Wage Agreement Renewed at Grand Rapids

The agreement of the Grand Rapids Railway, Grand Rapids, Mich., with its employees covering wages and other working conditions expired on May 1. The employees demanded an increase in the wage scale, but after various negotiations, it was finally agreed that the old arrangement should be extended for a period of one year, until May 1, 1925. No change was made in the wage scale or any of the other provisions, the entire agreement being simply extended one year from May 1, 1924.

Thus the following scale is continued in force: First six months, 49 cents an hour; thereafter, 51 cents an hour, with 5 cents an hour added for operators of one-man cars.

Conference Called on Surface Transportation in Chicago

A conference of all surface transportation concerns operating in the city of Chicago is to be called by the Illinois Commerce Commission at its offices at 139 North Clark Street.

Rerouting of loop cars, together with a consideration of the routes taken by the bus lines, with a view to their coordination for the best interests of all transportation, may be the result of the conference. A general rerouting plan of street cars, largely worked out by Major R. F. Kelker of the city engineering staff, in conjunction with traffic men of the Chicago Surface Lines, is now under consideration by the committee on transportation.

The concerns cited to appear at the hearing in addition to the Chicago Surface Lines are the Chicago Motor Coach Company, the Chicago Motor Bus Company and the Depot Motor Bus Company.

Subway Station Measure Before Massachusetts House

The Massachusetts House has advanced the bill to provide for a subway station in the Cambridge tunnel at Charles and Cambridge Streets, Boston. The measure is on petition of the Massachusetts General Hospital and before being advanced was amended so that the expense shall not exceed $600,000, which is to be met by a bond issue.

A resolution has also been reported by the ways and means committee of the Legislature for an investigation by a joint special committee of methods of financial, additions, extension and improvements of the Boston Elevated Railway system and of the advisability of continuing public operation.

Applies for Dismissal of Electrification Ordinance in Buffalo

Council for the New York Central Railroad has applied to the City Court of Buffalo for dismissal of the city's complaint in the suit brought under a city ordinance to compel the New York Central and other railroads entering Buffalo to electrify their lines. It is the contention of the railroads that the ordinance is unconstitutional.

The New York Central claims that a recent decision of the United States Supreme Court holds that in matters of this kind, the Interstate Commerce Commission has the only jurisdiction. Railroad officials say it would cost $60,000,000 to electrify their lines in the city and the project could not be carried out for four or five years.

William S. Rann, counsel for the New York Central, will base his position on the decision of Justice Taft in the Los Angeles case. There it was held that the State Railroad Commission of California did not have authority to compel the Southern Pacific and other lines to build a union station in Los Angeles. In this case, the United States Supreme Court rules that this would in all probability require the railroads to issue new securities, which could not be done without sanction by the Interstate Commerce Commission.

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Berlin Official Studying Rapid Transit Methods Here

Emil Pavel, director of the Electric Elevated and Underground Railway, Berlin, Germany, is making a trip through this country to study rapid transit conditions here. After attending the automobile convention at Detroit during the week ended May 24, his itinerary is taking him to Chicago, Boston, Philadelphia and New York.

Since 1903 Mr. Pavel has been director of the Elevated and Underground Railway in Berlin, having particular control over operation. He also is a member of the board of supervisors of the Berlin Omnibus Company.

After he was graduated from the Berlin Technical High School in 1892, Mr. Pavel was connected with the government railways, serving as chief construction engineer in the divisions of Cöln, Essen and Erfurt. He also was for some time government representative at the Krupp works at Essen and at other factories in the Ruhr district. In 1901 he resigned from government service and joined Siemens & Halske in Berlin in charge of their electric railway department. Since Jan. 1, 1903, he has been engaged in his present work.

Wages Up Two Cents in Chicago

An increase in wages of 2 cents an hour, affecting all trainmen of the Surface Lines and the Elevated Lines in Chicago, will go into effect on June 1, in accordance with the arbitration agreement entered into more than a year ago.

The increase follows one of 3 cents an hour over the old scale, granted to the men after a board of arbitration of three men had decided the issue.

The new scale provides for pay for surface men at the rate of 70 cents an hour for the first three months. For the next nine months the pay is 73 cents an hour, and after one year the wage is 75 cents an hour, 2 cents increase for each division. This agreement continues in effect for another year, but the agreement with the various shop crafts expires in August.

For the Elevated, regular motormen will receive a flat rate of 77 cents and extra motormen will receive 71 cents the first three months, 72 cents the next nine months, 77 cents the second year and thereafter. Regular conductors will receive a flat rate of 72 cents. Extra conductors receive 70 cents the first year and 72 cents the second year and thereafter. Regular guards will receive a flat rate of 70 cents. Extra guards will receive 67 cents the first three months, 68 cents the next nine months and 69 cents the second year and thereafter.

News Notes

Will Put on Bus Lines.—The North Carolina Public Service Company, Greensboro, N. C., has announced the establishment of two bus lines within the next few months. The next step will be some definite legislation by the City Council concerning such operation.

Wants Tayler Grant Extended.—The City Council of Cleveland, Ohio, recently voted to ask the Cleveland Railway to extend operations of the Tayler grant to all sections of the city. If this is done, West Park, Nottingham and the section on Euclid Avenue beyond East Cleveland would receive service at the city rate of fare. An effort to have restored the 349 car stops in the city eliminated a short time ago was defeated.

New Magazine Appears.—An "original and distinctive" name is wanted for a new paper which made its debut in April and which is being published monthly by the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo. A prize of $25 is offered for the best suggestion. It is the editors' plan to give some interesting information about the company's business and some live stories about the activities of the various departments. Personal notes about the employees are sought so that all may become better acquainted.

Railway Has Effective Police Department.—The Kansas City Railways, Kansas City, Mo., has a police department somewhat different from that of other car companies. It consists of a chief day and night, a captain and fourteen officers, the department functioning twenty-four hours a day. A fast automobile equipped with a police siren is used for making hurried calls to places where the officers are needed. The men have full police authority and answer accident calls, handle crowds, secure names of witnesses, assist in caring for injured and clear the streets. They also arrest traffic violators or disturbers when necessary. In times of heavy traffic movement such as parades, baseball games and other special events they report to the chief dispatcher and help to distribute the load, preserving order and exercising general police authority. These men are also used as guards and watchmen at all points where money is handled. In addition to the special police force there are 115 police commissions in the transportation department of the car system.

Wage Increase Granted.—A 3-cent an hour wage increase was granted on May 17 to motormen and conductors of the Beaver, Penna-Steubenville, Ohio, division of the Steubenville-East Liverpool & Beaver Valley Traction Company's lines. A one year agreement was signed calling for a scale ranging from 49 to 63 cents an hour. Employees on the East Liverpool division who had sought a flat raise of 10 cents an hour accepted the company's compromise offer after a board of arbitration had been appointed and prepared to open its sessions. The scale also applies to trainmen on the Steubenville division and is retroactive to May 1.

Wage Hearings Concluded. — Hearings by the board of Arbitration, which have been held in the Trenton City Hall to adjust differences between the Trenton & Mercer County Traction Corporation and its employees, have been concluded. Lewis C. Parker of Westfield, Mass., chairman of the board, at the conclusion of the examination of witnesses, asked that James H. Vahey, arbitrator selected for the men, and Albert S. Richey, arbitrator for the company, submit briefs.

Wage Agreement Removed at Erie. —Trainmen in the employ of the Buffalo & Lake Erie Traction Company at Erie, Pa., have agreed to continue to work at 60 cents an hour, the same scale of wages in effect for the last year. The men had asked an increase of 5 cents an hour, while the company sought to have them accept a decrease of 5 cents an hour.

Wants Higher Fare. — The Virginia Railway & Power Company, Richmond, Va., has petitioned the State Corporation Commission for increased rate in Petersburg.

Opposes Bus Competitors.—The East St. Louis & Suburban Railway, East St. Louis, Ill., through counsel, has filed complaint with the Illinois Commerce Commission at Sprinfield against the continued operation of the Intercity Express Company of St. Louis, Mo., and the Frederick Truck Company of O'Fallon, Ill. It charges that these companies are operating bus lines in competition with the Suburban's interurban lines without securing permits to do so from the Illinois Commerce Commission.

Withdraw Demands.—Employees of the Auburn & Syracuse Electric Railway, Auburn, N. Y., recently agreed to withdraw their demands for higher wages and to renew the contract which expired on May 1. The wage scale which will continue is: City carmen, 45 cents an hour, interurban carmen, 50 cents an hour; express and freight carmen, 52 cents an hour.

Citizens Will Take Over Line.—Citizens of Greenfield and Montague, Mass., at special town meetings on May 24, ratified an agreement of the boards of selectment of these towns to take over the railway line between Greenfield and Turners Falls from D. P. Abercrombie, receiver. The purchase price is $62,000 for operation under the Massachusetts transportation area act. Four trustees, two from each town, will be named to manage the line. The first members will be for one-year and two-year terms and all subsequent members for two years each. It is stated by the receiver that as nearly as can be computed this line made an operating profit of $12,000 last year. The line has 8.7 miles trackage.

Seek Increased Wages. — Representatives of the motormen and conductors employed on the lines of the Pennsylvania-Ohio Electric Company in New Castle, Youngstown and Sharon, in conference on May 19 with representatives of the company, presented a demand for an increase of 10 per cent in wages.

Weekly Pass in Jacksonville.—The Jacksonville Traction Company, Jacksonville, Fla., has received permission as of June 1 from the Railroad Commission to change from a straight cash or token fare of 7 cents to a schedule of 10 cents cash, 7-cent tokens sold five for 35 cents and $1.25 for an unlimited-ride, transferable weekly pass. Both the tokens and the passes will be sold on the cars. The population of Jacksonville is approximately 100,000.

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Front Entrance Cars in Use.—The United Railways, Baltimore, Md., has placed two front-entrance cars on the Roland Park line as an experiment. Instead of the pay-as-you-enter type, which is used in Baltimore, the fares are paid as the passengers pass from the front to the rear. The passengers leave by a center door.

Improvement Work Abandoned.—The Worcester Consolidated Street Railway has notified the Mayor of Worcester, Mass., that it is not financially able to undertake relaying the rails on Park Avenue this year. The Mayor is making a drive for better streets and the City Council committee on streets was prepared to recommend that Park Avenue, one of the main thoroughfares, be repaved this year. The project now has been abandoned.

Strike in Alliance Settled. — Following a five-day strike on the lines of the Stark Electric Railroad, Alliance, Ohio, the men returned to work adopting the old wage scale and eliminating a section of the working agreement calling for two men on all passenger cars. The men had asked for a 9-cent increase, while the company had proposed a 10-cent reduction. Following the settlement of the strike N. H. Brown, general manager of the company, announced that one-man cars would be placed on city runs as soon as present cars could be remodeled. The present cars are full length, side entrance, pay as you leave. Under the company's plans only the two end doors will be operated by the motorman.

Asked to Accept Reduction.—Union carmen employed by the Boston Elevated Railway, Boston, Mass., have been asked by a vote of the board of trustees to accept a reduction of 5 cents an hour, beginning July 1, when the existing contract expires. The action followed recent demands made by the wage conference committee of the local asking for a new maximum of 95 cents an hour for the blue uniform men, who comprise the bulk of the employees.

No Objection to Bus Line.—With the exception of a suggestion that the city operate a municipal bus line, there was no objection made at the public hearing before the Rensselaer City Common Council on May 20 on the proposed ordinance granting permission to the Capitol District Transportation Corporation to operate buses in the city in lieu of the present Broadway-Aiken Avenue line of the United Traction Company. The transportation company will be prepared to start operating the buses as soon as the necessary permission is obtained.

Weekly Pass Continued.—At the request of the State Department of Public Works, the Tacoma Railway & Power Company, Tacoma, Wash., has consented to continue the $1 weekly pass until June 15. Manager Sullivan expressed the belief that the weekly pass had become so popular with patrons that they do not want the company to discontinue it, and he said further that the company plans to make every effort to continue it, if possible. The weekly pass was installed as an experiment about a year and a half ago. Reports to the State Department of Public Works evidence that while the sale of the pass greatly increased traffic, with about 10,000 passes sold weekly, it was unprofitable to the company. The expiration date had been set for May 25 until the present continuance was announced.

Trackless Trolley in Seattle?—Seattle may test out the trackless trolley as a means of furnishing transportation service in the outlying residence districts, it became known recently. Superintendent Clark R. Jackson of the public utilities department has been asked by city Councilmen to make an immediate investigation with a view to establishing the service on some route reaching a populous residence section now without street car facilities. Seattle is said to be particularly adaptable for such a system, as there are thickly settled districts that cannot be given street railway transportation because the Seattle Municipal Railway lacks funds to build the extension.

Another Company Increases Fares.—The Beech Grove Traction Company, Indianapolis, Ind., has been granted permission by the Public Service Commission to increase its rates to conform with the recent increase granted the Indianapolis Street Railway. In order to be on a par with the Indianapolis Street Railway in the transportation of city passengers the Beech Grove Traction Company has made arrangements with the former company to sell and interchange tickets. The fares on the lines of the Indianapolis Street Railway call for a 7-cent cash rate and four tickets for 25 cents. The filing of the application was noted in the ELECTRIC RAILWAY JOURNAL for May 24, page 826.

New York Commission in New Quarters.—The New York Transit Commission will remove its headquarters on July 1 from 49 Lafayette Street to 270 Madison Avenue. Arrangement has been made for the future occupancy of the entire building at 49 Lafayette Street, which the city owns, by the Department of Transportation, a city body created by the last Legislature. The commission has leased two floors of the building at the northwest corner of Madison Avenue and Thirty-ninth Street, comprising 23,000 sq.ft. of space. The new quarters will accommodate the 350 employees the commission retains and will also afford adequate space both for meeting and hearing purposes. On July 1 Mr. Delaney, who will head the new board, will take over his old offices as head of the forces left in the Lafayette Street building, most of whom served under him during his previous term as Transit Construction Commissioner.

Foreign News

From the Journal's Own Correspondents

Trackless Cars Succeed Tramway in Wolverhampton

After experience with the trackless trolley on its Wednesfield route, the Wolverhampton, England, Tramways proposes to introduce the same system on its Bushbury route instead of renewing the tramway track there. The conversion of the route and the extension of it for a mile are estimated to cost £9,000, and the cost of the trolley buses will be £10,500 more. The reconstruction of the tramway track, it was estimated, would cost £24,000. Single-deck vehicles seating 38 passengers each are proposed. Tenders for the vehicles and equipment have been invited.

Naples Tramway Shows Loss.—The Belgian company that owns and operates the tramway system of Naples, Italy, announces that the operation during 1923 shows a loss of 1,044,721 Belgian francs.

Belgian Coast Line Has Increased Revenue.—The summer resort link of Belgian coast towns is today better furnished with transport facilities than before the war. The electric line running to the westward from Ostende to Blankenberghe had receipts of 6,627,000 francs in 1922, which increased to 7,872,000 francs in 1923.

Escalators Supersede Lifts.—Three escalators, which supersede five lifts, were put into service at the Bank of England station of the Central London Railway on May 7. The cost of construction has been about £96,000. Each escalator is driven by a 45-hp. motor. The speed is 90 ft. per minute, and with two passengers on each step each escalator can carry 135 passengers a minute, or more than 24,000 per hour for the three. A unique feature is that the three escalators are abreast in one shaft 27 ft. in diameter. The work of excavation presented extraordinary difficulties owing to the number of underground pipes that had to be dealt with. It was begun in August last and has been carried out without any interference with the railway service. The central escalator is reversible, so that two of them can be worked in the ruling direction of traffic.

Glasgow Subway Electrification. — The estimated cost of improving the Glasgow subway railway and the conversion of it from cable to electric traction is £600,000, or about £100,000 per route-mile, according to a report presented to Glasgow Town Council. Another report has been called for as to the practicability of increasing the present gage of 4 ft. to the standard gage of 4 ft. 8½ in.

Over a Billion Passengers in Paris.—The number of passengers carried in 1923 by the street car and autobus sections of the Paris, France, "Transports en Commun" is reported by the Prefecture of the Seine as 1,024,719,219. This compares with 917,723,323 passengers in 1922, showing an increase of 11.6 per cent. Receipts in the same period have gone up from 297,000,000 francs to 330,000,000 francs.

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Financial and Corporate

Jersey Plan Sanctioned

Commission Approves Readjustment Terms of Public Service Corporation—Valuation Illegal

The Board of Public Utility Commissioners of New Jersey has approved the application of Public Service Railway for the sale of the Public Service Terminal Building in Newark, to Public Service Corporation of New Jersey, the consideration being $7,500,000, the purchasing corporation giving $2,500,000 in cash and assuming $5,000,000 first mortgage bonds outstanding.

At the same time the board approved the application of the railway to change its capital stock from par stock to non-par stock of the full amount, also authorizing the issuance of 500,000 shares non-par value capital stock of Public Service Transportation Company, which is a subsidiary of the Public Service Corporation of New Jersey. The new stock is to be sold at $10 a share, the proceeds being used to pay for buses already acquired and others to be purchased as part of a general scheme for a co-ordinating trolley and bus service, to be operated in the New Jersey communities served.

The board has filed a decision approving the application made by Public Service Gas Company and Public Service Electric Company, subsidiaries of the Public Service Corporation of New Jersey, for merger of the two into a new company to be known as Public Service Electric & Gas Company.

The terms of the plan as originally announced have been supplemented by making provision for a sinking fund for the purchase of the perpetual interest bearing certificates of the corporation and the pledge of a 7 per cent instead of a 6 per cent preferred stock of the Public Service Electric & Gas Company as collateral therefor.

As explained in the ELECTRIC RAILWAY JOURNAL for Dec. 22, 1923, page 1070, the application for permission to sell the terminal set forth that occupants of the terminal, among them the Public Service Gas Company and the Public Service Electric Company, desired additional office space and that the railway deemed it inadvisable, if it had the available funds, which it has not, to make the necessary capital investment for the enlargement. It was further explained that the sale of the terminal by the railway would put the property in the possession of an owner who could advantageously make the enlargement and would in addition put the railway, which presented the petition, in possession of considerable funds to assist it in and about its railway business.

Judge Rellstab on May 17 filed with the clerk of the United States District Court at Trenton, N. J., a memorandum handing down a final decree in the injunction proceedings of the Public Service Railway against the Board of Public Utility Commissioners of New Jersey declaring as confiscatory and illegal the valuations by the board on the railway properties, and that the rate orders based on those valuations are correspondingly illegal.

The decree enjoins the state commission from fixing the railway's passenger rates, pending an experiment now being made on the company's lines of the zoning system of fares.

Judge Rellstab's final decree upholds a previous decision of the Federal District Court, where three judges sat on the case, declaring that the utility board's valuation of the railway's property was palpably below the true values.

As a result of the decree, the present rate of passenger fares will continue in effect.

Under the modified decision of the federal court, as returned by Judge Rellstab last September, the railway was authorized to charge a 5-cent fare within the city limits of larger cities of the State, and a 10-cent fare, without transfers, for rides beyond the limits of the cities. This arrangement was definitely established on May 17 with the filing of Judge Rellstab's final decree.

The injunction proceedings against the utility board were based on the contention of the railway that a fare of 7 cents, with 2 cents for a transfer, ordered by the commission, was confiscatory and should be set aside.

The 5-cent-city-limit fare prevails in all the large cities in which the company now operates.

San Francisco Municipal Loss $272,046

For the Year Ended June 30, 1923, an Excess of Income Over Operating Expenses and Reserves is $13,831, But Taxes and Similar Items Amount to $285,876

THE Municipal Railway of San Francisco continued to lose during the year ended June 30, 1923, according to the annual report for that period as prepared for and approved by the finance committee of the Board of Supervisors, and recently made public. Total revenue for the year was $3,005,201, and interest on securities owned increased this by $55,297, making a total income of $3,060,498. Deducting operating expenses of $2,302,055 left a net of $758,443. Against this was charged interest on the funded debt, $205,723, and reserve for depreciation and accidents (18 per cent of gross earnings), $538,889, leaving the balance $13,831.

For the purpose of securing a comparison between the results of operation of the municipally owned utility and those operated by private capital, the charter of the city and county of San Francisco provides that the operating reports shall include certain comparison charges consisting of items which constitute part of the actual cost of operating privately owned com-

COMPARATIVE INCOME ACCOUNT, SAN FRANCISCO MUNICIPAL RAILWAY, DEC. 28, 1912, TO JUNE 30, 1923

	Years Ended June 30		Dec. 28, 1912 to June 30,
	1922	1923	1923
Passenger revenue	$2,884,815	$2,993,829	$22,242,008
Miscellaneous revenue	11,300	11,372	94,004
Total revenue	$2,896,116	$3,005,201	$22,336,012
Interest on securities owned	48,476	55,297	270,155
Total income	$2,944,591	$3,060,498	$22,606,167
Operating expenses:			
Way and structures	$112,630	$109,573	$684,453
Equipment	216,315	216,606	1,307,850
Power	383,140	424,695	2,903,815
Conducting transportation	1,324,927	1,371,844	9,476,851
Traffic	79	16	3,727
General and miscellaneous	117,476	179,322	796,459
Loss on road retired	.....	.....	8,185
Total operating expense	$2,154,566	$2,302,055	$15,181,340
Excess of income over operating expense	$790,025	$758,443	$7,424,827
Less interest on funded debt	215,088	205,723	2,178,739
Excess of income over operating expenses and interest	$574,936	$552,720	$5,246,088
Less reserve for depreciation and accidents (18 per cent of gross earnings)	519,267	538,889	4,002,663
Excess of income over operating expenses, interest, depreciation and accident reserves	$55,669	$13,831	$1,243,424
Less charter comparison charges	246,535	285,877	1,972,580
Net income	*$190,866*	*$272,046*	*$729,156*
Analysis of comparison charges:			
*State franchise tax—4½ per cent of gross earnings	$152,038	$157,775	$1,171,111
†Municipal franchise tax—3 per cent of gross earnings	86,544	119,753	697,231
Municipal car license	2,970	2,835	27,124
Federal income tax	.....	.....	13,271
Salary of clerks	.....	.....	4,872
Law expenses	.....	.....	13,500
Insurance	4,983	5,513	45,471
Total	$246,535	$285,876	$1,972,580

* Franchise tax percentage has varied in different years.
† Municipal franchise tax now increased to 4 per cent.
Italics indicate loss or deficiency.

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STATISTICAL DATA, MUNICIPAL RAILWAY OF SAN FRANCISCO—FISCAL YEAR ENDED JUNE 30, 1923

	Total Amount	Per Car-Mile	Per Car-Hour	Ratio to Passenger Revenue
Total passenger revenue	$2,993,828.70	$.3674	$3.5091	1.00
Total operating expenses (taxes and depreciation not included)	2,302,055.28	.2825	2.6983	.....
Total operating earnings (taxes and depreciation not included)	691,773.42	.0849	.8108	0.2311
Total taxes and charter charges	285,876.50	.0351	.3351	0.0955
Depreciation	538,889.17	.0661	.6316	0.18
Operating expenses, depreciation and taxes	3,126,820.95	.3837	3.6650	1.0444
Net deficit from operation	*132,992.25*	*.0163*	*.1559*	0.0442
Platform expense (62½ cents per hour, eight-hour day)	$1,130,575.35	.1387	1.3252	.....
Passenger car and bus mileage	8,148,703.18			
Passenger car and bus hours	853,156.46			

	Total Amount	Per Car-Mile
Number of passenger cars owned	189	
(Twenty additional cars under construction)		
Number of work cars owned	4	
Total number of cars owned	193	
Total number of buses owned	8	
Total number of cars and buses owned	201	

	Total Amount	Per Car-Mile
Number of passengers carried—		
5-cent fares	59,368,024	
Government tickets—5-cent fares	40,906	
School tickets—2½-cent fares	916,375	
‡Revenue transfers—2-cent fares	329,479	
Free transfers	12,359,780	
Free pass (employees, etc.)	619,196	
Total passengers carried	73,633,760	9.04

‡ Transfers received at Fillmore and Union Streets treated as revenue transfers pending result of litigation. Italics indicate loss or deficiency.

panies but which the municipally owned utility is not required to pay. For the year these charges amount to $285,876, leaving a net deficit of $272,-046. This compares with a similar deficit for the preceding year of $190,866.

There has been a continuing deficit, as shown by the cumulative income account for the period from Dec. 28, 1912, to June 30, 1923, amounting to $729,156, when the comparison charges are included. Neglecting these, there has been an excess of income over operating charges, interest and reserves of $1,243,424 for the same period.

Particular attention is given in the report to the explanation of the items in the balance sheet, which is reproduced in condensed form herewith. The capital assets consist of cash in bond funds, $17,428, which represents unexpended balance of the bond fund cash now in possession of the treasurer; road and equipment, $7,267,838, and general expenditures, $324,873. These latter accounts represent the total cost of the road and equipment, the net increase in the property account for the year being $465,201, consisting of $495,851 total additions less $30,650 for retiring twenty-four old Union Street cars.

The current assets consist of $991,682 cash in various funds, $1,033,384 for the book value of the securities bought for the account of the depreciation fund; accounts receivable, $11,362; materials and supplies, $204,968.

Deferred assets have not changed during the year.

On the liabilities side, the funded debt item represents the par value of the bonds outstanding in the hands of the public on June 30, 1923. Current liabilities include accounts and vouchers payable, $227,769 and interest due on funded debt, $115,358. The reserves include a reserve for depreciation of $1,508,327 and a reserve for compensation insurance of $107,413. The depreciation reserve includes the book value of securities in the depreciation fund, $1,033,384, and cash in the depreciation fund, $496,731; from this is deducted outstanding warrants of $21,788.

The municipal railway has no capital stock and the excess of its assets over its liabilities represents surplus. In the preparation of the balance sheet, it is stated, this surplus has been divided into two classes, first that which was created by donations or contributions and second, that which was accumulated from the earnings resulting from the operation of the road. The contributed surplus includes premiums realized from the sale of bonds, $26,000, and contributions from general taxes, $306,552. In surplus from income is included $1,289,000 representing bonds retired from income; $101,000 reserve for bond redemption. These amounts, totaling $1,390,000, represent the income which has been set aside in cash for the redemption of bonds, either actually redeemed and canceled or in the form of cash in the hands of the treasurer. Two items totaling $131,124 offset similar assets for the construction of the Twin Peaks and Stockton Street tunnels in deferred assets.

An item of considerable interest to railway operators is the charter reserve for insurance and taxes of $566,-592. As explained previously, there are set aside certain sums for comparison with private operation, of which this item is a part. The municipal system not having to pay any of these charges, the receipts from operation were deposited in the operating cash fund without any restrictions as to how they were to be used. As a matter of fact, however, most of the cash in the operating fund represented by such comparison charges actually was expended in new construction and addition and betterment work, so that these reserves representing obligatory charter comparison charges have in reality been used for betterments. For the purpose of making the balance sheet reflect the actual results of operations, it is stated, the amount expended in addition and betterment work has been reflected in an account entitled "additions and betterments from income," and the charter reserves for insurance and taxes carry a balance equal only to the unused portion of the original income. The amount in the additions and betterments account is $1,897,001.

Operating surplus is made up as follows:

Surplus, June 30, 1922, as per last report	.....	$211,407
Add:		
Reduction of compensation insurance reserve corresponding to dividends declared by the state compensation insurance fund adjustment	$25,713	
Transfers from depreciation fund to operating fund	37,867	63,580
		$147,827
Deduct:		
Amount transferred from income account	*272,046*	
Interest on bonds credited to income but deposited in the depreciation fund	*55,297*	
Reconstruction of roadbed, Columbus Avenue	*9,307*	*$336,650*
Italics indicate loss or deficiency.		*$484,477*

The statement of bus line operations for the year shows total revenues of $39,875 and expenses of $61,302, giving a net loss for the year of $21,427. This compares with a net loss of $29,086 in 1922 on a total gross of $38,863. These figures, however, do not include any supervision or other overhead or comparison charges.

The following table summarizes the operating statistics for the bus lines for the last two fiscal years:

	1923	1922
Receipts	$29,379	$28,565
Bus-hours	28,106	28,189
Receipts per bus-hour	$1.05	$1.01

STATEMENT OF BUS LINE OPERATIONS, MUNICIPAL RAILWAY OF SAN FRANCISCO—YEAR ENDED JUNE 30, 1923

Revenues:			
Passenger revenue	.....	$29,379.45	
Quartermaster tickets	$0.55		
School tickets	561.00		
Local transfers	9,933.64	10,495.19	
Total revenues			$39,874.64
Operating Expenses:			
Repairs to buses	.....	$12,002.32	
Tire expense	.....	11,684.80	
Conductors, Chauffeurs—buses	.....	18,062.10	
Garage expens.	.....	13,306.21	
Depreciation (18 per cent of receipts)	.....	5,288.28	
Compensation insurance	.....	958.40	
Total operating expenses	.....	.....	61,302.11
Net loss for year	.....	.....	$21,427.47
Average net loss per day	.....	.....	58.70

COMPARATIVE CONDENSED GENERAL BALANCE SHEET, MUNICIPAL RAILWAY OF SAN FRANCISCO, AS OF JUNE 30, 1923

Assets	1923	1922	Increase or *Decrease*
Capital assets	$7,610,139	$7,144,938	$465,201
Current assets	$2,241,396	$2,378,146	*$136,749*
Deferred assets	$132,123	$131,123	$1,000
Total assets	$9,983,659	$9,654,208	$329,451
Liabilities, Reserves and Surplus			
Funded debt	$4,192,000	$4,390,100	*$198,100*
Current liabilities	$343,127	$327,340	$15,787
Reserves	$1,615,740	$1,698,842	*$83,101*
Contributed surplus	$332,553	$332,553	
Surplus from Income	$3,500,239	$2,905,373	$594,866
Total surplus	$3,832,792	$3,237,926	$594,866
Total liabilities, reserves and surplus	$9,983,659	$9,654,208	$329,451

Italics indicate loss or deficiency.

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$500,000 Stock Taken by Chicago "L" Employees in Week

At the end of the first week of the campaign by the Chicago Rapid Transit Company to sell its new issue of $5,000,000 prior preferred 7.8 per cent stock, employees of the company, on the basis of incomplete returns, had purchased practically $500,000, par value, of the issue. This is half of the total amount of $1,000,000 of the new stock which was set aside for the employees and which, under the plan adopted, they have the exclusive right to purchase on favorable terms until after June 1. From the sales made during the first week, those in charge of the marketing of the securities are inclined to believe that the employees of the company will quickly absorb the total amount set aside for them. After June 1 the stock will be offered to the general public at par, with employees acting as salesmen.

An interesting feature of the sale is a daily newspaper issued by the central executive committee. This gives the up-to-the-minute news of the progress of the campaign.

Division of the company into sections to stimulate competition has created a great deal of interest in all departments. The returns are tabulated as fast as possible after they are received in the headquarters established for the stock sales. These results are then posted on a large bulletin board extending across the entire end of the room, giving it much the appearance of a broker's office. The data are posted by divisions and are analyzed so as to show for each division the total number of employees, total number of sales and total shares of stock sold. In this way interesting facts about sales are compiled, and these comparisons help to stimulate and maintain the enthusiasm which has been manifested by the various salesmen and other employees taking part in the campaign.

STOCK SALE DAILY NEWS

Stock Reports — The "L's" Greatest Newspaper — XXXX Edition

Vol. I. CHICAGO, MAY 21, 1924 No. 1

Opening Sale of Rapid Transit Company 7.8% Prior Preferred Stock

STOCK SALE STARTS OFF WITH A BANG

Employees Show Eagerness to Invest in Their Own Company

THEY'RE off to a flying start. Whof Why the Division Managers and their captains in the race to sell Rapid Transit Company 7.8% Prior Preferred Stock.

Are they going to put it over with a BANG!

That's just what they are going to do, with the assistance of every man and woman employed on the "L," and members of their families.

It ought to be easy to sell this stock. It is the first chance employes of the "L" have had to make a profitable investment in the stock of the company for which they work. A dividend check every month sounds mighty good.

It isn't the purpose of the "L's" Greatest Daily to tell you about the good qualities of this particular stock. The volunteer salesmen will do that. The purpose of this newspaper is to tell how it is being done.

There are big days ahead of the old "L." Big improvements are to be made with the money derived from this sale of stock. Improvements mean more work, more cars, more runs.

Here are the names of the men on the different divisions who are in charge of the stock sales:

Division	Manager
Metropolitan	J. A. Jarvis
North Side	W. J. Sacks
South Side	W. W. Hawthorne
Lake Street	John J. Moran
Loop	Walter R. Helton
Shops	H. A. Johnson
Road	Howard P. Savage
Electrical	Charles H. Jones
General Offices	E. E. Kretschmer

An executive committee has been selected composed of Bernard J. Fallon, chairman; Edward J. Blair, M. J. Feron, J. H. Mallon, E. A. Brion and Luke Grant.

Each Division Manager has a group of captains working under his direction. Later when this stock is offered to the public each of these captains will have about ten men working under him.

That gives you an outline of the organization. Later issues of this paper will give you more detailed information.

THE BOX SCORE

Following is the box score of stock sales by Divisions at the close of the second day's sales, May 20.

Division	Subscriptions	No. Shares
Lake Street	42	87
Metropolitan	36	103
North Side	41	143
South Side	33	92
Loop	42	111
Road Department	37	110
Shop Department	96	330
Electrical	17	57
General Offices	67	366
	411	1,399
Cash	76	281
Deferred Payments	235	1,118
	411	1,399

That is a fine start. Only 8,600 more shares to sell to put us "over the top." Ten days in which to do it. It's dead easy with a little "pep."

Under the Gun

Peter E. Johnson, electrical department, is the holder of the first shares sold. To achieve this honor he went to the offices of the Utility Securities Company before the sale was officially opened and made his purchase. Fast work, Pete!

Roses and Thorns

Miss Marie McNamara of the treasurer's office has been temporarily assigned to stock sale headquarters. With Ed Blair, Ed Kretschmer and Walter Helton as coworkers, one is almost tempted to make a crack about "beauty and the beasts" or something.

Human Nature

War Horse John Moran, who is in charge of the Lake Street division, says that one of his lieutenants felt hurt because the employes didn't come scrambling into the office after such a good stock buy as is offered.

"They ain't made that way," says John.

KIRK OF LAKE STREET AVERTS MAMMOTH HOLDUP

Casts Caution to the Winds When Beset by Bold Bad Bandits; Read On

Kirk, Lake Street division porter, brings in the heavy stock sale receipts from his division each day to sale headquarters.

Yesterday he was riding on a lightning Lake Street flyer, thinking seriously of a sumptuous repast of ham and gravy and yams, when his day's work was done, when he noticed two hard-boiled looking birds seated across from him eyeing his mail bag with its brass padlock and chain very suspiciously.

Kirk cast an anxious glance at the two passengers and bethought himself of the heavy receipts with which Wyman, Ogan and Schoen had filled the bag. Kirk squirmed a little and again glanced at the ragged pair, who seemed to keep him under surveillance out of the corners of their respective eyes.

"Those fellows have got some inside dope and are going to roll me for this jack," thought Kirk. "I'll get off at a station where there is a copper near."

As he arose to get off Kirk's wildest fears were realized. His two companions also got up.

"Feet do yo' duty," mumbled Kirk.

He reached the street and his heart leaped as he saw a policeman directing traffic. But it choked him again as he felt a tug at his elbow and turned to see the same pair who followed him. He was about to shout for aid as one of the men said:

"Hey, big boy, gotta match?"

Has Such a "Taking" Way

Miss Josephine Pike of the President's office has a "taking" way about her. If there are any around the General Offices from whom she hasn't taken a subscription, they needn't feel worried about it. She'll get them yet.

N. P. Hanson of the Met says he has worked on the "L" since it was a surface line, before it grew up, and he has never seen such a chance for a good investment. Hanse knows what he is talking about, too. Watch him get the subscriptions.

It is reported that Bob Griffin ran around the Loop so often after subscriptions that he got dizzy. Bob gets them, too.

First Page of First Issue of Paper Published in Chicago Stock Campaign

New York Railways' Property Ordered Sold

As a step in the reorganization of the New York Railways, New York City, the property of the company and its subsidiaries is advertised for sale on the morning of July 7. The sale is in the action brought by merchandise creditors against the company.

Among the parcels to be sold are the franchises and railroads of the South Ferry Railroad, the Lexington Avenue & Pavonia Ferry Railroad, the Central Crosstown Railway, the Chambers & Grand Street Ferry Railroad, the Metropolitan Crosstown Railway, the Metropolitan Street Railway and the Columbus & Ninth Avenue Railway. In addition there are a number of parcels of real estate.

Auction Sales in New York.—At the public auction rooms of A. H. Muller & Sons there were sold this week $3,000 of Interborough-Metropolitan Company collateral trust 4½ per cent gold bonds; receipt for deposit certificate; $15 lot.

Service to Be Discontinued.—Service supplied by the Blue Ridge Traction Company, Danielsville, Pa., will be discontinued on June 1. Notices to this effect have been posted at stations along the line by the Sofranscy Company of Allentown, which recently purchased it from the trustees. On the above date work will begin on the dismantling of the entire line, which runs from Walnutport to Danielsville.

Net Corporate Income, $28,232.—The Stockton Electric Railroad, operating in Stockton, Cal., reports to the Railroad Commission for the year 1923 that its operating revenue was $335,484 and operating expenses $278,794, giving a net operating revenue of $56,690. The net corporate income for the year was $28,232. The surplus at the beginning of the year amounted to $397,410. Miscellaneous additions to surplus for 1923 amounted to $2,035, and miscellaneous deductions were $89, leaving an accumulated surplus at the end of the year of $427,638.

Seeks Partial Discontinuance.—Application for permission to discontinue the operation of trolley cars between Pennington and Hopewell, N. J., has been filed with the Public Utility Commission by the Trenton & Mercer County Traction Corporation. The company wants to operate buses in places of trolleys. The route is 5.6 miles. The traction company argues that the route has annually shown a considerable deficit, amounting in 1923 to $7,000; that continued operation of the cars would mean the necessity of paying in the next year or two a total of $50,000 for the reconstruction of pavements in Pennington and Hopewell, and that no hope of any appreciable increase in traffic seems to exist.

Refunding Mortgage Bonds Offered.—The National City Company and Halsey, Stuart & Company, New York, are offering at 94 and interest to yield more than 6½ per cent $3,500,000 first lien and refunding mortgage gold bonds of the Portland Electric Power Company, Portland, Ore. The bonds, known as Series B, 6 per cent, are dated May 1, 1922, and are due May 1, 1947. A mortgage provides for a sinking fund requiring cash payments of at least $450,000 each year for the purpose of purchasing or redeeming first lien and refunding mortgage bonds, of which $15,388,500, will be outstanding, including this issue.

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Personal Items

F. T. Griffith Heads N. E. L. A.

Franklin T. Griffith, president of the Portland Electric Company, Portland, Ore., formerly the Portland Railway, Light & Power Company, was elected president of the National Electric Light Association at the annual meeting of that body in Atlantic City during the week ended May 24. Mr. Griffith has been president of the company at Portland since 1913. He is a lawyer by profession, and as chairman of the water power development committee of the N. E. L. A., he has untiringly worked to bring about far-sighted interpretations of these laws with working rules and regulations so that the most beneficial results might be obtained. He was born in Minneapolis in 1870 and was admitted to the bar in 1894 having qualified for the legal profession while he was supporting himself. He handled legal matters for the company at Portland before he was elected an officer of the company. He has been an N. E. L. A. vice-president since 1920.

W. C. Peters Sales Manager National Railway Appliance

W. C. Peters has been appointed manager of sales and engineering of the National Railway Appliance Company, New York. "Bill" Peters has been manager of the New England office of that company for the last four years. His new position gives him supervision of the sales forces in New York, Boston, Washington and Chicago, where district offices are maintained.

Mr. Peters received his technical training at the Worcester Polytechnic Institute. In June, 1911, he entered the employ of the Boston & Albany Railroad as a special apprentice in the locomotive shops at West Springfield, Mass., gradually advancing to the position of assistant mechanical engineer in the office of the superintendent of motive power at Boston. This position he held until America's entrance into the World War, going overseas in July, 1917, with the Fourteenth Engineers (Light Railway) serving as first lieutenant, and subsequently returning to his former position with the Boston & Albany Railroad. In April, 1920, he joined the National Railway Appliance Company as representative in the New England territory, with headquarters at Boston.

F. M. Richards has been selected to fill the vacancy in the New England territory caused by Mr. Peters' change to the main office of the National Railway Appliance Company in New York. Mr. Richards, previous to this change to the Boston office, was connected with the New York office of the company. This new territory will be familiar to Mr. Richards as he formerly was connected with the Atlantic Shore Line Electric Railway at Kennebunk, Me., in the capacity of electrical engineer.

William G. Boteler, superintendent of the Coast Cities Railway, formerly the Atlantic Coast Electric Railway, Asbury Park, N. J., has tendered his resignation. Mr. Boteler had been with the Asbury Park company for the past three years, having formerly been in charge of the now defunct Monmouth County Electric Company, operating between Long Branch and Red Bank, N. J. George B. Cade, assistant to the president of the Coast Cities, is temporarily discharging the duties of the position made vacant by the resignation of Mr. Boteler.

L. D. Albin, formerly general sales manager of the Ingersoll-Rand Company, New York City, has been elected vice-president in charge of European sales of that company. D. C. Keefe, formerly assistant general sales manager, has been appointed to succeed Mr. Albin as general sales manager.

R. B. Gummit is now superintendent of the Intercity Terminal Railway, North Little Rock, Ark. He was formerly assistant superintendent of the railway department of the Arkansas Central Power Company.

William E. Boyd, Jr., of Wheeling, W. Va., has just been promoted to the position of superintendent in charge of the Steubenville district of the Wheeling Traction system of the West Penn interests, which includes the Wheeling-Steubenville division, the Steubenville-Weirton division and the Steubenville-Mingo-Brillian division as well as a number of smaller lines. Mr. Boyd entered the service as a conductor. He was promoted to assistant train dispatcher, then to assistant superintendent and finally to superintendent of the Steubenville division. He has been identified with the Wheeling Traction Company for a number of years. During the World War Mr. Boyd was attached to the sixty-third engineers. Before entering the service of the Wheeling Traction Company he was connected with the Wheeling *News and Intelligencer*.

John V. Strange has been appointed operating manager of the Carolina Power & Light Company, Raleigh, N. C. He was for a number of years assistant general manager of the Pacific Power & Light Company, Astoria, Ore.

Elbert H. Henning has resigned as superintendent of the Niagara Falls local lines and the Park & River division of the International Railway, Buffalo. He has held that position for twelve years. Mr. Henning had been in the employ of the International Railway for twenty-seven years. Until the appointment of a general superintendent of interurban divisions of the International with headquarters at Niagara Falls six months ago, Mr. Henning was superintendent of the Buffalo-Niagara Falls, Buffalo-Lockport and Lockport-Olcott interurban divisions of the International Railway. He started as a conductor on the International lines and worked his way up through the ranks. He has made no plans for the future. Mr. Henning's successor has not yet been named. The duties of the office which Mr. Henning vacates will be taken over temporarily by the superintendent of the interurban division.

R. D. Beard, formerly secretary and treasurer of the Fort Smith Light & Traction Company, Fort Smith, Ark., is now with the Northern States Power Company as supervising auditor with headquarters in Minneapolis, Minn.

R. A. Prichard has been appointed assistant superintendent of the railway department of the Arkansas Central Power Company, Little Rock, Ark. Mr. Prichard has been associated with the Arkansas Central Power Company for the past twenty years. He entered the service as conductor.

Dr. Wilhelm Mattersdorf and **Wilhelm Stein** of the Hamburg Elevated Railway, who have been in this country on a short visit, returned to Germany on May 28. In company with Gustave Leo, chief of the Hamburg state civil engineering department, they inspected a number of rapid transit lines and electric railways in the larger cities of this country. Dr. Mattersdorf, before sailing, said that the trip had been very instructive and that the delegation hoped, after its return, to make use of the impressions derived.

Obituary

John E. Harvell

John E. Harvell, division manager of the Virginia Railway & Power Company, died recently at his home in Petersburg, Va., after a long illness. Mr. Harvell had been with the company for many years and was in charge of its railway operations in Petersburg, in Richmond and on the company's Petersburg-Richmond interurban line.

Mr. Harvell's experience extended over thirty-seven years in construction work and in the operation of railway, light and power activities. It was in 1887 that he secured his first job as a lineman with the Upper Appomattox Company, a pioneer water company. A few years later he was made assistant superintendent and still later was promoted to the position of superintendent of operations. In 1898 when the interurban line was put into operation between Richmond and Petersburg, Mr. Harvell was placed in charge of the service. Later his best attention was given to hydraulic power development which was being made on the Appomattox River, but in 1909 when the Virginia Railway & Power Company was organized he continued in charge of the operations of the interurban and Petersburg city lines. From then on he became steadily more prominent in both the railway and light and power departments until in the fall of 1921 he assumed new duties as general manager of the Richmond-Petersburg division of the property, succeeding C. B. Buchanan, but continuing to have full charge of the company's light and power business throughout the entire system.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Regulation from Within

Can Abuses Which Give Rise to Government in Business Be Eliminated by the Voluntary Action of the Industry Itself?

The advancement of science and our increasing population require constantly new standards of conduct and breed an increasing multitude of new rules and regulations, according to Herbert Hoover, Secretary of Commerce, speaking before the recent annual meeting of the United States Chamber of Commerce at Cleveland. A host of such regulations are necessary to maintain human rights in this industrial era. The question to consider is whether these restrictions are to be developed solely by government or whether they cannot in some large part be developed by voluntary action of business.

No one disputes the necessity for constantly new standards of conduct in relation to our modern tools and inventions. Our public utilities are wasteful and costly unless we give them a privilege more or less monopolistic. At once when we have business affected with monopoly we must have regulation by law. Much of even this phase might have been unnecessary had there been a higher degree of responsibility to the public, higher standards of business practice among those who dominated these agencies in years gone by.

There has been, however, a great extension of government regulation beyond the field of public utilities into the fields of distribution of commodities and credit. When legislation penetrates the business world it is because there is abuse somewhere. A great deal of this legislation is due rather to the inability of business to so organize as to correct abuses, rather than to any lack of desire to have it done.

The vast tide of these regulations that is sweeping onward can be stopped if it is possible to devise out of the conscience and organization of business itself those restraints which will cure abuse, eliminate waste and prevent unnecessary hardship in the working of our economic system. It is vitally necessary that we stem this tide if we would preserve that initiative in men which builds up the character, intelligence and progress of our people.

Practically our entire American working world is now organized into some form of economic association. We have trade associations and trade institutes embracing particular industries and occupations. We have chambers of commerce embracing representatives of different industries and commerce. We have the labor unions representing the different crafts. We have associations embracing all the different professions—law, engineering, medicine, banking, real estate, and what not. We have farmers' associations, and we have the enormous growth of farmers' co-operatives for actual dealing in commodities. Of indirect kin to this is the great increase in ownership of industries by their employees and customers, and again we have a tremendous expansion of mutualized insurance and banking.

Association activities are the promising machinery for much of the necessary determination of ethical standards. We have in them not only the agencies by which standards can be set but by co-operative action among the associations representing the different stages of production, distribution and use we can secure a degree of enforcement far wider than mere public opinion in a single trade. When standards are agreed upon by the associations representing the manufacturer and distributor and those representing the user we have a triple force interacting for their enforcement.

Business Holding Up Well

Business as a whole, measured by any other than the peak standards of 1920 and early 1923, is still at a fairly high level. This is the conclusion reached by the Guaranty Trust Company, New York, based on wide study by its experts anticipatory of the coming summer season.

Changes which are taking place were easy to forecast. The readjustments were not unexpected. The persistence of generally cautious buying by distributors and the close conformity of production with current scales of consumption, as well as the maintenance of an unusually strong position of the banks, have preserved the bases for orderly changes now under way.

The continued ease in the money market represents a credit situation markedly different from that obtaining in the latter part of 1920. There is no possibility of such drastic financial readjustments as were then necessary.

During the greater part of the period since the spring of 1923 the trend of the general level of commodity prices has been distinctly downward. Such a trend is commonly characterized by narrowing profit margins, smaller trade volume and reduced demand for labor, with a consequent decline in wage levels. The peculiarity of the situation during the last year lies largely in the relation between the movements of different groups of commodity prices, which has been such as to prevent a general drastic reduction of profit margins. While wage levels, representing one important group of costs, have been high, the prices of raw materials and other producers' goods, representing another group of costs, have declined with relative rapidity.

The survey says it is apparent that the present conflicting tendencies cannot go on indefinitely. With commodity prices declining and wage levels rising, the cost of labor is becoming an increasingly important factor in the ultimate prices of consumers' goods. This fact is reflected in the growing disparity between prices of commodities in the different stages of production and distribution. The longer these contrary movements persist, the more difficult it will be for employers to operate at a profit, and the stronger will become the resistance to further wage advances.

The anomaly in present conditions lies not so much in the relative positions of wages and prices as in the directions of their movements. Rising wage scales normally exert a strong upward pressure on the price level, both by increasing the demand for consumers' goods and by raising the costs of producing them. At the same time, declining commodity prices tend to lower wages by making it unprofitable to employ labor at existing levels. The bank sees wage reductions as inevitable if the present decline in commodity prices continues. The hope is expressed that workers will recognize the necessity of revising wage scales to conform to the movement of prices.

Large Lumber Cut in 1923

The lumber cut in 1923 of 733 large sawmills, reporting to the Census Bureau, shows a rate of increase over the cut of the same mills in 1922 of 13.9 per cent, according to the United States Department of Commerce.

These mills contributed 47.3 per cent of the total reported cut of all mills in 1922, on which basis the reported cut for 1923 will equal 36,000,000,000 feet, or the largest reported since 1914.

In 1920 the Forest Service estimated that the total cut of lumber was 33,800,000,000 feet on the basis of 29,878,360,000 feet as reported by 15,978 mills. On the same relative basis, the total cut of the country in 1923 would be the largest since 1913.

The figures for 1923 from 733 mills are considered by the Census Bureau as indicating with fair accuracy the conditions prevailing in the industry in the important lumber regions, since the mills to which they relate are distributed in twenty-eight states and contributed 47.3 per cent of the total cut of all mills reporting for 1922. All but two states, Louisiana and Missouri, show increases for 1923 over the output of the preceding year.

Metal, Coal and Material Prices

Metals—New York	May 27, 1924
Copper, electrolytic, cents per lb.	12.75
Copper wire base, cents per lb.	15.25
Lead, cents per lb.	6.95
Zinc, cents per lb.	6.16
Tin, Straits, cents per lb.	41.50
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.425
Somerset mine run, Boston, net tons	2.175
Pittsburgh mine run, Pittsburgh, net tons.	1.875
Franklin, Ill., screenings, Chicago, net tons	2.175
Central, Ill., screenings, Chicago, net tons.	1.625
Kansas screenings, Kansas City, net tons..	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.36
Weatherproof wire base, N.Y., cents per lb.	17.25
Cement, Chicago net prices, without bags.	$2.20
Linseed oil (5-bbl. lots) N. Y., per gal.	$0.97
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	12.25
Turpentine, (bbl. lots), N. Y., per gal.	0.88

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Fifty New Steel Subway Cars Being Delivered

Delivery of fifty new subway cars has been begun by the Pressed Steel Car Company of Pittsburgh in fulfillment of the order filed last summer by the Brooklyn-Manhattan Transit Corporation. Gerhard M. Dahl, chairman of the executive committee of the railway, says that about twenty of these are to be used on the western half of the new Fourteenth Street-Eastern Subway line, operation of which he believed would be begun about July 1.

The Brooklyn company has agreed to operate the western half of the Fourteenth Street-Eastern line as soon as it is equipped, in order to provide rapid transit to Fourteenth Street and Sixth Avenue, Manhattan, for the residents of the vicinity of North Seventh Street, Metropolitan Avenue and Bushwick Avenue, as far east as Montrose Avenue. It is not anticipated by the company officials that operation of this portion of the Fourteenth Street-Eastern line will relieve congestion at Canal Street. The congestion at that point is almost entirely due to the fact that the city has not completed the Fourteenth Street-Eastern line to East New York, as it agreed to do in 1913, where the line would connect with the Canarsie and Jamaica lines.

Rolling Stock

Baltimore & Ohio Railroad, Baltimore, Md., acting for the Staten Island Rapid Transit Railway, has asked for bids for eighty electric multiple-unit cars in accordance with the general design described and illustrated in the ELECTRIC RAILWAY JOURNAL for May 17, page 776. The specifications for the cars, motors, control, airbrakes, etc., were approved by the Public Service Commission and the New York Transit Commission before inquiries were sent out for bids. Some questions still remain to be settled regarding the trucks. Further conferences regarding this matter will be held with the commission after the bids have been received on the equipment. The new cars will be 47 ft. between truck centers and 67 ft. over the buffers.

New York, New Haven & Hartford Railroad, New York, N. Y., has been authorized by the Interstate Commerce Commission to issue equipment notes in the sum of $1,043,000 to provide funds to be applied to the purchase from the Westinghouse Electric & Manufacturing Company of twelve electric locomotives, which are to cost $1,589,700.

Detroit United Lines, Detroit, Mich., has added to its freight equipment fifty new trail cars, 47 ft. 6 in. long, 7 ft. 5⅜ in. wide, and 7 ft. 1⅞ in. high. Ten of these cars are equipped with staggered side doors 10 ft. in width for automobile shipments and other traffic that cannot be handled through the ordinary side doors. The cars are of 80,000 lb. capacity with steel underframes. The company now has forty motor cars, thirteen of which are of the heavy locomotive type capable of hauling from five to fifteen trail cars, and 133 freight trail cars, most of which are aproximately the same dimension as the fifty new cars. All of the freight trail cars of the Detroit United Lines are available for loading to all points reached by electric railways in the central states as far distant as Terre Haute, Ind.; Louisville, Ky.; Cincinnati, Cleveland, Canton, Akron and Youngstown.

Houston Electric Company, Houston, Tex., has purchased the fifteen cars which it announced it would do early in the present year. The prospective order was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Jan. 26, 1924. The detailed specifications follow:

Date of delivery	Aug. 1, 1924
Builder of car body	American Car Company
Type of car	Double-truck Birney cars
Seating capacity	44
Length over all	41 ft. 1 in.
Truck wheelbase	5 ft. 1½ in.
Width over all	8 ft. 5 in.
Height, rail to trolley base	15 ft. 5 in.
Body	All steel
Interior trim	Light colored mahogany
Roof	Arch
Air brakes	Westinghouse
Car signal system	Faraday
Control	K 35, double end
Curtain material	Pantasote
Destination signs	Hunter
Door-operating mechanism,	St. Louis pneumatic
Fare boxes	Johnson
Fenders	H. B. lifeguards
Gears and pinions	Helical
Hand brakes	Peacock
Headlights	Golden Glow
Motors	4 Westinghouse No. 508
Registers	Dapron air register
Sash fixtures	O. M. Edwards, No. 13
Seats	Brill Waylo special
Seating material	Canvas lined rattan
Slack adjuster	American Brake, Type E
Step treads	Feralun
Trolley catchers	Keystone
Trolley base	Simplex No. 3
Trucks	Brill No. 77 E
Ventilators	Utility
Wheels	Davis Steel, 26 in.
Power-saving device	Economy meters

Houston Electric Company, Houston, Tex., expects to purchase ten additional buses similar to the ones now in operation and each seating twenty-nine passengers.

Southern Canada Power Company, Montreal, Canada, has purchased from the F. B. Cutter Company, 50 Church Street, New York City, a number of one-man, single-truck Birney safety cars which will be put in service at Sherbrooke, Canada.

Cincinnati & Dayton Traction Company, Hamilton, Ohio, through Receiver Sohngen has been authorized to purchase six new cars of the one-man type by the Montgomery County Common Pleas Court. The total cost is $39,492, of which 25 per cent will be paid in cash. The cars will be installed on the Hamilton city lines.

Track and Line

Los Angeles Railway, Los Angeles, Cal., has started reconstruction of Forty-eighth Street from Van Ness to Sixth Avenue. New girder rail will be used.

Kansas City Railways, Kansas City, Mo., was granted permission on May 19 by the upper house of the Kansas City Council to construct a double-track loop around Muehlebach Field, Twentieth Street to Twenty-second Street and Euclid Avenue to Brooklyn Avenue. The plan includes the purchase of two lots at the northwest corner of Twenty-second Street and Euclid Avenue on which are to be constructed a loading platform and a loop. The total cost of the improvements will be $39,800, to be divided as follows: $34,800 for the double tracks, $3,000 for the loading platform and $2,500 for the lots. The plan to carry out this improvement was reviewed in the ELECTRIC RAILWAY JOURNAL for May 24, page 836.

Knoxville Power & Light Company, Knoxville, Tenn., expects to rebuild its tracks on Jackson Street.

Department of Street Railways, Detroit, Mich., will lay 2 miles of single track on Stotten Avenue and about 2 miles of single track on Warrent Avenue. In addition, 1 mile of double track on Grand River Avenue is to be reconstructed. All new track is being laid with 100-lb. A. R. A. 6-in. rail on twin steel ties in a monolithic concrete bed 14½ in. deep. This is the standard construction in Detroit.

Trade Notes

C. D. Price, for many years connected with the Industrial Works at Bay City, Mich., recently as traveling service engineer, has been appointed district sales manager of the St. Louis district with headquarters at the Railway Exchange Building, St. Louis.

White Manufacturing Company, Goshen, Ind., is building a new factory and adding to its equipment so that it can better take care of its business.

H. E. Listman, formerly manager of the motor coach division of the Garford Motor Truck Company, has joined the Yellow Coach forces at Chicago as assistant general sales manager, reporting to G. T. Seeley.

Railway Service & Supply Corporation, Indianapolis, Ind., has filed its certificate of incorporation in the office of the Secretary of State at Albany and will engage in business in New York State. The corporation, of which James P. Goodrich is president, is capitalized at $400,000 and will dispense railway service and supplies. Its New York office is Buffalo, N. Y. Mote & Goodrich, Indianapolis, are its attorneys.

Conveyors Corporation of America, Chicago, Ill., has announced that, effective May 1, Colwell & McMullin, its New England representatives, will be located in new offices in the Park Square Building, Boston. Colwell & McMullin handle the sales of American steam jet ash conveyors, American airtight doors, and other power plant specialties in Boston and the New England states.

C. H. Smith, assistant secretary of the Westinghouse Air Brake Company and director of clerical operations of all that company's interests, has, in addition, been elected vice-president of the Westinghouse Union Battery Company, Swissvale, Pa., subsidiary of the Westinghouse Air Brake Company. Mr. Smith began his connection with the Air Brake Company in 1900. Mr. Smith is a recognized authority on cost accounting and is prominent in the national councils of a number of business organizations.

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New York, June 7, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 63
Number 23

A Milestone in Railroad Electrification

SO MUCH publicity has been given in recent years to the things that would be accomplished by projected electrification of steam railroad trunk lines that there has perhaps been a tendency to overlook the actual accomplishments of roads already under electric operation. Of course, a projected improvement involving the expenditure of large sums of money is big news to the general press, whereas a continuing performance in a more or less routine manner is seldom given space.

As a matter of fact, there are quite a few very successful electrifications in this country and abroad that have continued to give excellent service over a considerable period of years. Occasionally the record has been printed in the technical papers, but in general little is heard of the success of these installations.

One railroad that obtained a great deal of publicity in the early stages of main-line electrification was the New York, New Haven & Hartford. Many predictions, favorable and adverse, were given, and for a time its operating records were printed. After a few years it passed out of the public eye, and became a part of the accepted routine. In this capacity the public has merely expected it to do its part in giving 100 per cent service day after day.

The New Haven has not been standing still, however. Extensions of the electrified zone have been made from time to time and new equipment has been added. The outstanding feature of the installation has been its reliability in all kinds of weather and its ability to handle any burden put on it. It has made an excellent record in the 17 years of service since electric operation began in 1907.

If financial misfortune had not intervened, much more rapid progress might have been made in electrification. But the operating management has kept on, adding bit by bit, until now all trains, both freight and passenger, in the entire district between New York and New Haven are operated electrically, except for a few which run a short distance from the New Haven freight yard to a branch line. This is the first case where all switching, all freight and all passenger movements over a large section of a main-line railroad have been entirely done without the assistance of any steam locomotives. It will now afford the best example to date from which to derive statistics as to the results that may be expected from complete electrification, as up to the present time it has never been possible to obtain data that did not comprise steam operation to some extent. Thus the recent accomplishment of the New Haven Railroad not only marks a milestone in the progress of that road, but a milestone of importance to electrification in general.

Tell This to the Motorists Who Pick Up Railway Patrons

THE outcome of a recent lawsuit in New York calls attention again to the responsibilities incurred by an automobilist who gives a lift to a person waiting for a street car. In the case in question the plaintiff claimed damages for injuries suffered while he was riding as a guest in the automobile of the defendant. The case was settled out of court by the payment of substantial damages.

The general principle has been established in New York that the owner or operator of an automobile owes to an invited guest the duty to exercise reasonable care in its operation, and not unreasonably to expose him to danger or injury by increasing the hazard of travel. A guest is entitled to recover from the owner for an injury resulting from a failure to use such care. The fact that the owner of the automobile is not a common carrier, and is not transporting a passenger for hire, does not relieve him of responsibility. In order for the guest to recover damages, however, he must show negligence or carelessness on the part of the owner.

If it becomes generally understood that giving a lift to another person may, in case of accident, involve the automobile driver in more serious difficulty than if he were alone, this may act as a determent to such generosity—which is a serious form of competition for street railways, especially in smaller cities.

Railways Should Not be Blamed for Delays Caused by Parades

THIS is the season of parades. Decoration Day has just passed and the Fourth of July looms ahead. Circuses are now on tour and June brings with it the great political conventions and consequent demonstrations. These parades will be held on the principal streets of various cities, resulting in serious interruptions to electric railway service, and the companies will be unfairly blamed for these delays.

If the public understood exactly what a parade meant in the way of interruption to street car service it might diminish the enthusiasm for the spectacle. Should the railway suffer a breakdown such that no cars moved for a couple of hours, an outcry from the angry populace would be heard from one end of the town to the other. Criticism of the trolley company would be on every tongue. It would be considered an outrage that people should be deprived of transportation for so long a time. Yet the municipal authorities in order to please a comparatively small group of people, a fraternal, religious or political organization, allow a parade to be held where it completely disrupts the trolley service.

Certainly there is no good reason why a parade should

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be given preference over street railway operation—why a large number of people should be discommoded to please a few. If an interruption to service resulting from some neglect on the part of the railway is considered reprehensible, why isn't an interruption to service resulting from the politician's desire to gratify a particular group of people equally undesirable? Here is a chance to apply the publicity policy mentioned in an editorial in the JOURNAL on May 24. If the railway, after a long delay caused by a parade, tells the public just what caused the delay, it will lessen the criticism directed at the company and may eventually result in a reduction in the number of parades.

The Auditor Often a Neglected Asset

VISITS to various properties show a great variety in the duties performed by auditors in connection with the many statistical statements compiled by them.

On some properties the auditor assumes that his work is completed when these statements are prepared according to the standard form and are submitted to the executives concerned in the minimum time after the figures are collected.

On another group of roads the auditor goes farther than this and prepares special analyses of the most significant figures, which he presents with written or verbal comments on their meaning to the executives most concerned. For this service the auditor should be well fitted. While he may not be as familiar with many of the details of operation as the head of the department to whom he submits these analyses and comments, he is usually more used to working with and comparing figures, and generally also he has a broader viewpoint of the financial status and needs of the entire property than the head of any single operating department. Hence his comparisons and conclusions ought to be of great help if offered tactfully so that he does not appear to be interfering with the direction of another department. The right kind of a department head, of course, will welcome such co-operation, because figures have value only to the extent to which they are used. If they are filed away without study, the railway might just as well save the cost of getting them up.

Still other auditors go farther, with advantage to the company. They realize that the executives to whom they submit their analyses have duties connected with the physical operation of the properties which demand a great share of their time and that the real significance disclosed by these financial analyses may be overlooked in the press of other matters—perhaps not more important but at least more immediate. In such cases the auditor can very properly bring the matter again to the attention of the executive who has power to act. He need not suggest the remedy. He need not even urge action. But at least he can take the responsibility of seeing that the matter receives consideration and is not lost in the limbo of forgotten things.

Which one of these several attitudes will be taken by the accountant will depend very largely on the manager of the property. If he indicates by his manner that he wants nothing more than statistics and financial statements, these are about all he will get. But if he does this he will fail to take advantage of what should be a great asset of the property. The auditor is not only accustomed to interpreting figures, but he is the only department head who has to keep in touch with what is going on in all departments. The wise executive will encourage him to keep up his study of the finances of the property and to submit any analyses of them which he thinks concern the economical operation of the road.

The good which an accountant can do does not end even with these services. As with the treasurer, who is the chief financial adviser of the company, his advice or that of both should be sought in the case of matters relating to financial transactions, especially those that are unusual. As an example, a certain railway some time ago leased another railway, agreeing to pay a specified sum as annual rental. But after the contract had been signed and sent to the auditor for filing he immediately saw that no provision had been made for terms of payment. Was this sum to be paid annually, quarterly or monthly, and was it to be paid at the beginning or at the end of each such period? As this part of the contract related directly to the disbursements which the auditor would have to provide for, he was impressed with the fact that this detail had not been covered. This point had not occurred to the lawyers who drew the lease.

Obviously, it seems, the broad knowledge which the auditor has of the finances of all departments of a railway should be utilized to the fullest possibilities.

Making the Breaks in Traffic

THE average schedule speed attained on a street railway system depends to a considerable degree upon the effort exercised by the car crews to be ready to make the breaks in traffic. There is a common tendency on the part of motormen to coast along leisurely if they see that traffic is against them at the intersection which the car is approaching. This practice is not good in two respects.

The first and minor reason is that it is annoying to the passengers who want to get off at this intersection to have the car approach their destination at so slow a pace. The more important reason is that often by the time the car reaches the intersection the whistle has blown, and then, before the passengers are off and the new ones on, the whistle has again blown and the car has to wait another change of the traffic flow. Had this car been operated at good speed and brought as quickly as possible to the stopping point, it would have had time to make its passenger interchange and been ready to proceed with the first change of traffic in its favor.

Riding on a certain car recently it was noted that the motorman lost the break in traffic in this way three times in a mile and a half, simply because his operation of the car was as though he had "all day" to get to the end of the line. Unfortunately, in the particular city in which this was observed, there is a notable absence of snap and get-up-and-go all over the railway system. Even though the equipment here is old and slow as compared with modern equipment, the trainmen are by no means getting the full speed capacity out of what they have.

Thus, the point of this comment about missing the breaks in traffic is exaggerated on the property in mind, but it is a point that could well be given attention on many systems.

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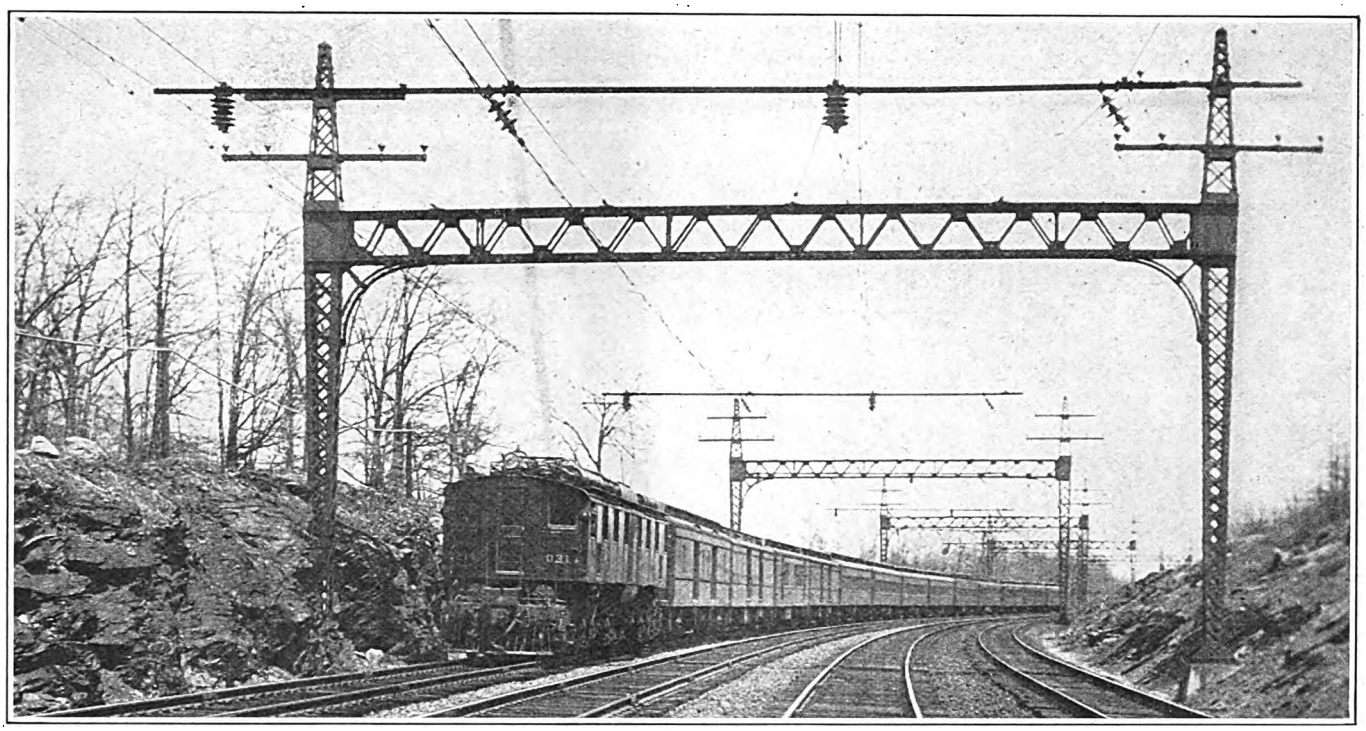


The Colonial Express, a 13-Car Through Limited Train, Operated Between Boston and Washington, Runs 84 Miles on Electrified Track Between New Haven, Conn., and Manhattan Transfer, New Jersey, via the Hell Gate Bridge Route Through New York City—Newest Type Locomotive

New Haven Inaugurates 100 per Cent Electric Operation

With the Addition of 12 Electric Locomotives and Extension to the Power Plant, the Use of Steam Engines Has Been Eliminated in the Through Electrified Service Between New York and New Haven

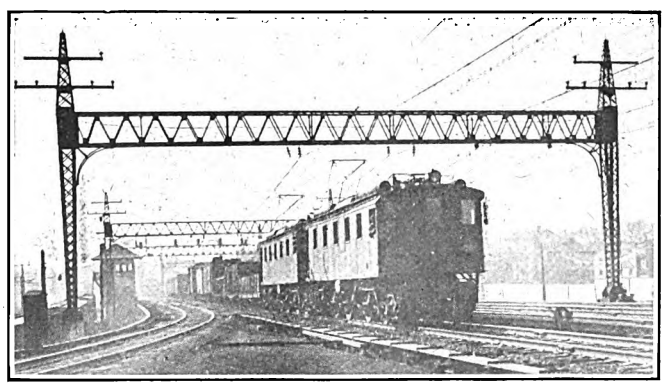
By H. F. Brown

Assistant Electrical Engineer New York, New Haven & Hartford Railroad, New Haven, Conn.

DURING the past year the New York, New Haven & Hartford Railroad has had under construction with the Baldwin Locomotive and Westinghouse Companies twelve 180-ton a.c.-d.c. electric passenger locomotives, similar in construction to the five a.c.-d.c. locomotives ordered in 1918, with the exception of a slight change in gear ratio and the length of the cab. The delivery of these locomotives commenced in November, 1923, and in April, 1924, the last one was received and placed in service between New York and New Haven. They are equipped with 12 Westinghouse 409-C-2 motors, and with the gear ratio of 25:89 have a continuous tractive effort, with forced ventilation, of 16,000 lb., with a maximum momentary tractive effort, for starting, of 47,500 lb.

During the past year also the New Haven Railroad has been replacing one of the 3,750-kva., 11,000-volt turbo-generator units originally installed in its Cos Cob power plant with a new unit having a single-phase rating of 12,860 kva. at 70 per cent power factor, not only to increase the plant capacity but to take advantage of the better economies of larger units of latest design. This new unit was placed in daily operation during January, 1924.

Prior to the advent of these 12 new electric locomotives, it was the custom to change locomotives at Stamford for many of the through passenger trains, as well as for all the passenger trains which leave the main line at South Norwalk, Bridgeport and Devon, substituting steam locomotives for the latter trains and for many of the through trains, or straight alternating-current electric locomotives, originally purchased for freight service, on some of the through trains to New Haven during the



Heavy Freight Trains on the New Haven Are Hauled by Double-Headed A.-C. Locomotives

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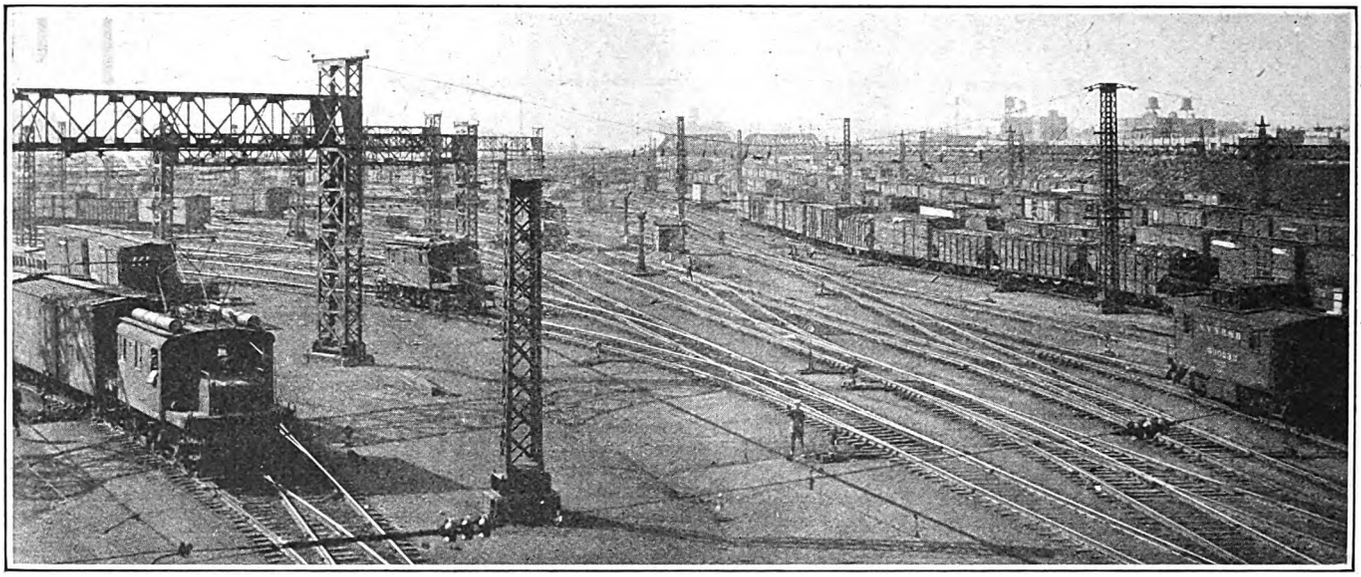


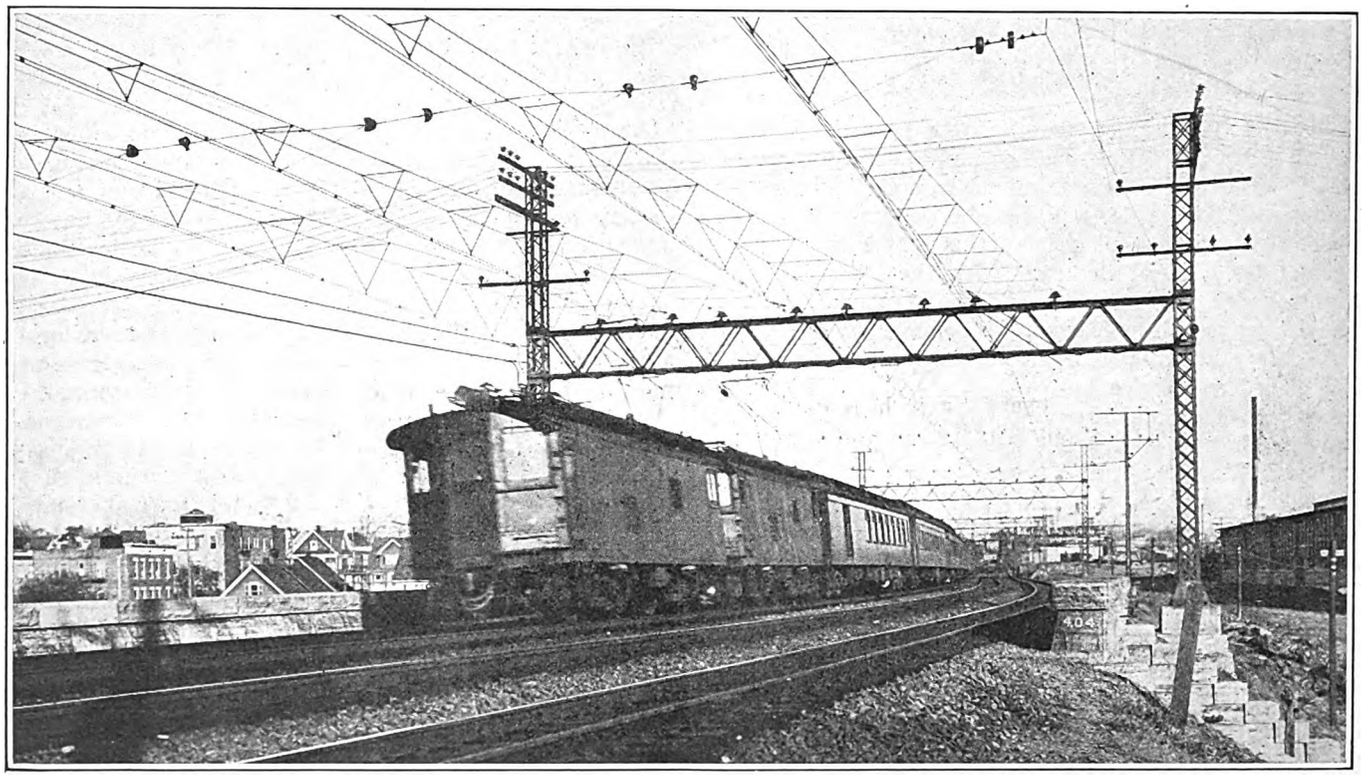
The Oak Point Yard in New York City Entirely Electrically Operated with Switching Locomotives Designed for This Service

summer months, when heating of cars is not required.

By March 1, 1924, enough of the new locomotives were in service to eliminate the necessity for changing locomotives on most of the through trains at Stamford; and by the end of April, when the summer time-table went into effect, all of the passenger trains running over the electrified zone were operated with electric locomotives. Trains which leave the main line at South Norwalk and Bridgeport now change to steam locomotives at these points.

With the new time-table, all the Hell Gate Bridge trains operating into the Pennsylvania Station, New York, have also been electrified and are now operated by the straight alternating-current locomotives, or by the 180-ton a.c.-d.c. type, changing power, as formerly, at Harold Avenue, Long Island City, from which point these trains are operated by the Pennsylvania direct-current electric locomotives. The popular "Colonial" and "Federal" express trains, which have been operated for many years as through trains between Boston and Washington, formerly being ferried from the Harlem River around New York into Jersey City, are thus now hauled electrically from New Haven into Manhattan Transfer, Newark, N. J., a distance of 84 miles.

Due to displacing the alternating-current electric freight locomotives from the passenger service east of Stamford, it was possible, about March 1 of this year, to inaugurate electric operation of all through freight trains between Harlem River, Oak Point, and Cedar Hill, New Haven, terminals. During March 150,052,075 ton-miles, trailing load, of freight were handled electrically, the average daily mileage for all locomo-



Electric Passenger Express Train on the New Haven, Showing Original Catenary Overhead and Original Type of Locomotive

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tives assigned to freight service, including those in the shop, being 117.49, and for serviceable locomotives more than 170 miles.

In order to speed up the movement of freight the greater number of the trains are dispatched from the terminals as soon as enough cars are ready to make up a trainload suitable for a single locomotive unit, although some of the heavy "drags" of approximately 4,000 tons (80 to 100 cars) are handled at lower speeds with two units operated in multiple.

Some additional facilities have been required for this all-electric service, notably an enlarged steam locomotive terminal at South Norwalk; electrification of several hundred feet of a branch line at Bridgeport, used for power interchange and for picking up and dropping off cars at this point, and an additional electric locomotive storage track with inspection pit and pantograph inspection platform at the New Haven terminal.

In addition to the new locomotives, five new train-heating units or tenders have been purchased, three of which have been in service since April. These contain oil flash boilers and tanks for the fuel oil and water necessary for train heating, and are primarily intended for use with the straight alternating-current locomotives, which have no train-heating equipment, when these are used in passenger and express service on the Hell Gate Bridge trains.

The Original Electric Locomotives Have Averaged 250 Miles per Day

It is expected that one of the economies of this all-electric operation will result in time from the reduction of the serious corrosion of the overhead structures and in reduced insulator maintenance. Continued steam operation, with its attendant smoke and gases, has been largely responsible for the difficulties experienced in this connection. The new locomotives will also allow a large margin in the operation of the original 41 electric passenger locomotives, some of which have made more than a million miles since their purchase in 1906. This is shown by the passenger locomotive-miles per day, which averaged 171 in March, 1924, against 220.5 for March, 1923. These have averaged in the past as high as 250 miles per day.

There remains one section of the electric zone—that between New Haven and Bridgeport, over which some steam operation will have to be continued on account of its being part of the route of the heavy freight traffic between Cedar Hill and Maybrook (the Poughkeepsie Bridge Route) as well as part of the route of the New York-Waterbury-Winsted passenger trains which change power at Bridgeport. All of these trains leave the main line at Devon.

The New Haven now has operating in heavy electric traction service 118 single-phase a.c. electric locomotives of the following types:

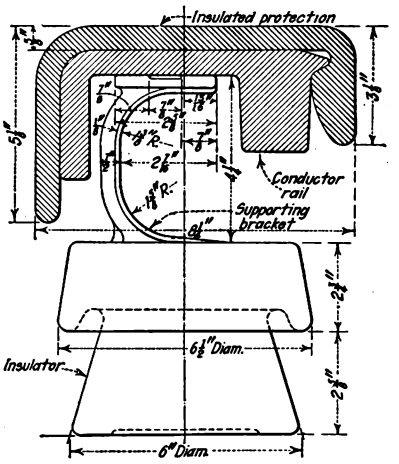
41	110-ton a.c.-d.c. for passenger service.
6	120-ton a.c.-d.c. for passenger service.
17	180-ton a.c.-d.c. for passenger service.
36	120-ton a.c. for freight service.
1	135-ton a.c. for freight service.
1	140-ton a.c. for freight service.
16	80-ton a.c. for switching service.

In addition to the above locomotives, there are 29 a.c.-d.c. and eight a.c. motor cars, together with 68 trailers, all with multiple-unit control.

Thus, with its electric operation of heavy through passenger and freight service, yard switching, and electric suburban motor car trains, the New Haven electrification comprises the entire field of heavy electric traction, in a magnitude not equaled by any other railroad.

Under-Contact Conductor Rail

A PROTECTED conductor rail and support, which comply with conditions governing the clearances in force on British railways, have been developed in London following a careful study of the successful experience with under-contact conductor rails in the United States and the Argentine. It is designed to give efficient protection to the third rail at 1,500 volts. A C-shaped bracket, mounted in an insulator, supports the U-shaped conductor rail, over which is hung the insulation in the form of an inverted trough. The rail section used, which is of a peculiar shape, as shown in the drawing, has an approximate weight of 100 lb. per yard. Its composition is based on experience gained in the production of under-contact conductor rails at present in use. The contact surface of the section allows for a considerable amount of wear.



Conductor Rail Is Mounted on "C" Insulated Brackets. Insulation Is Laid on Conductor Rail and Is Held in Position by Lip

The rail is so balanced that it is simply laid on the insulated C brackets and maintains itself in position by its own weight, the center of gravity being below the point of support. In joining the rail sections, single fish plates are used, held with ⅞-in. countersunk bolts.

The protective covering, of molded composition, affords adequate insulation, is non-inflammable, durable, and is said to be free from warping. This is applied in 6-ft. lengths, permitting standard straight sections to be used on most curves. The protective covering is simply slipped over the rail and is self-locking when once in position, as each length laps over the adjacent length, with the length over the incline bolted to the conductor rail.

The current-collector gear is of parallelogram construction, and may be used on either over-contact or under-contact rail, without adjustment. To keep the tension on the rail the same for both, the under-contact rail is mounted several inches lower than the over-contact rail. The shoe is of cast iron, chamfered at both ends. A thin elbow permits the shoe to break off if it meets an obstruction without further damage to the rail or shoe gear.

Tests conducted on the London, Midland & Scottish Railway have resulted in the successful collection of current at 1,200 volts and a speed of 70 m.p.h. Tests were made to determine the efficiency of the covering. Some of these were carried out dry, and others after soaking the protective covering in a solution of salt water. In neither case was any deflection obtained on a milli-ammeter, with the rail connected up to the 1,200-volt circuit.

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Interborough Tries Change-Making Machines

The Action of the Machine Is Automatic, an Electric Contact Device Controlling the Release of the Necessary Change When a Coin Is Inserted

MACHINES for automatically changing dimes, quarters and half dollars have been installed for trial in the northbound Seventy-seventh Street station of the Lexington Avenue subway, operated by the Interborough Rapid Transit Company, New York. The machine was developed by Frank Hedley, president and general manager, and J. S. Doyle, assistant general manager. The present installation consists of two units, which have been installed in the panels of the change-making booth at the Seventy-seventh Street station. The machines are approximately 30 in. square and the coin to be changed is inserted through slots at the top. A sign over the machine reads "Automatic Money Changing Machine—Insert Money Here" and arrows point to the slots for the reception of the coins.

When a coin is inserted it drops upon two contact points in the change-making machine and establishes an electric circuit to release the necessary change. The coin is held in position back of a magnifying lens, so that it can readily be seen by the person who inserts the coin. Similar lenses on the back of the machine inside the booth also provide for an operator's inspection. A switch is provided in the operator's booth so that he can open the circuit and thus automatically prevent the issuing of change, should it be necessary to retain a coin for inspection. Inserting a second coin in the slot releases the one in view and the second coin takes its position upon the inspection contact.

Automatic Change-Making Machines in Seventy-seventh Street Station of Interborough Rapid Transit Subway, New York

Should a coin of other denomination than that indicated be inserted in the slot, it drops into a receptacle immediately over the magnifying lens so that it can be returned. Change for the money inserted comes out in receptacles at the bottom of the machine.

In the present installation doors are provided on the front side for filling the machines with change and for taking out money which has passed through the machine. When the machines are extended to use in other stations, however, it is the intention to provide doors only on the inside of the change booth. It may also be necessary to make the machines up in individual units, one for dimes, one for quarters and a third for half dollars.

While the present installation is entirely in the nature of a trial, it is the intention of the officials to extend the use of these change-making machines to other stations on the system as soon as they are satisfied with its working. At congested points, like Times Square, it may be desirable to install these at frequent and convenient locations and have an attendant to oversee their operation and fill the machines with change as is required. Where there are separate stations on opposite sides of the tracks a single attendant on the traffic side should be able to take care of the change-making machines at both locations. This also applies to stations which have more than one entrance. In this latter case one attendant could take care of several machines, which would be installed at the most convenient points where passengers pass through turnstiles.

Statistics collected by the Interborough Rapid Transit Company indicate that approximately 50 per cent of the change issued at subway stations is for dimes, so at heavy traffic centers it may be necessary to have a larger number of machines for changing dimes than for the other denominations. The mounting of individual units would also be of assistance in taking care of maintenance, as a single machine could be removed and replaced by another without interruption to service and without interfering with adjacent machines.

The three-unit machines at present being tried provide for change up to approximately $175. Another interesting point in the statistics gathered is that at present approximately 5 per cent of the riders ask for change at fare booths, the remaining 95 per cent obtaining their change at other points.

After the installation of the machines, the company expects to keep accurate records regarding the amount of money changed and the various denominations to serve as a guide in determining the best size for the machines and the number of individual units needed.

Encouraging Trainmen to Tell the Truth About Accidents

AN UNREMITTING safety campaign without any intensive drive or spasmodic effort on the Middlesex & Boston Street Railway reduced the number of accidents from 147 in January, 1923, to only fifty-eight in January, 1924. Carefully formulated rules for the operation of cars and strict enforcement all the time are thought by the company to have been responsible for this improvement. Although the reduction is perhaps partly explained by better street conditions, the number of automobile collisions decreasing from seventy-seven to fifteen, the general improvement also was quite noticeable.

It is the custom of this railway to take no disciplinary action against a motorman after an accident provided he tells the entire truth concerning it. On the other hand if he is detected in any false statements concerning the circumstances of the accident he is invariably discharged. No excuses whatever are accepted for a car collision. The rule provides that no car under power shall follow another closer than 500 ft. and shall never approach closer than two car lengths. Enforcement of this rule has resulted in almost complete elimination of car collisions.

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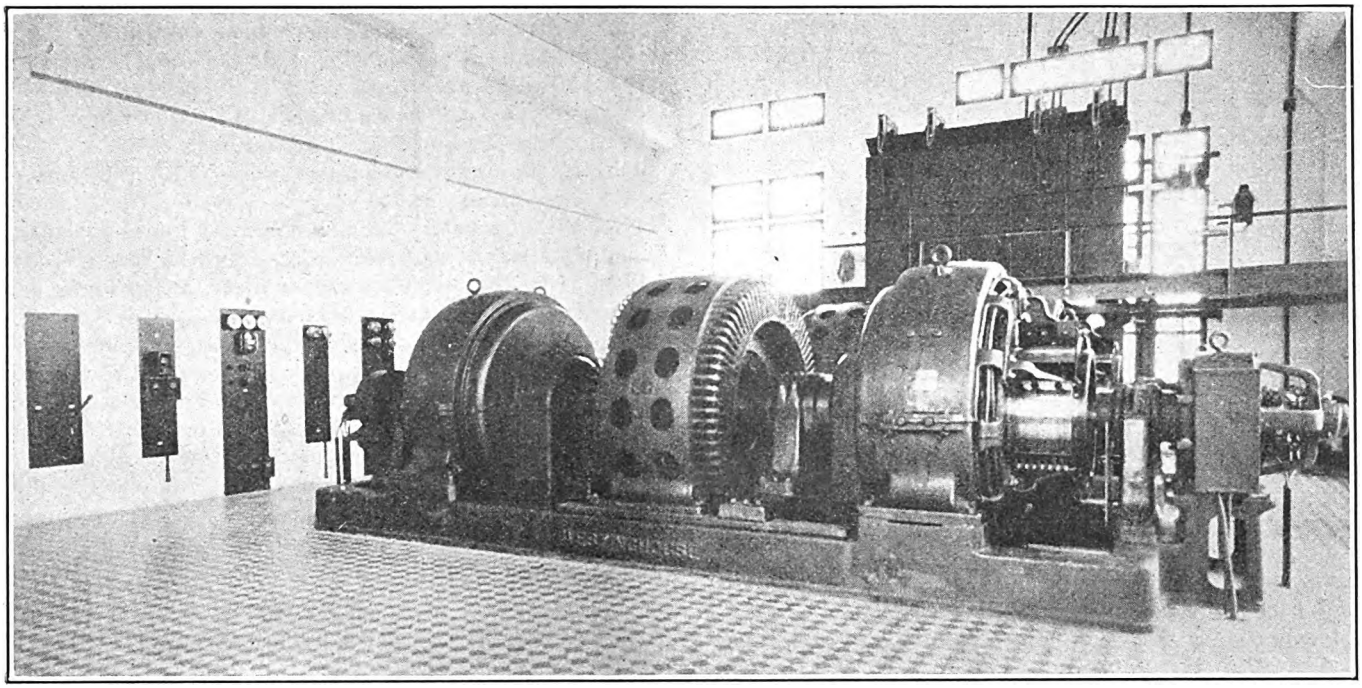

Interior of Quilicura Substation, Showing One of the 2,000-Kw. Motor-Generator Sets and Switchboards

Power Distribution System of Chilean State Railways Electrification

Five Stations, Each with Two 2,000-Kw. Motor-Generators, Supply 3,000-Volt D. C. for Operating This Electrified Railroad—A Special Method of Integrating Power Demand Is Used in Connection with Bills of the Power Company Supplying the Railway

By D. C. Hershberger
General Engineer Westinghouse Electric & Manufacturing Company

RELIABILITY of operation has been the main objective of the designers of the power equipment for the electrification of the Chilean State Railways between the seaport of Valparaiso and Santiago, the capital and metropolis of Chile, 116 miles distant. The contact line is supplied with direct current at 3,000 volts from alternating-current power stations, making a.c.-d.c. substations an essential link in the power supply system.

This first zone of the electrification, now in full operation, is equipped with five modern synchronous motor-generator substations which include design features that have proved most effective in transcontinental service in the United States.

Part of the electrified zone between Valparaiso and Los Andes forms a link in the only transcontinental line in operation across South America. This route has one terminal at Valparaiso on the Pacific Ocean and the other at Buenos Aires, Argentina, on the Atlantic. The first zone to be electrified comprises approximately 10 per cent of the entire route mileage of the Chilean State Railways broad-gage lines.

Transportation conditions are especially severe in this district, owing to the mountain range between Santiago and the coast. The maximum grades are 2½ per cent and the shortest curves 10 deg., both of which conditions made steam operation very difficult; in fact, the limit of capacity with steam had virtually been reached. With electric motive power the track capacity has been increased enormously, putting off for many years the construction of second tracks, as the track capacity with electric operation is more than three times as great as before, and it is susceptible of still further increase by the use of heavier motive power units, and a corresponding increase in the size of substations and overhead distribution system.

Energy Is Supplied by a Private Company

Although the Chilean government had control of sufficient water power sites that it could have constructed its own generating stations and transmission system, it was decided to purchase energy, thus simplifying the operation and reducing the necessary capital for the electrification of the first section. It also makes possible a greater diversification of load, especially as other customers are supplied from the same transmission lines. Accordingly arrangements were made with the Compania Chilena de Electricidad, Limitada, for the supply of the necessary energy. This company has recently completed a 25,000-kva. hydro-electric generating station at Maitenes, 37 miles southeast of Santiago. Power is supplied from this station, the 15,000-kva. Florida hydro-electric station and the 20,000-kva. Mapocho steam station, which also furnish

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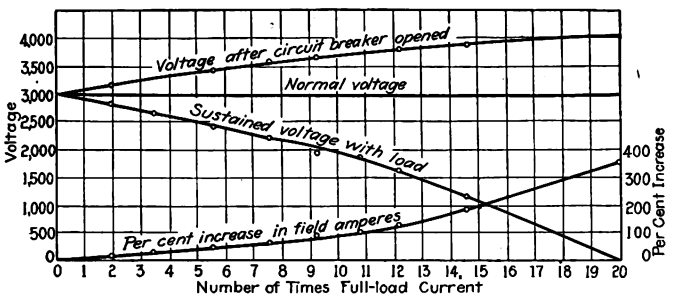


Direct-Current Terminal Voltage Characteristics of the 2,000-Kw. Motor-Generator

power to Santiago and more recently to Valparaiso, Los Andes and intermediate cities.

The railroad owns the substations for converting the railway power in the first electrified zone, while the power company owns the transmission lines. Since other customers are served by the same transmission system the energy for the railway is metered separately at each railway substation. This is done on the low-tension side of the transformers supplying the motor-generator sets, a nominal amount being added to the meter readings to compensate for transformer losses.

In general the railroad has preference over other customers in obtaining power for the operation of trains, shops, engine houses and for station lighting, except under certain conditions where this preference would not be exercised by the railroad to the detriment of the general public.

The energy is billed to the railway on two separate bases—maximum demand and kilowatt-hour consumption. The maximum demand is controlled by a power indicating and limiting system that will prevent the total combined demand of the five substations from exceeding a predetermined limit. A minimum annual kilowatt-hour consumption clause also is included in the contract.

Power is transmitted three-phase at 50 cycles. From the Maitenes generating station through the San Cristobal receiving station at Santiago to Valparaiso, approximately 125 miles, there is a duplicate 110,000-volt transmission line. The San Cristobal station and the railway substations also may receive power in emergencies from the Santiago city system, which is fed by the Florida and Mapocho stations.

From the San Cristobal receiving station a twin-circuit three-phase, 12,000-volt line supplies the Quilicura (No. 5) substation. At Las Vegas the power company has installed a transformer station which steps down from 110,000 to 44,000 volts for distribution to the railway substations at San Pedro, Llai Llai, and Rungue (Nos. 2, 3 and 4) by means of separate duplicate lines to each station. These lines are also used for supplying other power customers. At Miraflores, near Valparaiso, another transformation down to 12,000 volts is made for the line supplying Vina del Mar substation (No. 1) and the city of Valparaiso. All of these lines have been duplicated so as to permit repairs to be made without shutting down the stations, and also giving a greater factor of reliability.

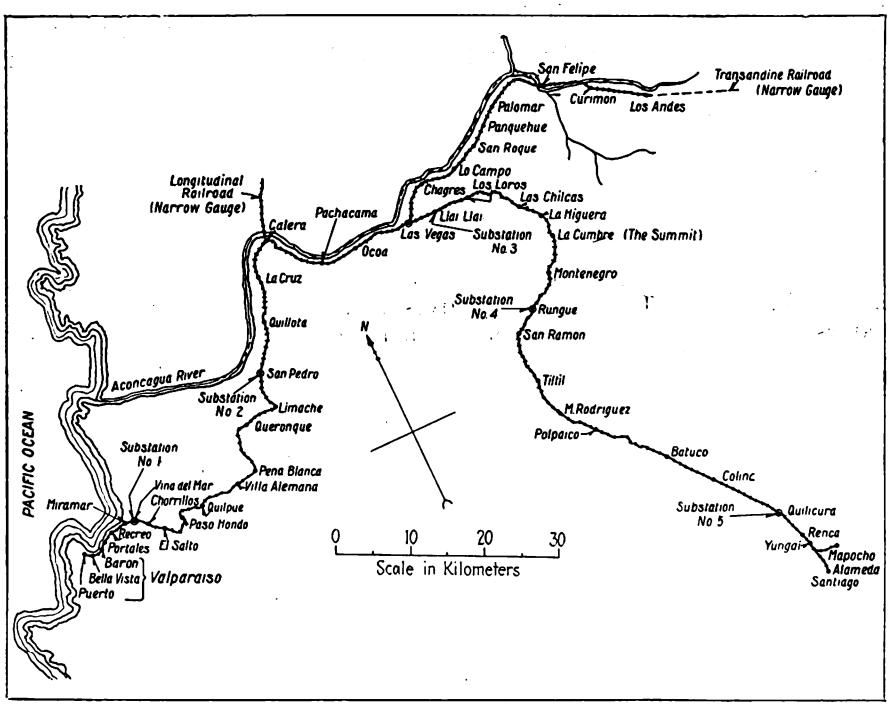
Energy Is Transformed in Five 4,000-Kw. Substations

Energy for railway operation is converted from high-tension alternating current to 3,000-volt direct current in five 4,000-kw. substations, each of which is equipped with two 2,000-kw. synchronous motor-generator sets.

The substation buildings are of reinforced concrete with reinforced concrete roofs. Windows on all sides provide natural lighting in the machine and transformer rooms. The blowers for the motor-generator sets, the starting and running circuit breakers, station service transformers and breakers and the flash suppressors are located in the basement. Space also is provided beneath the transformers for oil tanks in which to store the oil when it is drawn off from the transformer cases. The machine rooms of all the stations are identical, and have been designed to accommodate a third motor-generator set, which will be installed when it is necessary to provide for increased traffic. A traveling crane for handling the motor-generator and switch-gear parts spans the room.

The transformers are housed in a separate room, which is of the same general design as the machine room but is narrower and does not have a traveling crane. The roof trusses of the transformer room, however, are designed with sufficient strength to support chain blocks over the transformers for raising the cores out of the cases, after which the cases may be rolled to one side and the cores lowered to the transformer foundations.

Each motor-generator set is driven by a 2,840-hp., three-phase, 2,300-volt, 50-cycle, 500-r.p.m. synchronous motor on the same shaft with two 1,000-kw., 1,500-volt direct-current generators, one on either side of the motor, and connected in series for 3,000 volts. These machines are shunt-wound compensated generators, with commutating poles. The sets include two exciters, one of which supplies current for the synchronous motor field and the other for the generator fields.



Map of First Electrified Zone of the Chilean State Railways, Showing the Route and Locations of Substations

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The motor-generator sets are reversible, being able to receive direct current from the contact line when the locomotives are regenerating and convert it to alternating current, which is fed back into the alternating-current transmission line for use elsewhere.

The sets were designed to give successful performance under a wide range of loads, and to withstand severe short circuits on the distribution system. They are rated at 2,000 kw. continuously, followed by 3,000 kw. for two hours without exceeding a temperature rise of 55 deg. C., and can have this followed with 6,000 kw. or 200 per cent overload for 5 minutes without exceeding a safe temperature.

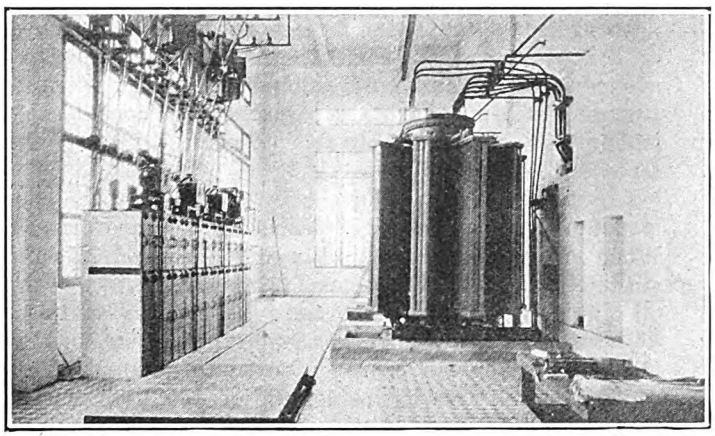
The synchronous motors have sufficient capacity that fans are not required, and the fields are of such size that high power factors can be obtained over a wide range of loads. The exciter windings are arranged to give the desired power factor when the machines are operating either as motors or as generators.

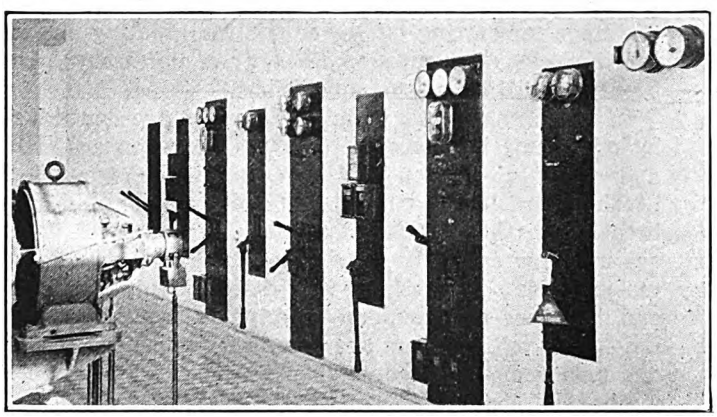
The generators are partially inclosed to minimize windage loss and are provided with a separate blower that operates only after a definite temperature of the windings has been reached. The blower is started automatically by means of a resistance coil taped up with a series conductor in such a manner that it maintains approximately the same temperature as the armature. Thus by shutting down the blower on light loads the over-all efficiency of the set is increased.

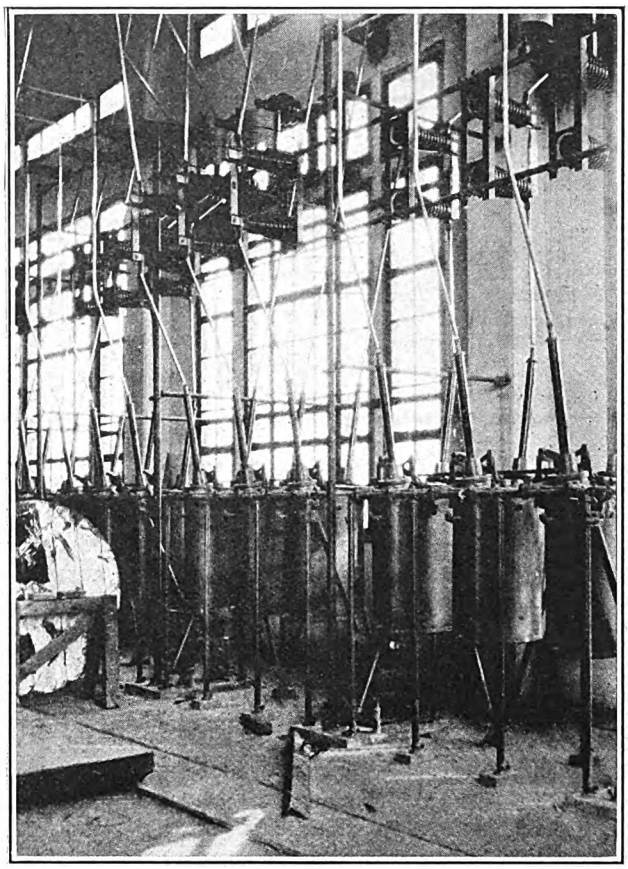
Since good commutation is essential for high-tension direct-current machinery under the severe conditions of heavy sustained overload occurring in normal operation, every precaution has been taken to assist in obtaining it. One of the important features is the use of compensated windings, distributed across the faces of the main poles.

The voltage characteristics of the generator sets, as determined by oscillograph tests, is shown in one of the accompanying diagrams. Each point on the curve represents a short-circuit test made with one side of the line grounded and the other opened by a low-speed circuit breaker.

Another diagram shows an oscillograph record of a short circuit on the machines. In the test the generators were short-circuited at 3,000 volts with no external resistance other than the necessary cable conductors and circuit breaker. In this test the current reached 13,000 amp., or 20 times full load current.







Some of the High-Tension Substation Apparatus

Above—The main transformers and the 12,000-volt breakers installed in the high-tension room at Quilicura substation.
Below—The 44,000-volt circuit breakers at Llai Llai substation.
At Right—The panels controlling the transformers, synchronous motors, incoming lines and flash suppressor are mounted in the dividing wall between machine and transformer rooms.

Previous experience with this type of equipment showed that it was unnecessary to use extensive flash-guard equipment as a precaution against flashovers. Their omission gives greater accessibility to the commutators. Flash suppressors have improved conditions so remarkably as to make their use very desirable, despite the unusually stable operation of these generators under short circuits. They add reliability to the system as a whole, in that short-circuit currents are not permitted to rise to high values, endangering the condition of the circuit as a whole, including armatures and electrical equipment. The flash suppressor adopted consists of a group of light knife switches mounted on a shaft to which is attached a strong spring held in tension. When the tripping mechanism is operated the switches close at high speed, short-circuiting the generator armature windings on the rear end through three collector rings to which taps are brought out through the armature windings. Trip coils

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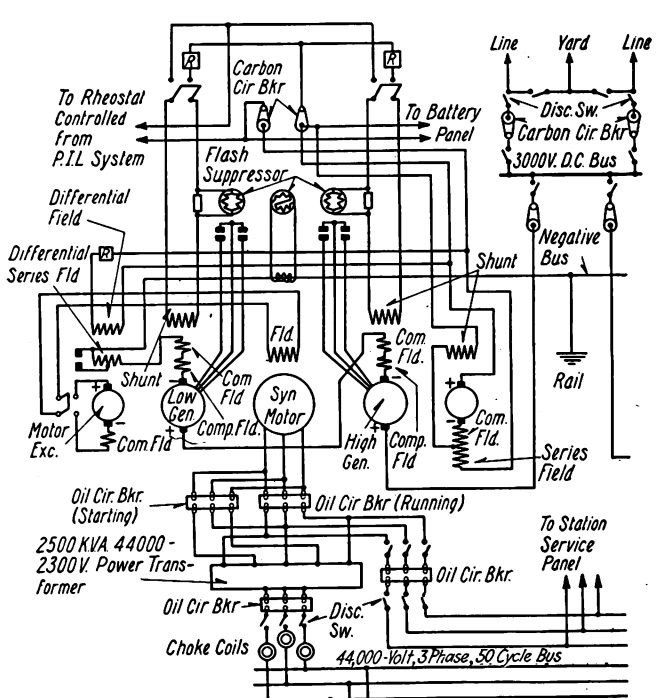


Schematic Diagram of Connections of One of the Substations, Showing One Incoming Line and One of the Motor-Generator Sets. The Other Set Is Connected in Exactly the Same Manner

energized from the secondaries of through-type transformers operate the tripping mechanism. The transformers in turn are energized by the current rise in the main generator circuit.

THREE-PHASE TRANSFORMERS ARE USED

Each station contains two three-phase, 50-cycle transformers. Two of the stations receive power at 12,000 volts and the other three at 44,000 volts, making necessary the use of main transformers of different voltage in the two groups of substations. All the transformers are rated at 2,500 kva. continuous, followed by 150 per cent load for two hours with a 60-deg. C. rise. Following this load the transformers are capable of withstanding 300 per cent load for 5 minutes.

These transformers all deliver 2,300 volts on the low-tension side, with starting taps giving less than half this voltage. Normal voltage may be delivered to the low-tension side when the transmission line voltage is 10 per cent below normal through a second set of taps on the primary. All the transformers have star-connected primaries and delta-connected secondaries.

The transformers are of the oil-insulated, self-cooling radiator type designed for indoor service. The scarcity of cooling water made this type preferable to the water-cooled type.

Since the railroad has a number of tunnels in the electrified zone with low clearances, it was found desirable to strip the tanks clear for shipment, with the radiators boxed separately.

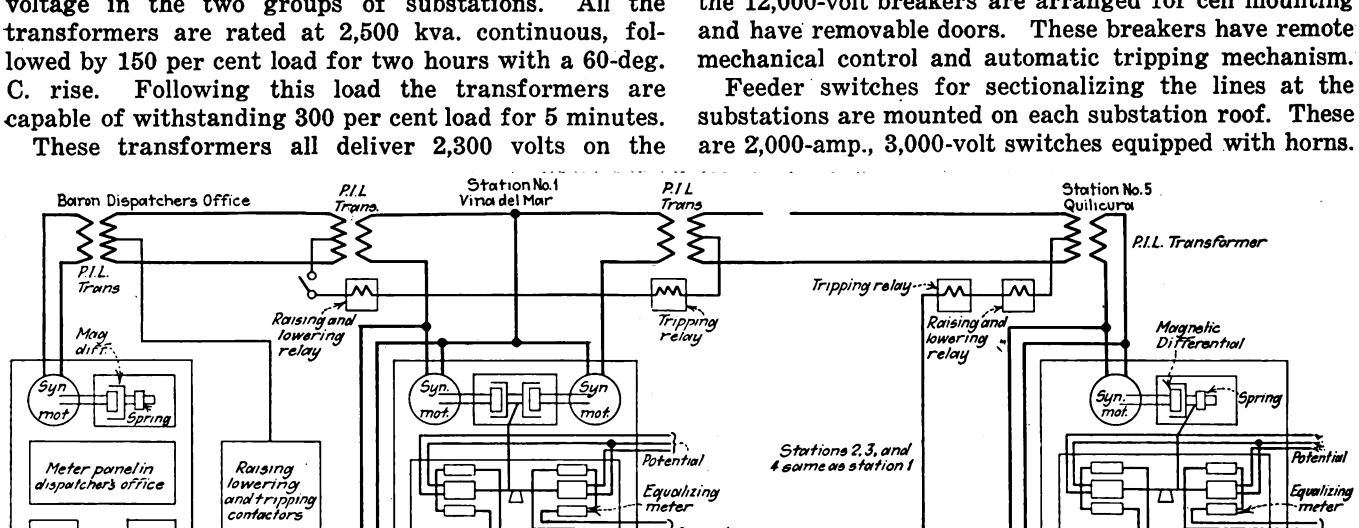
In order to limit the stresses due to short circuits on both the low-tension and the high-tension sides, the arrangement of the transmission system and the transformer stations is such as to introduce a considerable amount of impedance in the circuit, limiting the stresses to conservative values.

Oil storage facilities have been provided by the construction of tanks located underneath the transformers. When making repairs the oil is first drawn off into the storage tank, this arrangement also facilitating the oil filtering. The transformers have been equipped with wheels and a foundation containing tracks, so that the transformer can be rolled out onto a truck. This can be moved the entire length of the high-tension room and outside the building, where tracks are laid.

Horn-gap switches mounted on poles outside the buildings for cutting off power and for isolating one of the duplicate transmission lines when necessary have been provided at all the substations.

In the high-tension room the circuits are controlled by oil circuit breakers between the horn-gap switches and the high-tension bus. Westinghouse type G-1 breakers are used in the 44,000-volt stations and E-6 breakers in the 12,000-volt stations. Similar breakers are used for controlling the transformers on the high-tension side. The 44,000-volt disconnecting switches and breakers are mounted on pipe framework, while the 12,000-volt breakers are arranged for cell mounting and have removable doors. These breakers have remote mechanical control and automatic tripping mechanism.

Feeder switches for sectionalizing the lines at the substations are mounted on each substation roof. These are 2,000-amp., 3,000-volt switches equipped with horns.



Schematic Diagram of the Power Indicating and Limiting System

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They are capable, if necessary, of rupturing the 3,000-volt circuit without the aid of other circuit breakers.

At substations Nos. 2 to 5 four of these horn-gap switches are installed, while at substation No. 1 (Vina del Mar) nine switches were required to sectionalize the distribution system properly. Stations 2 to 5 are located along single track, while No. 1 is located along double track. The horn-gap switches facilitate train movement in case of emergency due to failure of the overhead construction between substations, as the defective section can be isolated and trains from the opposing direction set in on side tracks energized from the section which is in good operating condition. The yard overhead construction is insulated from the main line and is fed, in the case of stations located on single track, from either feeder breaker. This arrangement permits the passage of the maintenance equipment without delay. On the double-track sections the yard can be fed from any feeder.

In the case of trouble within the substation buildings affecting the 3,000-volt cables, these switches can be used to cut off the power entirely from the building, and the contact line can be fed past the substation without the current entering the building. The arrangements at the Vina del Mar station are shown in one of the accompanying diagrams. The operating levers are located back of the main switchboard, and are connected to the switches by vertical rods passing through the roof.

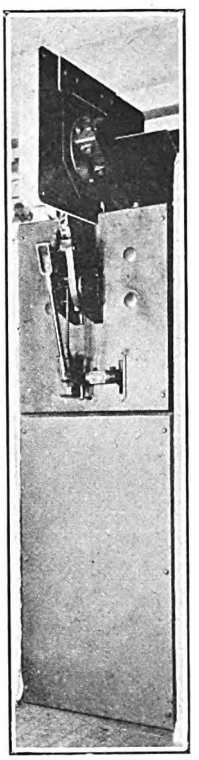
Lightning conditions in the Valparaiso-Santiago district are not at all severe, but the occasional discharges between clouds and earth are cared for by the installation of type AL aluminum lightning arresters with impulse gaps in both the 44,000-volt and 12,000-volt stations. The arresters are located in the high-tension room near the circuit breakers and tap onto the high-tension busbars.

Control Equipment for the Sets and Station Service

The starting and running breakers for the 2,840-hp. synchronous motors are in the basement under the machine room. They are controlled from the motor panel directly above, and are mounted in the dividing wall between the machine room and the transformer room. In the illustration of the switchboard, the first panel at the right is for the control of the transformer breakers, the second is for the control of one of the synchronous motors and the third for one of the incoming high-tension lines. The fourth panel controls the 2,300-volt breakers in the circuit for station service. The last panel on the left carries the handles for resetting the flash suppressors.

The station is supplied with low-tension current through a 37½-kva., 2,300 to 220-volt, three-phase transformer, which receives power from the secondaries of either of the two main transformers. This 220-volt power is controlled through a panel in the switchboard under the balcony, which contains the three-pole knife switches for the station service, comprising blower motors for ventilating the main motor-generator sets, station lighting, compressors for blowing out equipment, oil testing, filtering and drying equipment, and for the power indicating and limiting equipment of the motor-generators.

The main switchboard for the generators and outgoing d.c. feeders is divided into two sections, that for the instruments and generator control being on the main floor at one end of the machine room, while the section containing the circuit breakers and disconnecting switches for control of the 3,000-volt circuits is on the balcony directly above the control and instrument section.



Panel and 3,000-Volt D.C. Circuit Breaker Located on Balcony

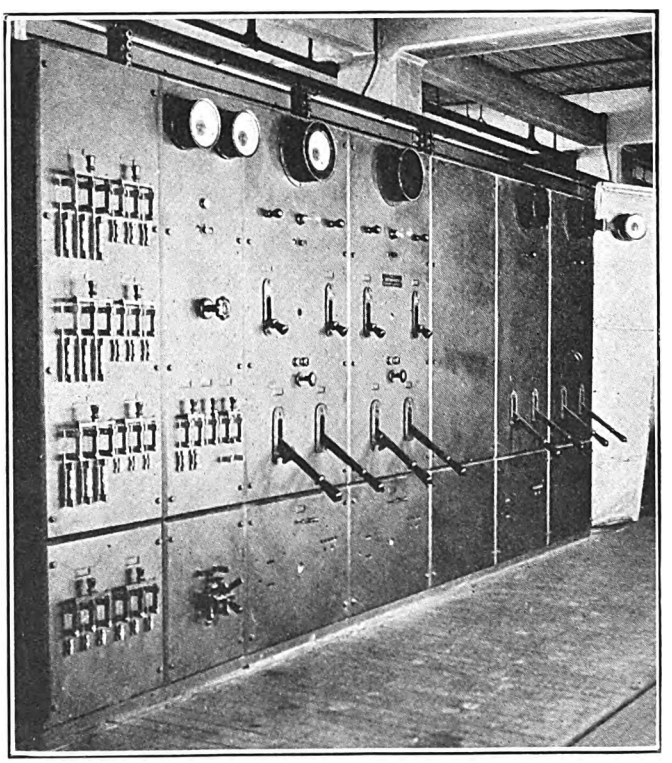
The breakers and switches are so placed that failure of any part of the high-tension circuit would cause minimum damage, the circuit breakers being mounted on the front balcony panels and the disconnecting switches on the rear panels and separated from the breaker panels by barriers. Breakers and disconnecting switches are arranged for mechanical operation from the control board. The meters are mounted on a Bakelite disk within a Bakelite case with a plateglass front, affording a clear view of the indicating dials with safety.

The generator panels carry the control handles for the main and exciter circuits, including field rheostats for the main generators and their exciters.

The feeder panels in stations Nos. 2 to 5 control the feeder breakers and disconnecting switches inside the building, while provision for additional protection and flexibility is obtained by placing yard feeder switches on the substation roof. Substation No. 1 has four feeder panels because of the double track.

All the generator and feeder circuit breakers are provided with unusually powerful magnetic blowouts and large arc chutes, although the duty of these breakers under short-circuit conditions is made easier by the flash suppressors.

The generator negative leads pass through transformers and tap onto a negative bus attached to the



The Control and Instrument Sections of the Main Switchboard

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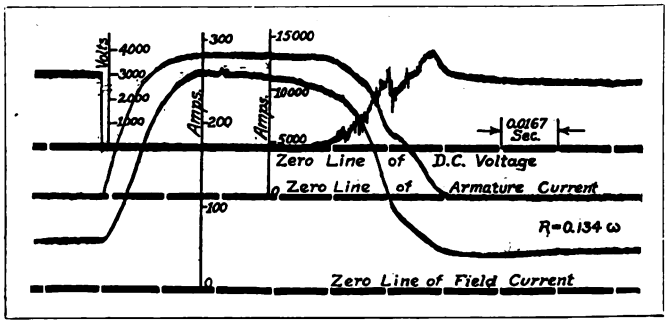


Oscillogram of Short-Circuit Tests at 3,000 Volts. The Current Reached 20 Times Normal Without Bucking Over

track rails. The secondaries of these transformers are connected to the trip coils of the flash suppressors, which act upon sudden increase of current due to short circuits or grounds on the d.c. system. These flash suppressors are located in the basement. They are reset from a panel in the wall between the machine and transformer rooms. When the flash suppressor is reset the generator field switch closes automatically.

Lightning protection on the d.c. system is provided by a Westinghouse type A electrolytic arrester in the feeders at each station. These are the only arresters on the 3,000-volt system.

The control system for operation of relays, circuit-breaker trips, indicating lamps, klaxons, etc., is 32 volts d.c., supplied by a storage battery. An automatic two-pole double-throw switch connects the station emergency lamps to the battery in case of failure of power on the station service board.

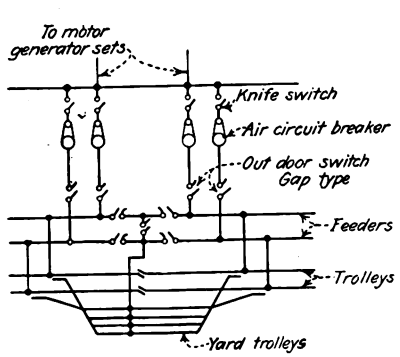
Each station contains a National Brake & Electric portable compressor driven by a 220-volt, three-phase motor for blowing out the machine windings and for other purposes. This has a capacity of 16½ cu.ft. per minute.

A 3-kva., 30,000-volt induction-regulator type oil-testing unit takes power from the station service panel at 220 volts. To provide for drying out the main transformers after installation or repair a special transformer drying outfit was designed. It consists of a bank of grids receiving 220-volt, three-phase power for heating air that is forced through the transformer being dried out by a motor-driven blower.

The oil in the breaker tanks may be reconditioned to regain its insulating properties by means of a Westinghouse type A-30 drying oven.

The Power Indicating and Limiting System Is Unique

Due to the type of hydro system employed, it is impracticable to provide storage capacity near the Maitenes or the Florida generating station. The power contract is based on energy used in kilowatt-hours, and also on the maximum demand in kilowatts. The maximum demand is defined as the highest reading during any 15 consecutive minutes. Although the contract does not set a limit to the power that may be taken by the railroad, a special power indicating and limiting system has been designed and installed for lowering the demand by reducing the trolley voltage at the peak.



Yard Feeder Switch Arrangements on Double Track

The long duration of the peak period specified is favorable to the railroad, in that there is little danger of serious penalization of schedules due to the operation of this device. Its greatest use probably will be that of totalizing the power taken by all five substations and indicating it in the dispatcher's office at Baron. The permanent chart drawn by graphic meters serves to determine the maximum demand factor for calculating this portion of the bill.

For the contemplated service it is interesting to note that calculations have indicated the following demand figures, the load factors being based on a calculated average load for the system of 4,800 kw.:

Length of Maximum Demand Period, Minutes	Calculated Maximum Demand for Period, Kw.	Load Factor, per Cent
2	13,500	35.5
10	11,550	41.8
15	10,150	47.3

The principle of operation of the power indicating and limiting system is quite complicated, although the operation is entirely automatic and it is not liable to derangement. The basic instrument is a Kelvin balance type contact-making wattmeter, arranged to measure accurately the total power supplied. One of these is installed in each substation. At the Quilicura substation, No. 5, is located a 2-kva. motor-generator set consisting of an alternating-current generator driven by an adjustable speed direct-current motor, whose speed is controlled by the contact-making wattmeter. With no load on the substation this speed is set to give 25 cycles on the generator. The direct current for operating this set is obtained from another motor-generator set fed from the a.c. station service bus.

The variable-speed d.c.-a.c. set drives a small synchronous motor that operates a magnetic torsion device connected mechanically to the beam of the wattmeter, the equipment being combined to produce an alternating frequency varying with the power input to the station in such a way that the excess frequency above 25 cycles is proportional to the power input to the station.

An electromotive force carrying this variable frequency is transmitted at approximately 2,200 volts over two aluminum conductors carried on cross-arms on the trolley poles to substation No. 4, at Rungue, where there is a similar equipment to that at Quilicura, except that instead of a single small synchronous motor operating in conjunction with the wattmeter there are two synchronous motors with magnetic torsion devices, one driven by power from No. 5 substation and the other receiving power from the variable-speed motor generator in No. 4 substation.

This equipment is so arranged that the speed of the motor-generator produces a frequency equivalent to that transmitted from substation No. 5, augmented by an amount proportional to the power input to substation No. 4, the new frequency thus being equivalent to an amount in excess of 25 cycles proportional to the sum of the power inputs to the two substations combined.

The new frequency is then transmitted on to No. 3 substation at Llai Llai, where there is similar equip-

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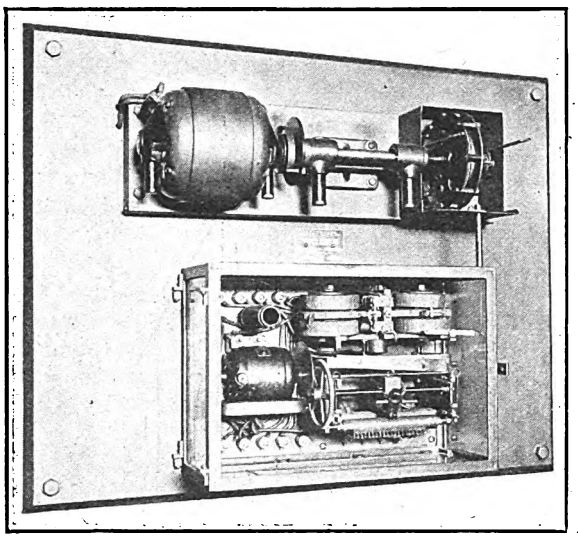
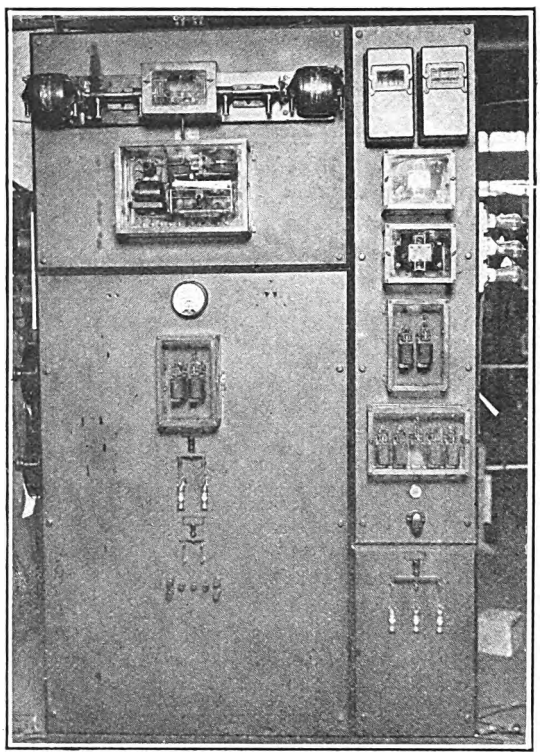
ment, increasing the frequency by an amount proportional to the power input at that station, then to No. 2 at San Pedro and to No. 1 at Vina del Mar, from where the total power indication, expressed in frequency, is finally transmitted to the dispatcher's office at Baron in Valparaiso.

At the load dispatcher's office the variable-frequency alternating current drives a small synchronous motor actuating a magnetic torsion device, which is connected mechanically to a contact-making wattmeter similar to that in Substation No. 5. This wattmeter receives power from a local source, and is provided with a means of automatically adjusting the amount of power supplied to it proportionally to the excess over 25 cycles; that is, to the total power input to all the substations.



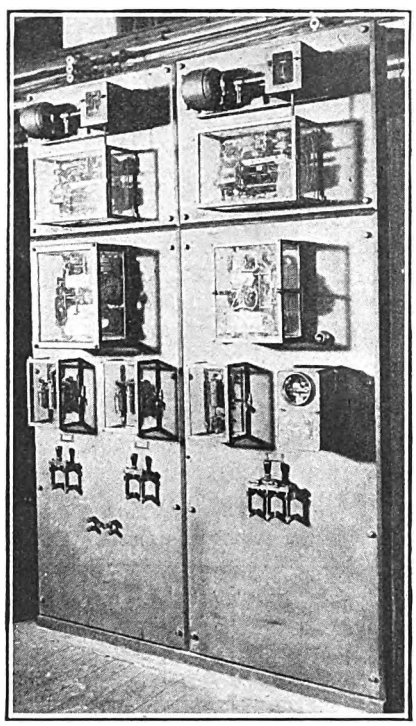


The Power Demand Integrating Mechanism

At left, end station panel of power indicating system at Quilicura.

At right, equalizer panel for intermediate stations in power indicating system.

Below, control panels in dispatcher's office at Baron.



In series with the contact-making wattmeter are a graphic wattmeter and a combined watt-hour meter, and maximum demand meter measuring the integrated energy consumption as well as the maximum integrated demand over a period of 15 minutes. There is also a maximum demand limit meter.

Control of the power demand is accomplished through a combination of relays in the load dispatcher's office so arranged that when a predetermined load is reached a series of impulses is sent out over the power indicating and limiting circuits, which actuate relays in the various substations to control the generator field rheostats and lower the trolley voltage sufficiently to maintain the load within the required limit. As the power demand decreases the trolley voltage is restored to normal.

The impulses are transmitted from station to station by direct current carried through the middle taps on the transformers. This direct current is supplied from the motor-generator set in the dispatcher's office, which is fed directly from the power company's system. A rapid rise in power peak exceeding the setting desired, and which would be beyond the limit of control of voltage on the motor-generator sets, is avoided by transmitting a higher current through the circuit. This trips the circuit breakers and takes the stations off the line.

When power is returned to the line by regenerative braking this is credited by the meters, so that the measurements represent the net power being delivered to the substations. On this electrification the maximum spacing of stations is 31 miles on a section of relatively light traffic and easy gradients, while the shortest section, 20 miles long, has the heaviest grades in the entire engine division. The densest traffic is on the Valparaiso end of the line, between Puerto and El Salto, in which a number of suburban trains are run in addition to the through trains. The next most important section is that between El Salto, Las Vegas and Llai Llai. A number of passenger trains are run to the latter station from Valparaiso and others from there to Los Andes. Several freight trains cover this section, and are diverted to the Los Andes branch at Las Vegas. The section of the line between Llai Llai and Santiago has the most severe gradients, reaching the maximum elevation of approximately 2,600 ft. above sea level, but the number of trains is smaller.

Substation No. 1, Vina del Mar, will be quite heavily loaded, and requires the two 2,000-kw. motor-generators now installed to handle the initial installation. Station No. 3, at Llai Llai, will be the heaviest loaded station of the five, since it will supply energy to the locomotives hauling trains up the heavy grade section to the summit of the mountain, and also will supply energy to the Los Andes branch and northward toward substation No. 2. Two motor-generator sets will be sufficient for a limited time, and increased traffic will require the installation of a third set.

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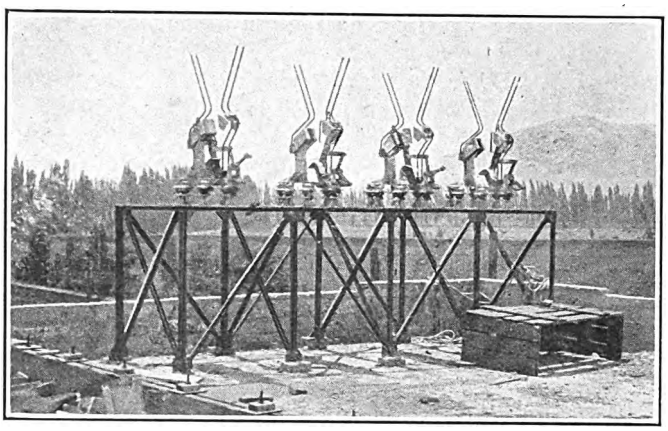


The 2,000-Amp., 3,000-Volt Yard Feeder Switches Are Mounted on the Roof of the Substation Building

Stations 2, 4 and 5, at San Pedro, Rungue and Quilicura, did not from capacity requirements need two 2,000-kw. motor-generator sets, but from the standpoint of reliability two were installed at the request of the railroad. Quilicura is the end station, and classification yards at Yungai receive their energy from this station. When the electrification is extended southward past Santiago, this station will serve to feed a considerable section of the new installation.

The substation spacings and layouts were selected to provide for an increase in the traffic to approximately 2¼ times that which existed in 1921. Each building has provisions for the installation of a third motor-generator set when needed.

The feeders, like the substations, were arranged to handle traffic 50 per cent greater than that in 1921. All aluminum feeders were used, largely on account of its lower cost at the time the equipment was purchased, and steel-reinforced aluminum conductor was found unnecessary on account of the small stresses. The feeder used is a 795,000 circ.mil, which is equivalent to 500,000 circ.mil of copper. On the Los Andes branch two 596,000 circ.mil feeders are used, each of which is equivalent to approximately 375,000 circ.mil of copper.

On the heavy traffic sections from the summit of the mountain northward the drop was limited to a maximum of approximately 350 volts. Eastward from the summit toward Santiago the maximum drop may run occasionally as high as 550 volts, but this will be exceptional, even with traffic 50 per cent in excess of that figured on. The lowest potential probably will occur on the Los Andes branch, but the traffic there is very light and there is ample leeway in the schedules. The drop can be reduced when the traffic warrants by running a short-cut feeder across the mountain from Rungue or in several other ways. The feeder capacity between the summit at La Cumbre and Llai Llai is such as to limit the drop on motoring to 350 volts and the voltage rise on regeneration to between 250 and 300 volts. These values are, of course, calculated and may vary somewhat in operation.

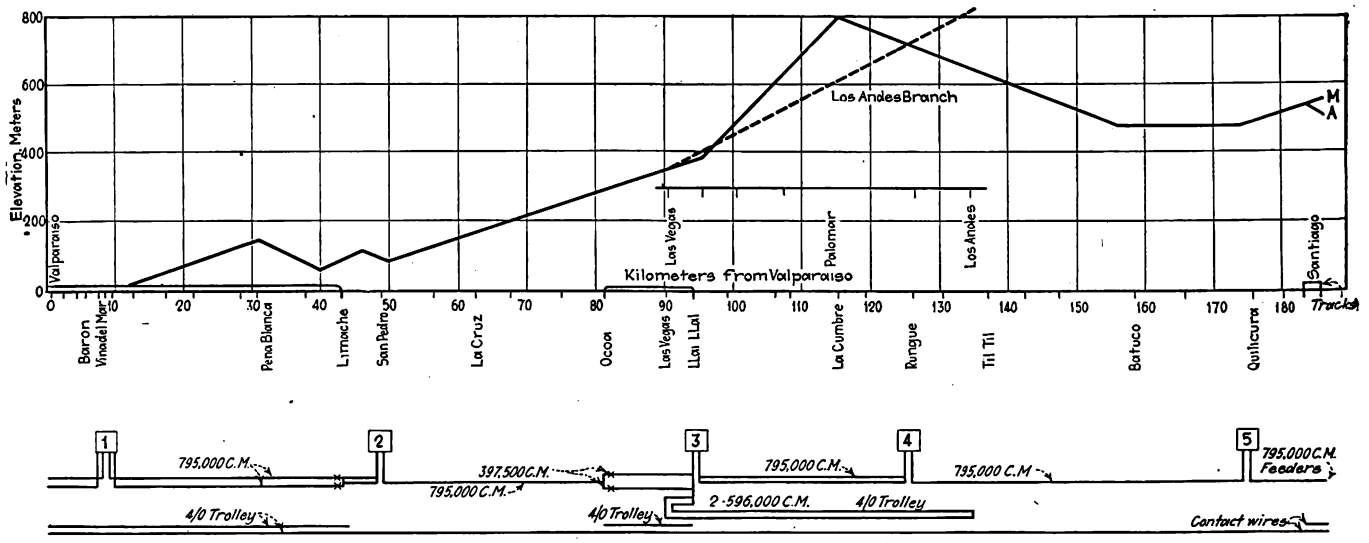
A single No. 0000 copper trolley wire is strung over each main track, while in the yard the size was reduced to No. 00 copper trolley. Between the feeders and the trolley there is sufficient current capacity that any substation may be shut down while continuing to operate trains, although, of course, they would operate at reduced speed in the vicinity of the station out of service.

The electrical equipment for the substations, with the exception of a few minor items, was manufactured by the Westinghouse Electric & Manufacturing Company, and was installed under the direction of that company's engineers. The buildings were constructed by Errazuriz Simpson & Company.

Details of New Pennsylvania Electric Locomotives

Additional Information on 200-Ton Engines Designed for Either A.C. or D.C. Operation and for Preference Freight or High-Speed Passenger Service

IN FEBRUARY of this year the Pennsylvania Railroad completed the first of three similar electric locomotives, one of them for use in either freight or passenger service on 11,000 volts, 25 cycles, alternating current and the other in passenger service on 650 volts direct current. The mechanical parts were designed and built by the Pennsylvania Railroad, and the electrical parts by the Westinghouse Electric & Manufacturing Company. The locomotives were assembled at the Juniata shop of the railroad. A description of these locomotives was published in ELECTRIC RAILWAY JOURNAL for Jan. 26, 1924, page 133, and a photograph was



Condensed Profile, Feeder Layout and Substation Location Diagram for the Electrified Section of the Chilean State Railways

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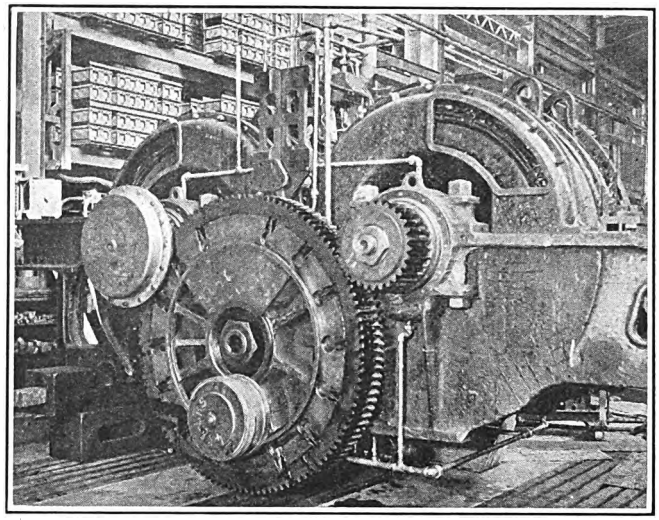
published on Feb. 9, page 218. Further details are now available and are given below.

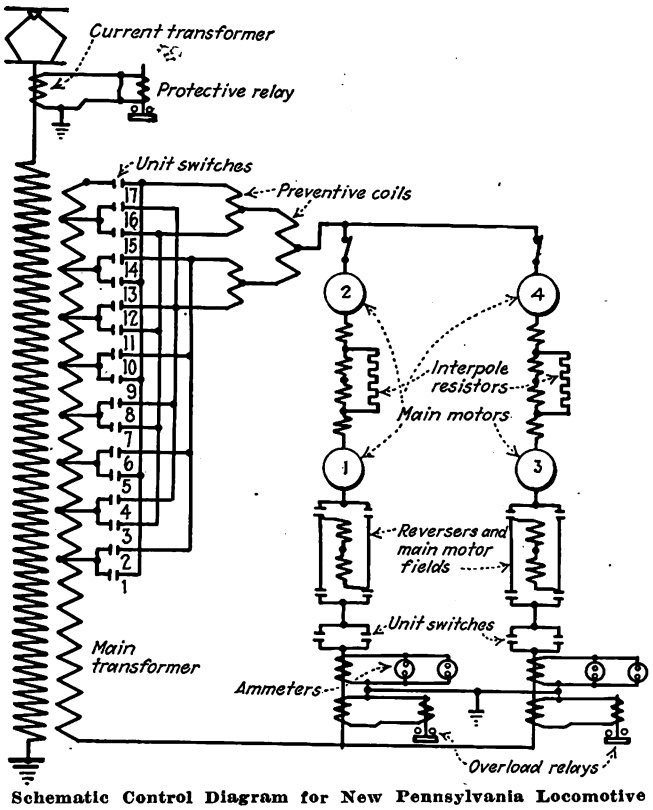
The first locomotive, known as the L-5, was placed in freight pusher service on the 11,000-volt alternating-current section between Overbrook and Paoli, Pa. A second, equipped for passenger service at 650 volts direct current, and known as the L-5-A, has just been completed and will be placed in service at the New York terminal.

Each locomotive weighs 408,600 lb. total, of which 308,600 is on drivers, and is equipped with four Westinghouse type 418 single-phase commutator motors. Two of these motors are geared to a jackshaft, which is connected to two pairs of drivers through the side rods. The two center drivers are flangeless.

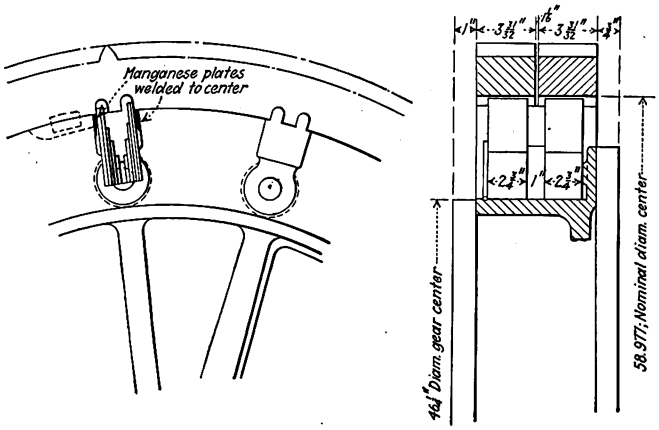
Lubrication of motor and jackshaft bearings is obtained by an oil circulation system. Under each jackshaft, cast integrally in the main frame, is an oil reservoir holding an adequate supply of oil. Geared to the jackshaft is a plunger type pump which, when the locomotive is running, pumps the oil from the reservoir to a distributing manifold. From this point, the oil flows under low pressure to each motor and jackshaft bearing, and thence back to the reservoir. An indicator, consisting of a sight feed valve, is located in each operating cab.



Motor and Gear of the Pennsylvania Locomotive Assembled for Testing



Schematic Control Diagram for New Pennsylvania Locomotive



Details of Flexible Gear of Pennsylvania Locomotive

The guiding trucks on each end of the locomotive are of the radial center-bearing type equalized with the main drivers through bell cranks and tension rods. Flexibility is obtained between the truck and bearing plate by means of transverse flat leaf springs resting in the swing links supporting the weight on the truck.

Each jackshaft is equipped with two sets of flexible gears, one set on each end of the shaft. A set of gears consists of a cast steel gear center carrying the side rod pin, two heat-treated gear rims and a number of flat spring flexible units interposed between the gear rims and the center as shown in an accompanying drawing.

The motors each carry two pinions meshing with the gears, the pinion on the motors nearest the center of the locomotive being solid and those on the outer motors being flexible. The flexible pinions are similar in construction to the gears, using duplicate flexible elements.

THE L-5 GEARED FOR A.C. FREIGHT SERVICE

	Amp. per Motor	Brake Hp.	Tractive Effort, Lb.	Speed M.p.h.
At maximum tractive effort...	4,250	3,450	100,000	12.5
At one hour rating.....	2,600	3,300	59,000	21
At continuous rating.....	2,300	3,070	50,000	23
THE L-5 GEARED FOR D.C. PASSENGER SERVICE				
At maximum tractive effort...	4,250	3,450	54,000	22
At one hour rating.....	2,600	3,300	29,500	42
At continuous rating.....	2,300	3,070	25,000	46

The traction motors are of the interpole type and the excitation of the interpole fields is adjusted by suitable resistance shunted across the interpole winding. The main circuits of the alternating-current locomotive are shown in the accompanying diagram.

The air brake equipment is the type 14-EL., an adaptation of the No. 6-E.T. to electric locomotives. Compressed air is furnished by a single compressor having a capacity of 150 cu.ft. of free air per minute when operating against a pressure of 140 lb. per square inch.

Energy for control and lights is obtained from a 30-volt storage battery, which is charged from a small motor-generator set consisting of an alternating-current single-phase motor and direct-current generator.

The ratings of the L-5 locomotive geared for both passenger and freight service are given in the accompanying table.

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Toronto Shop Has 5 Acres Under One Roof

This Building, the Principal One of the Group Recently Completed by the Toronto Transportation Commission, Was Designed so as to Involve the Minimum Movement of Materials, Equipment and Men—The Arrangements Provide for About 1,800 Cars, Including All Departments Necessary for Overhauling and Painting

THE car repair shop of the Toronto Transportation Commission is the largest one of the group of buildings at the Hillcrest Yard, recently built as a part of the rehabilitation program that has followed the operation of the property by the municipality. A preliminary article on this shop was published in the ELECTRIC RAILWAY JOURNAL for April 28, 1923, page 723, and a general description of the entire group of buildings was published in the May 24, 1924, issue, page 801.

When the commission took over the property of the old Toronto Railway, the shops and equipment were found entirely inadequate for the work they had to do. The condition was such that, with the purchase of new cars and with increased service, a new shop with modern facilities was essential. Accordingly plans for the present shop were begun as soon as the final steps were taken to acquire the railway. The entire layout, based on a system operating 1,800 cars, has been planned to obtain efficiency in repair work and conserve movements, both of the cars and parts under repair and of the men engaged on the work.

The main shop is a single building 452 ft. 2 in. long and 466 ft. 10 in. wide, divided in the middle by a transfer table which traverses the entire width of the building. The transfer table occupies a space 50 ft. x 566 ft., including a 50-ft. extension at each side of the building. This makes a total area under one roof of slightly more than 218,000 sq.ft. The useful floor area of the building is 181,790 sq.ft. or about 4 acres.

The building is designed and laid out as a complete unit, embracing under the one roof all the separate departments engaged in car repair work. For the most part it is a clear open space. Only the paint section, the "free stores," the forge shop and a lunch room for the men are partitioned off. This arrangement was decided on as permitting intimate association, promoting co-operation, and tending to stimulate good work among the employees. On account of the rather severe winters in Toronto it is particularly desirable to have the work concentrated in this manner, as with it there is no necessity for the men to go outdoors for any purpose in connection with their regular work.

One of the particular features of this building is the good natural lighting, which is obtained through the use of skylights in the roofs. These are of the familiar saw-tooth variety, with the glazed portions facing the north. By this means a diffused light is available, which is reflected from the white ceilings to the working floor below. This natural lighting is sufficiently uniform that no shadows are cast by objects or workmen on the floor of the shop. In addition to the skylights, fully half of the side walls are of glass. The light is sufficient for accurate work even on dull days, as is evidenced by the interior photographs illustrating this article, most of which were taken on a cloudy day.

The shop building is heated with a hot-air system. Steam from the main heating plant is passed through coils within an air chamber located in the basement near the southwest corner of the building. From here it is forced by a fan through a system of ducts reaching every portion of the shops, except the paint shop, where direct steam heat is used in order to minimize dust and facilitate drying. Outlets from the hot-air ducts are provided at frequent points so that the shop is kept at a uniform temperature.

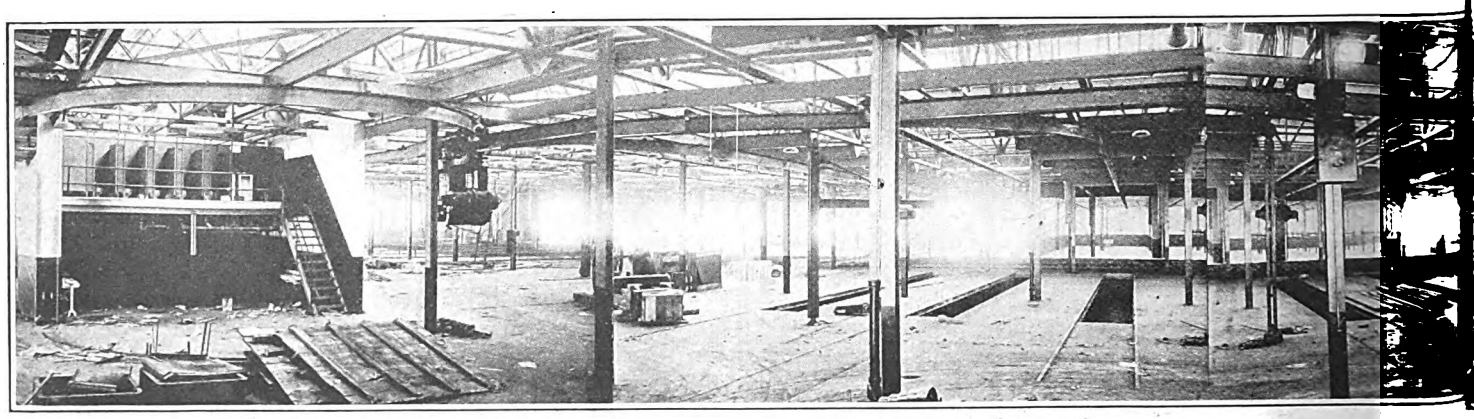
THE TRUCK SHOP HAS SPACE FOR 29 CARS

The truck shop occupies the space directly south of the transfer table. It is 100 ft. wide and the full length of the building, with 29 tracks, each of which has ample capacity for handling a car. Four tracks at each end of the building, or eight in all, are equipped with car hoists. The tracks at either end of the shop are fitted with a wheel grinder.

All of these tracks are connected with the machine shop, armature shop, forge shop and the free stores by means of an overhead monorail system, which is used for the handling of heavy parts such as wheels and axles,

Panoramic View of Toronto Shops

The view on these facing pages, taken before the shops were occupied, shows in general the layout of the building. The storeroom and forge shops are behind the partition at the extreme left. To their right is the main truck and motor shop, with the car body shop and woodworking department in the background beyond the transfer way. Further to the right in the background is the paint shop, and at the extreme right are the machine shop and winding room.



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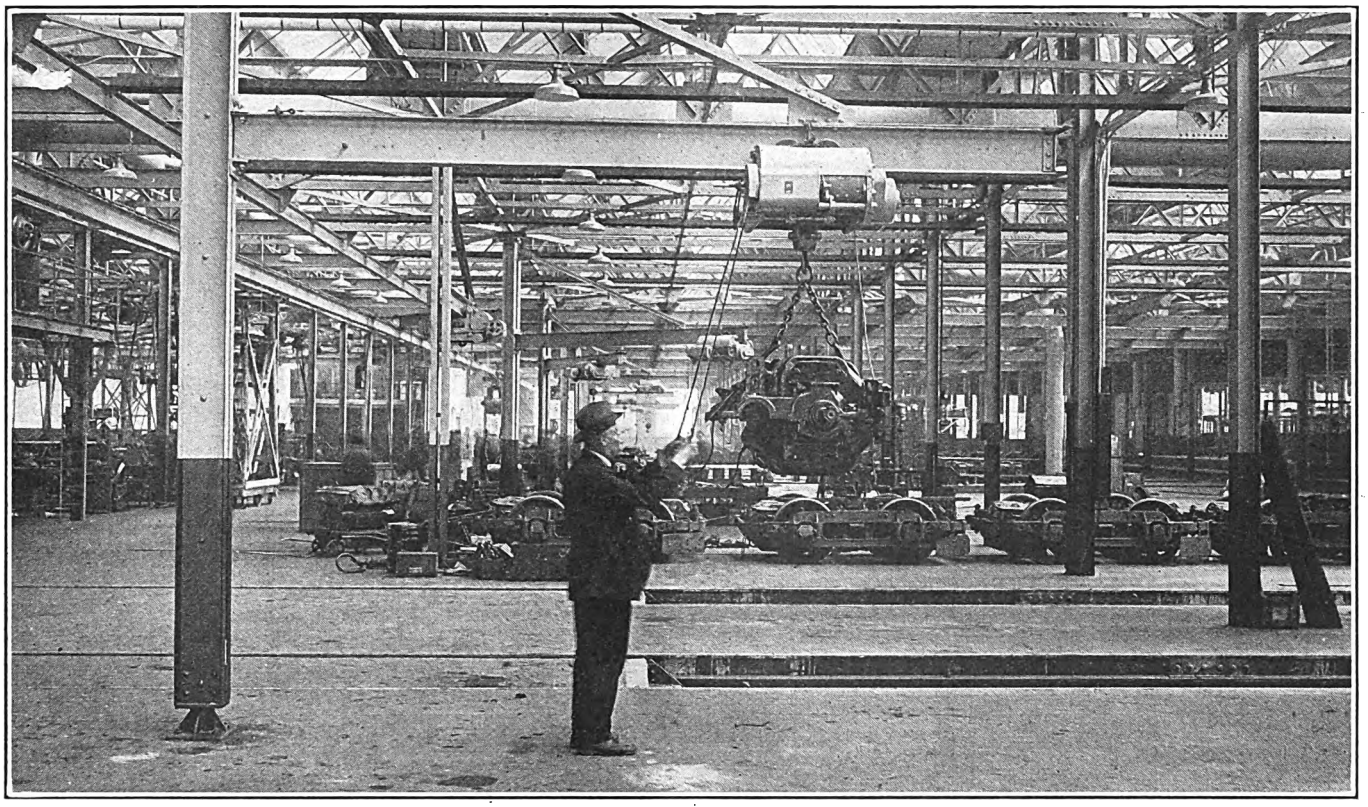


Looking West in the Truck Shop. One of the 14 Jib Cranes Is Shown in the Foreground

motors, etc. A 5-ton Shepherd electric crane, shown in an accompanying illustration, is used on the monorail system.

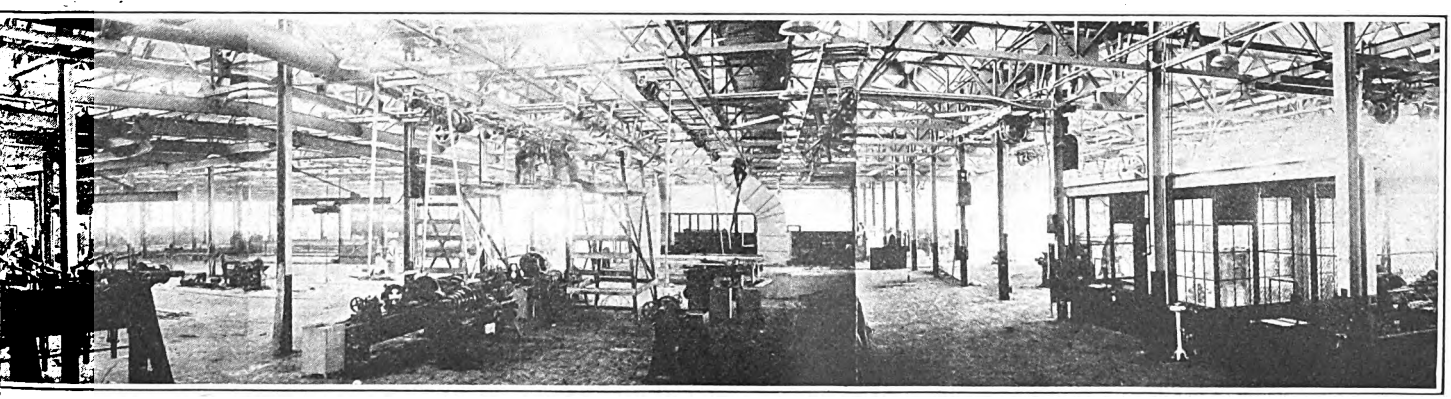
An individual jib crane is provided between each two tracks in the truck shop. In this department and in the machine shop there are in all 14 of these jib cranes of 1½-ton capacity and one of 1-ton capacity. Each has a radius sufficient to handle trucks and motors on the two tracks which it serves, and to place material within reach of the main monorail system. Each crane is equipped with an electric hoist.

Loose dirt is removed from the motor cases, after they are taken out from the trucks, by means of a special vacuum cleaner. The motor to be cleaned is set on the shop floor adjacent to the intake of the vacuum system and a canvas-covered wooden frame placed over it, covering it completely. Suction is provided by the motor-driven vacuum pump shown in one of the accompanying illustrations, which is mounted on a platform above the floor. With the motor in position the nozzle of a hose connected to the shop air line is inserted through a hole in the canvas cover, and the air pressure is turned on. This nozzle is moved around within the case, and all loose dirt is blown off the motor, the dust being carried through the suction line into the receptacle of the cleaner on the platform, where it is deposited. Thus all the dirt is confined, and the operation can be conducted in the shop without interfering with other operations.

The winding room, machine shop, forge shop and free stores are all located adjacent to and separated by a 6-ft. aisle from the motor and truck shop. This layout is such as to compel the shortest possible movement by truck or monorail of material to and from the various production departments to the motor and truck shops, which is the point of demand for such material.

THE FORGE SHOP

The forge shop is located in the southwest corner of the main building, adjacent to the free stores, to which the bulk of the material produced is delivered. Another reason for this location of the forge shop was to keep dust and dirt as far away as possible from the electrical and mechanical work. This location also permits the unloading of fuel oil used in heating the furnaces, the bulldozer, etc., by gravity direct from the steam railroad



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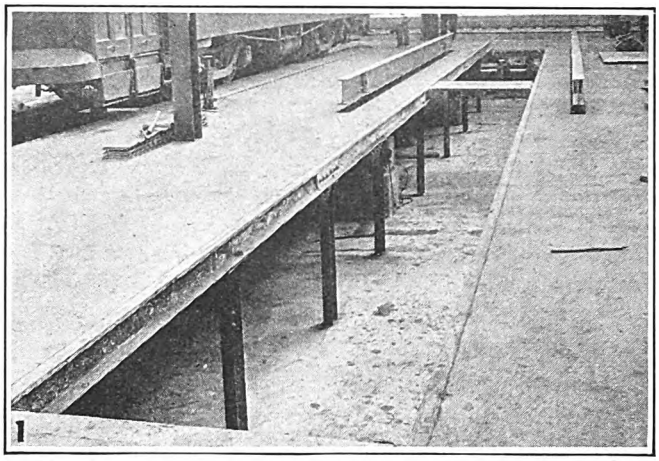
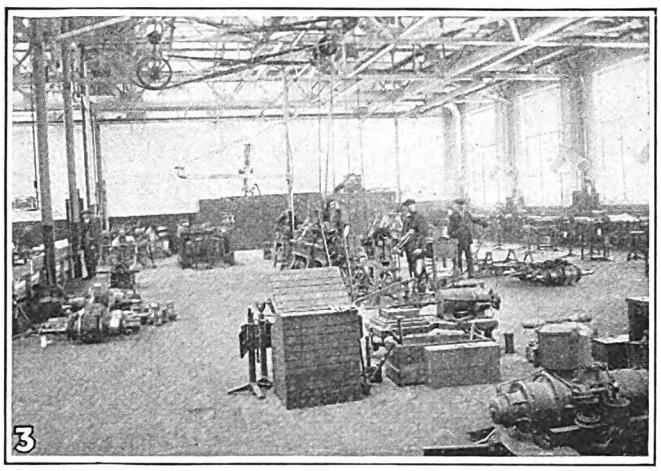
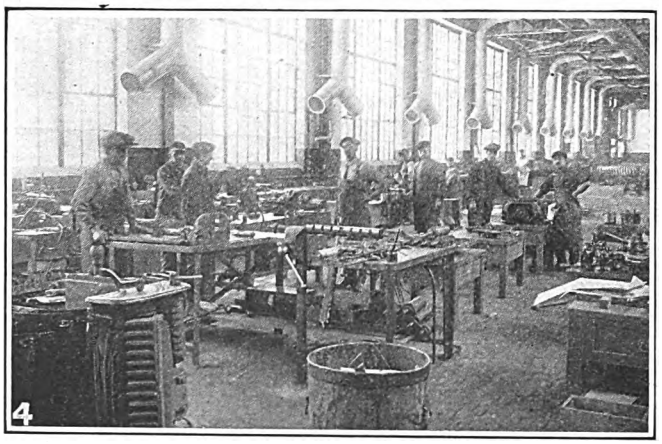






No. 1. The pits are of open construction, forming a shallow basement under the entire truck shop. The car hoists of the type shown beside this pit are placed on eight tracks.

No. 2. The forge shop has excellent facilities for car repair work.

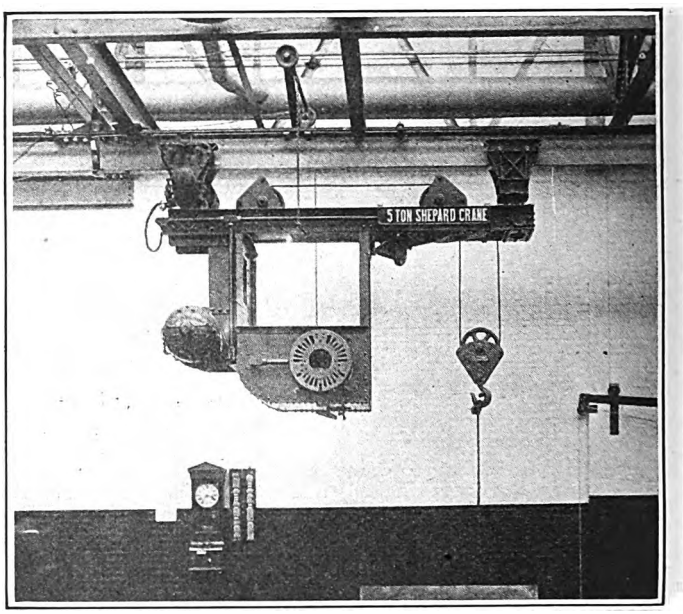
No. 3. The armature winding department.

No. 4. The controller and air-brake sections are adjacent to the winding room and the machine shop.

track at the west of the shop into an underground storage tank.

Forge coal is stored in a basement beneath the free stores, which keeps it dry and in good condition and also obviates the necessity of the helpers going to an outside storage, which wastes time and is dangerous to health in winter.

The eight forges are of the down-draft type. Air pressure for the fires is delivered through a glazed tile pipe which is laid in the exhaust tunnel. There are two direct-connected, air-operated forging hammers, one of 800-lb. and one of 160-lb. capacity. Two gas-fired heating furnaces, one 36 x 36 in. and one 36 x 72 in., and one large-sized electrical heat-treating furnace are installed. The electric furnace is equipped with necessary instruments and apparatus to provide automatic heat control. In addition to this equipment there are large and medium-sized, direct-connected, motor-driven punches and shears, a bulldozer, an emery grinder, an oil furnace, a hardening furnace and a spring furnace. Space



The Monorail System, Which Serves the Truck and Machine Shops, Is Equipped with a 5-Ton Crane

has been provided for a forging machine and a furnace which may be installed later. The electric babbitt-melting furnace and the gas furnace for melting out babbitt from bearings are also located in the blacksmith shop.

The electric and acetylene welding equipment are in the southeast corner of the forge shop, screened to prevent glare. Space also has been provided here for the manufacture and repair of fenders and lifeguards.

Material Is Controlled Through the Free Stores Department

Located between the blacksmith shop and the machine shop is the "free stores," in which are stored and through which pass all incoming and outgoing car parts for repair and also those already repaired. This department is really a clearing house between the divisional carhouse shops and other departments sending material to be repaired and the main repair shop. The duties of this department are to account for all materials received for repair from the carhouse or from other departments of the commission. One of the duties of the storekeeper is to inspect all materials, including

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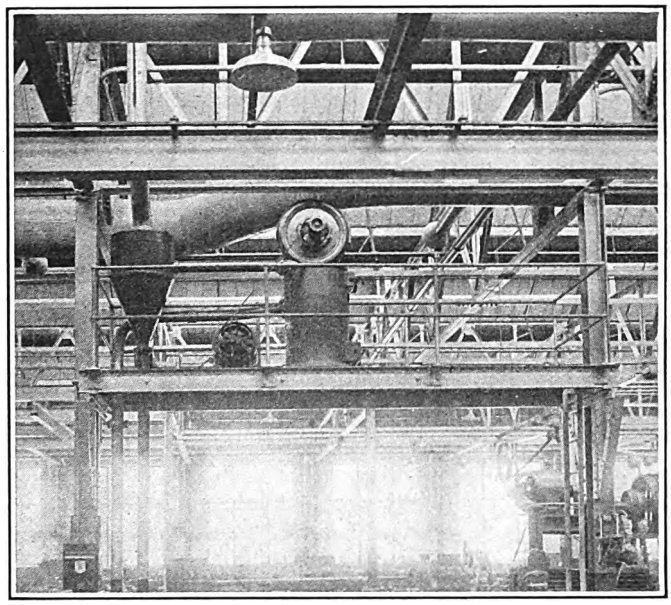
scrap, to decide whether it can be repaired or reclaimed, and whether materials such as brakeshoes have been worn to the fullest extent.

The oil reclamation and oil and waste soakage room is located in a section of the free stores.

The machine shop is located between the winding room and the free stores. A general foreman's office, sub-storeroom and toolroom are placed in the center of this space.

The various machines and their locations in the shop are shown in the diagram. A horizontal boring mill and a planer are located on the main aisle dividing the motor and truck shop from the machine shop, so that motors and truck frames need only be swung across the aisle from one department to the other. A new turret lathe for axle bearings and trolley wheels has been installed. It is anticipated that this tool will do the work of three ordinary lathes.

A group consisting of a heavy four-spindle drill and four lathes of various sizes is installed near the main



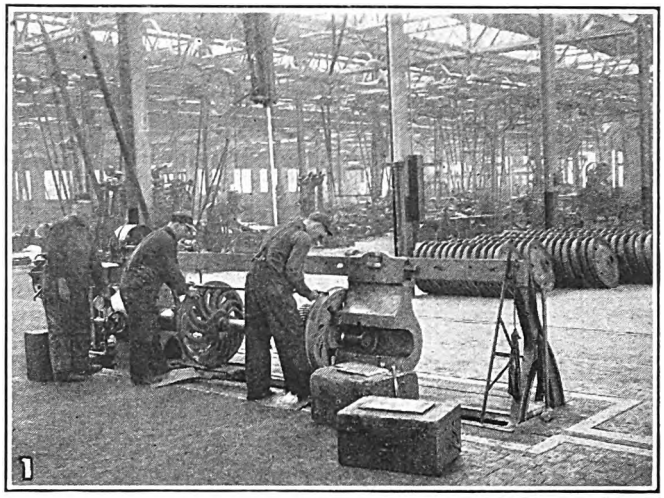
By the Use of the Vacuum Cleaner, Motors May Be Freed from Loose Dirt Without Causing Dust in the Shop

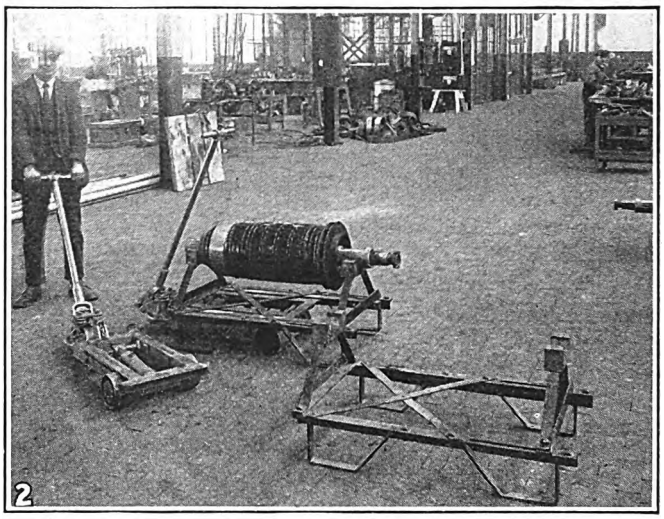
aisle. These machines, which are all new and modern, are designed for high-speed steel and quick change devices for variable speeds and feed. It is estimated that these machines will save at least 40 per cent over the obsolete type of lathes in the old shop, so that for the same amount of work only 60 per cent as many lathes were installed here.

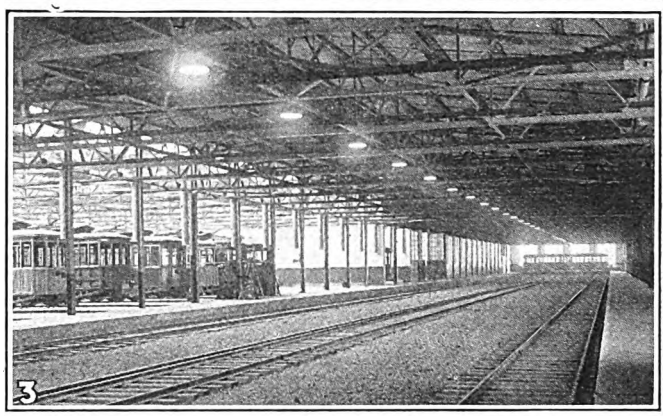
The wheel-fitting department directly adjoins the free stores, because the heaviest and greatest quantity of material passes between these departments. In this department are an axle lathe, a wheel borer, a wheel press and a tool grinder. Space is provided for a steel wheel turning lathe should it be decided at any time later to use steel wheels instead of the cast-iron wheels with which all the Toronto cars are equipped.

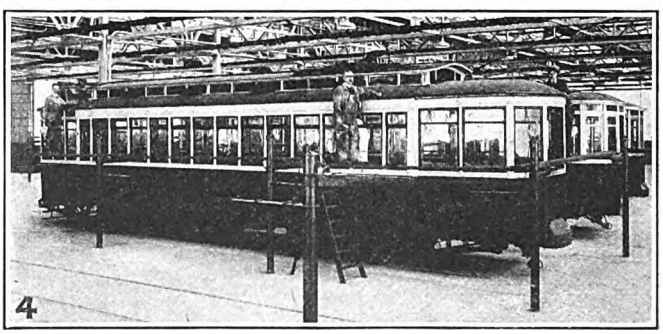
EQUIPMENT OF THE WINDING DEPARTMENT

The armature department is located in the southeast corner of the building and without a dividing partition, although it is partially separated by lockers and sub-storerooms. It is provided with 10 armature winding racks, three coil-winding machines, two coil-taping machines and two coil presses. There also is a small wind-









No. 1. The wheel press is located adjacent to the storeroom.

No. 2. Transveyor trucks are used for transporting many articles of moderate weight, such as armatures, about the shops.

No. 3. The transfer table separates the machine work from the body and paint shops. The body shop is shown at the left, and the wash room and paint shops, in the background, are inclosed.

No. 4. In the paint shop permanent posts with movable brackets make it easy to adjust the scaffolding.

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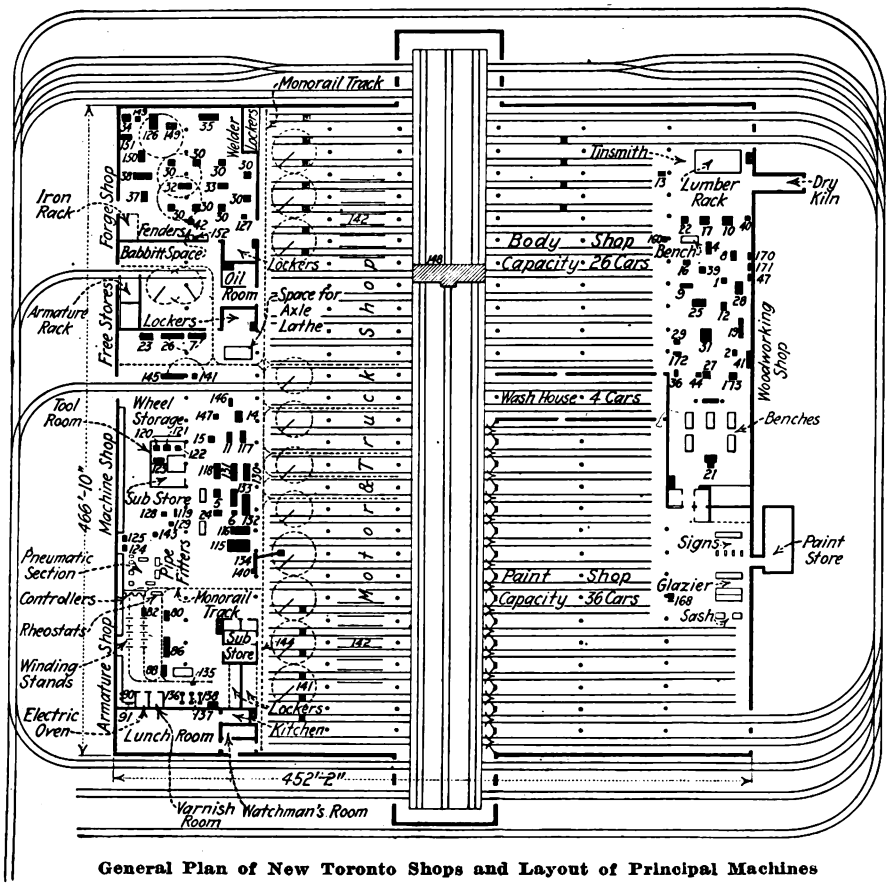

General Plan of New Toronto Shops and Layout of Principal Machines

Machine Shop
5. Universal milling machine
6. Wet wheel grinder
7. Axle lathe
11. Radial drill
14. Bolt cutter
15. Drill press
18. Shaper
23. Boring mill
24.* Shaper
26. Wheel press
115. Planer
116. Horizontal boring and milling machine.
117.* Four-spindle drill
118.* Turret lathe
119.* Lathe
120.* Tool room grinder
121.* Milling machine
122.* Drill grinder
123.* Tool room lathe
124*, 125.* Combination grinder
128.* Three-spindle drill
130.* 24-in. lathe
131.* 20-in. lathe
132.* 36-in. lathe
133.* 18-in. lathe
134.* Vacuum cleaner
140*, 141.* Wet wheel grinder
143* Power press
145. Wheel press
146.* Bolt cutter
147.* Machine saw

Armature Shop
80. Binding machine
82. Hydraulic press
86. Lathe
88. Commutator slotting machine
90, 90. Coil presses
91, 91. Taping machines
135.* Insulation test
136-7-8.* Coil winders
139.* Stove armature winder

Forge Shop
20. Bolt cutter
30, 30. Forges
32. Large hammer
33. Small hammer
34. Gas furnace
35. Blast fan
37, 38. Punch and shears
42. Melting out furnace
126.* Bulldozer
127.* Wet grinder
149, 149.* Oil furnaces
150.* Roll former
151.* Square shear
152.* Babbitt furnace

Woodworking Shop
1. 36-in. bandsaw
2. Boring machine
4, 9. Jointers
8. Self-feed ripsaw
10. 12x26-in. planer
12, 16. Trimsaws
13. Drill press
17. 8x27-in. planer
28. Molder
19. Belt sander
21. Roller sander
22. Bandsaw
25. Shaper
27. H. C. mortiser
29. Jigsaw
31. Tenoner
36. Dowel machine
39. Sash sticker
40. Swingsaw
41.* Wood turning lathe
44.* Chain mortiser
47.* Knife grinder
160.* Wet wheel grinder
170.* Bandsaw filer
171.* Circular saw filer
172.* Grindstone
173. Disc sander

Paint Shop
168.* Wet wheel grinder

General
148.* Transfer table
141.* Jib cranes
142.* Car hoists
144.* 5-ton monorail

*Indicates new machines

ing machine for armatures for the car heater blowers. A varnish room and an electrically heated baking oven provide for finishing the armatures and a high-tension insulation testing set for testing them. A commutator slotting machine, a hydraulic press for commutators, a lathe for turning commutators and a banding machine complete the equipment in this section.

A sub-storeroom is located to the north of the armature department, where supplies are kept for both the armature and motor and truck departments, being issued as required by the departmental foremen. Offices for the foremen of these departments are located adjacent to this storeroom.

The air-brake and controller sections are located between the armature department and the machine shop, from both of which the repairing and overhauling of controllers and air brakes require material.

For the handling of light and small materials a system of communication by means of transveyor trucks, and a number of platforms for use in connection with them, has been provided. Thus material when unloaded from the supply car or motor truck can be placed on the platforms and tables and conveyed to the various departments for necessary repairs, thus making it possible to keep all materials off the floors, and resulting in a clean, orderly shop, together with considerable saving in time and expense.

A special use of the transveyor trucks is for transportation of armatures. Instead of being laid on the floor, each armature is stored on a rack designed for the purpose, with brackets for supporting the two ends of the shaft. These are of steel angles and straps, making them light but strong. In order to move an armature one of the transveyor trucks is run directly beneath the frame, and by a movement of the handle the truck lifts the frame off the ground so that it may be carried readily anywhere in the shop.

CAR BODY AND WOODWORKING SHOPS

The north side of the shop is assigned to car body work, the woodworking mill, the wash house and the paint shop. The car body shop is located directly north of the transfer way, and occupies about 45 per cent of the north portion of the building. There are 14 tracks of two-car length, giving a capacity of 28 cars for body repairs. The tracks in this department are directly in line with those in the motor and truck department, enabling car movements from the truck department, the second step in the progress of the car, to the car body shop by means of the transfer table with the least possible time and effort, and without interfering in any way with the other cars in process of repair.

A car straightener has been built into the floor on one of the tracks in the body shop. The arrangement, which is somewhat different from some other recent straighteners, is shown in accompanying illustrations.

The space north of the body shop is assigned to the woodworking department. This shop is equipped with 23 machines, 18 of which were selected from the 41 in use in the old shop. Four new machines were added because of their greater efficiency. These are a double surfacer, a chain mortiser, a universal woodworking machine and a pattern lathe.

The flooring of this shop is of 2-in. x 4-in. lumber, placed on edge on steel joists, with a top flooring of ⅞-in. tongued-and-grooved maple. Where the operator

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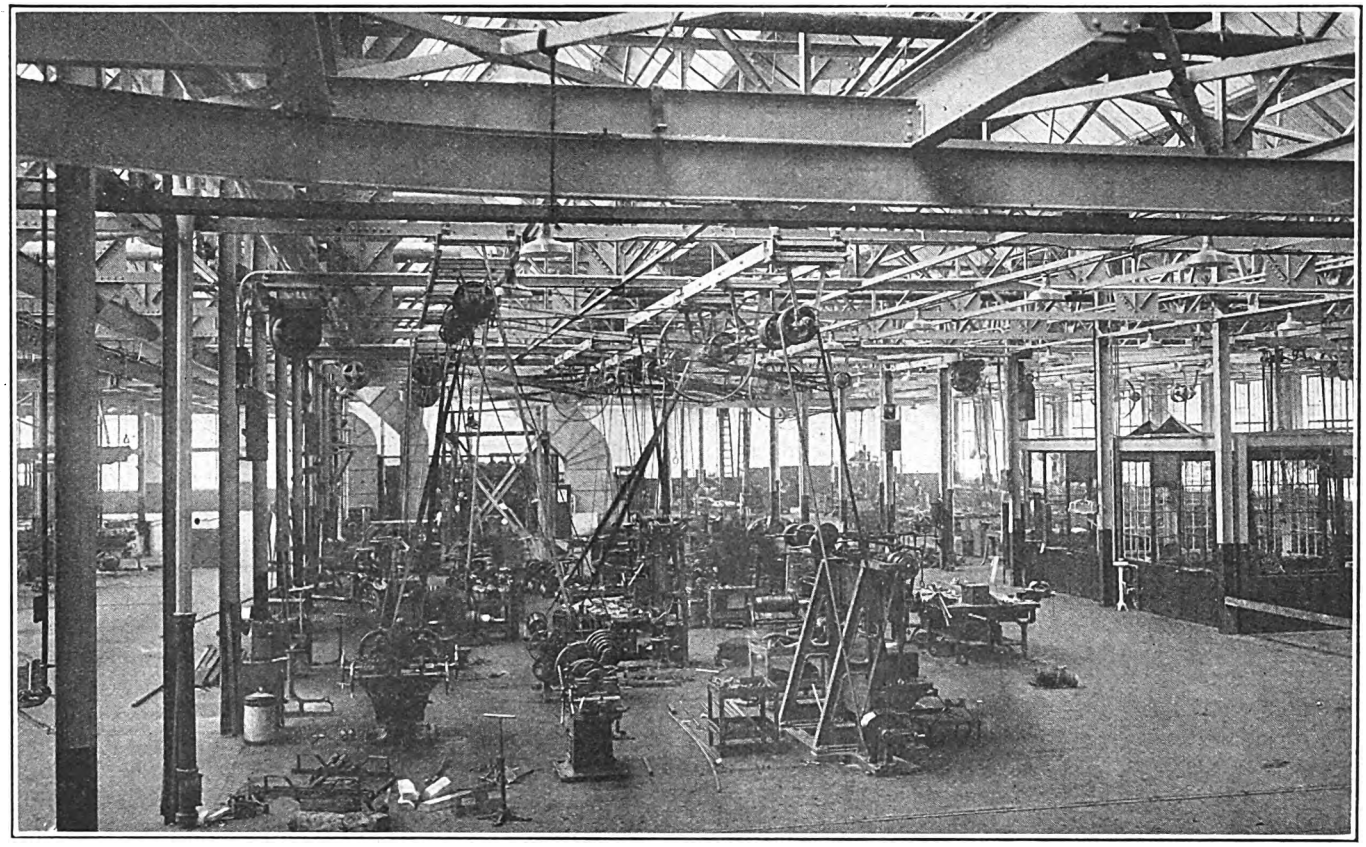


Looking East in the Machine Shop from the Storeroom

stands in front of each machine a slab of mastic flooring is installed to keep him from slipping and falling on the machine.

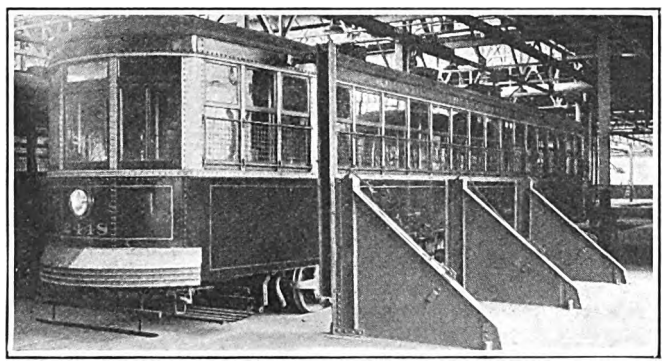
The machines are placed so that the work progresses in regular order from the rough lumber, taken either from the dry kiln or the lumber rack, through the machines to the cabinet benches and from there direct to the paint shop, adjacent. The wood mill is not walled off from the car body shop in order to insure free movement of material.

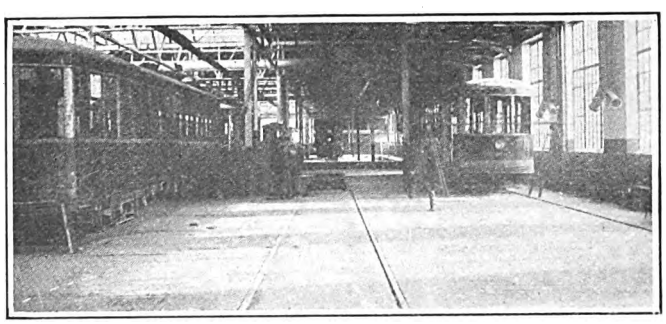
There is a basement underneath the entire wood shop, and all the motors are installed there, directly beneath the machines they drive. This arrangement frees the wood shop entirely from overhead belts and shafting, as may be seen from the illustrations. Each individual motor is controlled by push buttons located on the machine it drives, placed within convenient reach of the operator.

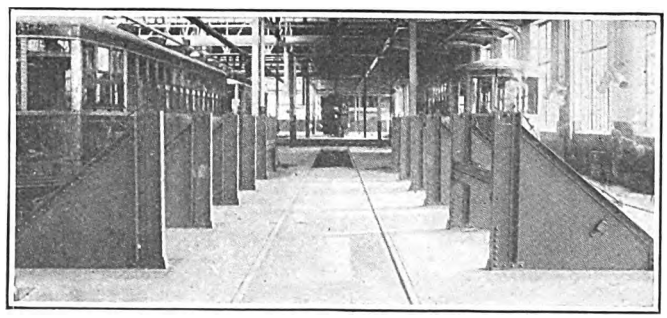
The basement also provides space for the storage of finished car parts, such as sash, doors, molding, etc.

In the wood shop are two small portable jointing machines and two combination rip and cross-cut saws. These are driven by motors, both machine and motor being mounted on a specially designed frame, which permits of the machine being taken to a job to be done on a car body, such as trimming a window sash, instead of this job having to be carried into the woodworking shop.

All the machines are supplied with factory box trucks, so that the material can be kept off the floor. Where possible the material is allowed to fall from the table of the machine directly







The Car Straightener Is Located in the Body Shop

At left, the beams are dropped into pockets in the floor. Right, all twelve of the beams are raised in this picture. In practice only such beams are raised as necessary for straightening. Above, a car in the press being straightened. Note the extension beam bolted to the regular beam to permit straightening the upper part of the car.

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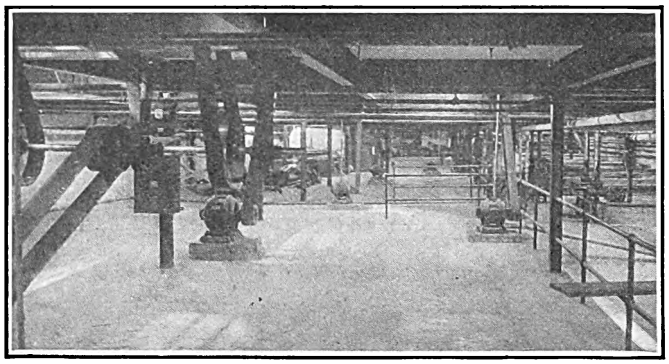

This Picture of the Basement Beneath the Woodworking Shop Was Taken Entirely with the Light from the Regular Illuminating System

onto the truck, which can then be moved to the next step in the progress of the work without further handling.

A small separate building has been constructed to the north of the main building to form a dry kiln. This is so arranged that a car loaded with lumber may be run directly into it. It is supplied with steam from the main heating plant.

It is estimated that owing to the layout there will be a saving of at least 35 to 40 per cent in the cost of repair work in this department over what was possible in the old shop, together with a much improved quality of work performed.

Paint Shop Equipment

The paint shop is located in the northeast portion of the building. It is entirely inclosed, so as to keep it free from dust and dirt, and so that the fumes will not penetrate other parts of the building. It has 13 tracks, each of two-car capacity, two tracks of three-car capacity, and a wash bay with space for four cars, making a total of 36 cars. In addition there is a finishing room 60 ft. x 144 ft.

The paint storage is in a separate one-story building immediately north of the paint shop, and connected with it by a covered passageway, which, however, can be closed by a fire door. All paints and supplies are kept in this storeroom, minimizing the fire hazard in the main building.

A complete equipment of adjustable scaffold posts is provided for the convenience of the men while engaged in painting the cars. These consist of 4-in. hollow iron posts set in the concrete floor at regular distances. On each post are two extension arms which slide up and down on the outside, being adjustable for height and counterbalanced by weights inside the post. Planks can then be laid on these extension arms. This equipment is much safer and more convenient than scaffolding ladders.

The finishing room is efficiently located in relation to both the paint shop and the woodworking shop. Sash racks are provided for drying varnished sash, revolving tables for varnishing sash, special benches and easels, and transveyors and racks for transporting sash and car trimmings from the car to the body shop, then to the finishing room and back to the car in the paint shop to be finished.

Toilet, washroom and locker facilities for the men have been provided in balconies located at various places convenient to the various departments.

Immediately east of the armature room is the employees' lunch room, where tables and chairs are provided for the men to serve themselves with lunch. The management has made arrangements for supplying tea, coffee and milk at rates just sufficient to cover the cost.

Looking West in the Woodworking Shop. The Lumber Storage Racks Are in the Background

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Association News & Discussions

"Move Over, Brother"*

The Community Safety Movement as It Is Being Worked Out in New England Communities with the Co-operation of the Electric Railways

By Lewis E. MacBrayne
General Manager Massachusetts Safety Council

IN A MASSACHUSETTS city of 125,000 population automobile traffic on one of the main streets on a Saturday night, when the suburban motorists come in to shop, has become so congested that it is necessary to post a traffic officer on duty every hundred feet to keep autos off the street railway tracks. Five lines of trolley cars enter the downtown area through this street, and without traffic control there would be a hopeless blockage. A traffic sergeant moves down the line from time to time, waving his hand, and bidding the motorists "Move over, brother."

In another city, of wider streets and an even greater volume of traffic, I saw a crowd gathered recently about a heavy trolley car and a wrecked automobile. A loquacious colored brother, who had been passing when the collision occurred, told me what had happened. "Dis gemman was drivin' to kingdom come out of de side street, an' he bust into dat car right in its middle," he said. "He was de mos' surprised gemman to see dat 'lectric car dar."

It seems to me that one phase of our present highway problem, as it concerns autos and street cars, is described in those two phrases: "Move over, brother," and "Driving to kingdom come." One group of motorists, with no real intention of adding to the troubles of a fully occupied motorman, is continually cutting in on the trolley, but without causing much personal injury. The other is as frequently shooting out of intersecting streets into highways where there are no traffic men on duty, heading straight for kingdom come, and often narrowly missing arriving there. An analysis of 7,675 auto accidents that have occurred recently in Connecticut cities shows that 650 were collisions with trolley cars; not an unduly large proportion, but important in view of the fact that the street car was the only object in the various types of collisions that was moving over a defined and restricted route.

I need not discuss with you today the particular type of a collision with which you are all familiar. May I, instead, consider the broader problem of how much more acute our highway problem in New England may become, and to what degree we can lessen it as it develops.

I have been serving as a member of the special committee recently appointed by the Governor of Massachusetts to investigate the causes that have resulted in an abnormal increase in highway fatalities within the state since last summer. Considerable evidence presented to us served to lead to the conclusion that we had reached the point of saturation when 500,000 motor vehicles were registered within the state; or, to put it in simple terms, our small state, with its 39 cities and numerous towns, would safely hold only half a million motor vehicles, and that beyond that number we were creating so many potential hazards that we must be prepared to pay a higher price, in life and limb. The end of April, however, appeared to upset this theory, for the increase in fatalities that had been going on for four months was checked with a reduction of five deaths over the previous April, and for no apparent reason than the widespread publicity given to the daily sessions of the committee, and several organized safety drives on in various cities of the state. Up to the present time in May the month records a reduction of ten deaths as compared with the same period a year ago, and it is apparent that the human factor is still the important element in the problem.

Now just what are we to conclude from this? A medical examiner of one of our counties, writing to me yesterday, said that he believed that our spasmodic safety campaigns were all wrong, since the public returned to its careless ways soon after these intensive periods were over. He urged that we develop some method of carrying on a permanent campaign of education. I partly agree with him, because I have been seeking data, for the past two years, to determine just how long the respect of the law, or the good intentions of the individual—you may take it either way—survives the community campaign. In Lawrence, where the Massachusetts Safety Council supervised a safety campaign last October, our real dividends were checked up in the 30 days that followed. There were only six serious accidents as against 16 for the same period in the previous year. There were no fatalities as against six for the corresponding period. A 30-day safety campaign put on in an industrial plant in Buffalo last October obtained only moderate results at the time, but there has been a steady improvement ever since, and in six months a reduction of 66 per cent in the number of accidents was recorded.

My own organization is now receiving calls for service of a type that perhaps indicates the trend of this community safety work. The city of Somerville had the unfortunate experience last year of killing ten children to four adults on the highway. The proportion should have been seven adults to six children. When we gave publicity to this fact the city, at first through its Rotary Club, and later through its Mayor and other city officials, requested us to look into local conditions and suggest a remedy. We found one or two abnormal conditions, such as a police force with no adequately trained traffic squad, due to local financial reasons, but speaking generally it was a situation existing in several other cities; an increasing stream of intercity traffic, many street cars contributing to the obstructed view, mothers of young children not yet conscious of the abnormal highway conditions.

Somerville has now organized, not for a special safety drive, but for a campaign to extend throughout the season. Every civic organization is represented upon the general committee. Local speakers are being trained for safety talks. Meetings with safety films have been held in all the schools. A series of articles, discussing all phases of the accident problem, is being prepared for the press. The whole city will eventually concern itself with its own safety.

You may reasonably ask me, at this point, what has all this to do with the subject of my paper, "Move Over, Brother." Well, just how are you going to move Henry Ford's mobile army —not to mention the several other makes—from your car tracks? The motorman cannot verbally swat each one, nor can the superintendent of the division personally police the entire system. It must be done by creating enough public opinion to cover the entire highway problem. It must therefore be included in the community safety program.

We are supervising such a program in Chelsea during the present week. The city is about to observe its 300th anniversary, but its highway and fire hazards are such, and its population is composed of so many racial groups, that the Mayor, an energetic young man, was unwilling to open the celebration before his city had put itself in the frame of mind to think and act safety. The following program was accordingly worked out for him. Last Friday a printed message, illustrated with four street hazards, among them the street car, was sent into 10,000 homes. On Saturday, at seven theater performances, 7,200 children saw safety reels and were told how to cross a street safely, with an emphasis upon the danger of running in front of the street car, because of the fast moving auto

*Paper presented before New England Street Railway Club, Boston, May 22, 1924.

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that it might conceal. On Sunday the clergymen all talked safety, and on Monday we began a series of four-minute talks in the theaters, one being devoted to the motorists' place on the highway. Other features included daily safety articles in the press and the use of 800 posters with the slogan, "Motorists, Slow Down."

When such a program is on it is sometimes possible to include a street railway man as a four-minute speaker. At Lawrence we found a motorman who developed a telling talk in the course of the week. I may remark here that we furnish an outline for every talk scheduled, no matter what its topic, in order that the psychology of its presentation may be correct, and certain important facts be stressed. Nature has gifted very few of us who are engaged in daily tasks with the power of ready expression, and yet the man in uniform—traffic officer, fire chief or motorman—has a quick appeal to an audience when we have taught him how to present his story.

I have been watching with interest the effort of one of our street railway systems in Massachusetts to sell its service to the public over its own dashboard. We were advised during midwinter that it was cheaper to put up the auto and use the street car. We were informed that the trolley was convenient for shopping. All this is legitimate, and suggests to me that it might be possible, if collisions with motor vehicles still increase, to get over our "Move over, brother," plea in a like manner. What would be the effect on the average operator of an auto to read, as he approached a street car, "Motorists, please give this car the right of way on its own rails," or "Auto drivers can help this street car reduce collisions." In the first place, it would establish in the public mind the fact that the street railway company was concerned over the highway problem, and anxious to gain co-operation in solving it. Public opinion often develops along such a lead as this. In the second place, it would put the careless motorist in the position of being reckless in the face of a protest.

The theory has been advanced that our more conservative citizens, the people of good judgment, were all included in the first ten million automobiles purchased in the United States, and that the last five million have given us a larger proportion of inexperienced and careless operators. My own idea is that we still have only about 4 per cent of drivers who ought to be ruled off the highways, but that the increasing total of motorists in the country automatically increases this group so that it becomes more evident and more noticeable. The point of automobile saturation for the United States has been set as high as 20,000,000, and for Massachusetts as high as 1,000,000. Nobody knows that it really is, and the industrial and agricultural prosperity of our people is undoubtedly a factor.

We have been killing 1,000 more persons annually for each million new motor vehicles put into commission. We have been increasing the number of collisions involving automobiles. But if the human factor is still the controlling one, then our task is to educate the individual in the control of speed and the elimination of fool chances. Too many drivers, many of them young and untaught in the value of human life, are driving for kingdom come. One can almost imagine them, hurled into eternity, picking up a new and joyous equipment of wings, and speeding on through the realms of space, cutting in and out on other angels, and eventually duplicating all the collisions that they had on earth.

Electric Locomotives Discussed at A.S.M.E. Meeting

Tendencies in Recent Designs Are Given by N. W. Storer and A. H. Armstrong—Reasons for the Adoption of Various Types of Drive and Arrangement of Mechanical Parts Are Emphasized

TWO papers on the subject of developments in electric locomotives were presented at the spring meeting of the American Society of Mechanical Engineers held at Cleveland, Ohio, May 29. One was by N. W. Storer, general engineer Westinghouse Electric & Manufacturing Company, the other by A. H. Armstrong, railway engineer General Electric Company.

Brief descriptions of some of the recent Westinghouse electric locomotives were given by Mr. Storer. These included the locomotives for the Paulista Railway of Brazil, the Chilean State Railways, the New York, New Haven & Hartford, the Norfolk & Western, the Virginian and the Pennsylvania. These locomotives have been described in various issues of the ELECTRIC RAILWAY JOURNAL. The principal features of the design were tabulated by Mr. Storer. They are given in the table on page 900.

Another type of locomotive which has been discussed more or less in the last few months is the motor-generator type, which it was announced some time ago was being built by the Ford Motor Company for the electrification of the Detroit & Ironton Railway. This locomotive, Mr. Storer said, will operate under a 22,000-volt, single-phase, 25-cycle trolley, but will have an oil-cooled transformer to reduce the voltage to a low value for a synchro-

DATA ON GENERAL ELECTRIC COMPANY ELECTRIC LOCOMOTIVES

	Gearless Passenger								Geared Passenger			
	N. Y. C. Type "S" (122 ton)		N. Y. C. Type "T" (133 ton)		C. M. & St. P. Pass. (260 ton)		Paris-Orleans Pass.		Paulista Pass. (120 ton)		B. A. & P. Pass. (80 ton)	
General Data												
Diameter of drivers	44 in.		36 in.		44 in.		47.2 in.		42 in.		46 in.	
Number of driving axles	4		8		12		6		4		4	
Diameter of guiding wheels	36½ in.		.....		36 in.		36 in.		36 in.		...	
Number of guiding axles	4				2		4		4		...	
Total wheel base	36 ft. 0 in.		46 ft. 5 in.		67 ft. 0 in.		53 ft. 6 in.		46 ft. 0 in.		26 ft. 0 in.	
Width over all												
Length inside knuckles	43 ft. ½ in.		56 ft. 10 in.		76 ft. 0 in.		62 ft. 5 in. (over buffers)		55 ft. 0 in. (over buffers)		37 ft. 4 in.	
Height over trolley, locked down	15 ft. 1 in.		15 ft. 1 in.		16 ft. 8 in.		12 ft. 7 in.		14 ft. 3 in.		15 ft. 6 in.	
Ratings	1 Hr.	Cont.	1 Hr.	Cont.	1 Hr.	Cont.	1 Hr.	Cont.	1 Hr.	Cont.	1 Hr.	Cont.
Amperes	2,300	1,060	3,000	2,480	990	860	1,200	1,275	460	440	392	370
Tractive effort, lb.	15,200	4,900	15,100	11,500	48,500	40,800	12,750 11,620	13,650 F.F.* 12,600 S.F.*	14,750	13,900	16,800	15,600
Coefficient of adhesion—per cent	10.5	3.3	5.7	4.34	10.59	8.9	7.54 6.9	8.1 F.F.* 7.5 S.F.*	9.2	8.7	10.4	9.7
Speed at full rated voltage	41.8	60.6	54.0	59.0	27.1	28.7	58.0 64.0	56.5 F.F.* 62.8 S.F.*	42.8	43.4	25.4	25.0
Horsepower-driver	1,691	792	2,180	1,810	3,500	3,300	1,940 1,985	2,060 F.F.* 2,100 S.F.*	1,680	1,608	1,140	1,040
Horsepower-output												
Maximum safe speed, m.p.h.	80		85		90		.....		56		45	
Tractive effort—25 per cent adhesion	37,125		66,250		114,450		42,300		40,000		40,250	
Weights												
Total	244,500		265,000		521,200		240,000		240,000		161,000	
On drivers	148,500		265,000		457,800		169,000		160,000		161,000	
Per driving axle	37,125		33,125		38,150		28,170		40,000		40,250	
Mechanical	184,500		177,000		286,550		137,000		160,300		101,000	
Electrical equipment	60,000		88,000		234,650		103,000		79,700		60,000	
Track gage	4 ft. 8½ in.		4 ft. 8½ in.		4 ft. 8½ in.		4 ft. 9 in.		5 ft. 3 in.		4 ft. 8½ in.	
Motors												
Number	4		8		12		6		4		4	
Type	GE-84-A		GE-91-A		GE-100		GE-101-A		GE-267-A		GE-229-A	
Rated voltage	600		600		1,000/3,000		750/1,500		1,500/3,000		1,200/2,400	
Method of drive	Direct		Direct		Direct		Direct		Twin Gear, Springs		Twin Gear, Solid	
Gear ratio	Gearless		Gearless		Gearless		Gearless		70/30 = 2.33		80/25 = 3.2	
Ventilation	Natural		Forced		Forced		Forced		Fan on Arm.		Forced	
Regenerative control	No		No		Yes		No		Yes		No	

*F.F.-Full field; S.F.-Short field.

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nous motor-generator furnishing direct current for motors mounted on the axles. The reason for reviving the motor-generator idea, which was proposed a good many years ago, is that recent developments have made it possible to design a motor-generator set of sufficient capacity for heavy locomotives without excessive weight or dimensions. The control of this type of locomotive is ideal, as all of the motors may be connected permanently in parallel and supplied with current from the generator at any desired voltage. The control of the motor fields will permit the locomotive to develop its full horsepower rating over a wide range in speed and thus to secure one of the excellent characteristics of the steam locomotive.

While it may at first appear that a motor-generator type of locomotive is simply a direct-current locomotive with transformer and motor-generator set added, such is not the case, as the motors will be smaller and more rugged than high-voltage direct-current motors, since they will be wound for low voltage and operated on an ungrounded circuit which is individual to the locomotive. This reduces the amount of control apparatus very greatly and thus not only decreases the weight but also the cost of the equipment. While none of these locomotives has been completed, the speaker holds that this type will have an important place on alternating-current railways.

In all the locomotives described there are three types of driving motors and three distinct types of drive, Mr. Storer pointed out. In general, it may be stated that the choice of drive and the wheel arrangement, which together practically determine the entire design, will depend, first, on the class of service, i.e., whether it is freight or passenger, slow, medium or fast, light or heavy, the permissible wheel loading, track alignment, etc.; second, on the kind of driving motor that is to be used, i.e., whether direct-current, single-phase commutator type, or three-phase induction motor, and, third, on the judgment of the engineers who direct the design.

It is taken for granted that every one is striving to secure a locomotive that will in the last analysis show the greatest economy in operation, i.e., one which will give the lowest total cost per ton-mile. The assumption that a locomotive with maximum power concentrated in a single unit on the minimum number of driving wheels will produce this result, while true in the case of the steam locomotive, may be questioned and requires a specific analysis in each case for the electric. One of the principal reasons for the use of the maximum size of locomotive with a steam engine, the cost of engine crews, has no application at all on the electric. By the use of multiple-unit control it is everyday practice for one crew to handle as many motive-power units as can be desired at one point in the train. Where a very heavy locomotive is required, the capacity of motive-power units should therefore be selected from the points of view of convenience, first cost and operating cost, with due consideration to the effect on track and bridges.

After pointing out some of the points to be settled in the design, the author stated that he appreciates that there are not yet sufficient data available to make anything more than a few general statements in regard to these points, but he feels that the subject is one of such importance that it should be very carefully studied. The very active interest that is now aroused in railway electrification will naturally result in further engineering analyses of this subject.

The tendency in heavy locomotive design for freight use seems to be toward the use of maximum axle loadings and transmission by gears, jackshaft and side rod from motor to axles, together with the combination of the cab with the side frames. There is also a noticeable tendency toward the use of the individual drive with spring-mounted motors for higher speed locomotives of large capacity. For locomotives with small capacity and axle loading with direct-current motors, the axle-hung motor certainly has the field.

FOR HEAVY SERVICE

	Geared Freight								Geared Side Rod
C. M. & St. P. Freight (288 ton)	Mexican Freight (150 ton)		Paulista Freight (100 ton)		Spanish Northern Freight		B. A. & P. Freight (81 ton)		N. Y., N. H. & H. (Bull Moose) (125 ton)
52 in.	46 in.		42 in.		39.37 in.		46 in.		54 in.
8	6		4		6		4		4
36 in.	.....		.....		.....		.....		36 in.
4									4
102 ft. 8 in.	40 ft. 6 in.		26 ft. 8 in.		35 ft. 0 in.		26 ft. 0 in.		54 ft. 10 in.
112 ft. 0 in.	52 ft. 11 in.		39 ft. 2 in. (over buffers)		46 ft. 0 in. (over buffers)		37 ft. 4 in.		10 ft. 62 ft. 0 in.
16 ft. 8 in.	15 ft. 2 in.		14 ft. 3 in.		13 ft. 5 in.		15 ft. 6 in.		14 ft. 5 in.
1 Hr. Cont.	1 Hr.	Cont.	1 Hr.	Cont.	1 Hr.	Cont.	1 Hr.	Cont.	1 Hr. Cont.
960 920	750	690 F.F.* 690 S.F.*	460	440	440	430	392	370	1,800 1,600
84,500 79,500	51,600	46,200 F.F.* 33,720 S.F.*	28,900	27,300	27,100	26,500	25,600	23,600	27,000 22,200
18.8 17.65	16.7	14.95 10.9	14.45	13.65	15.75	14.8	15.8	14.6	13.9 11.5
15.25 15.4	19.9	20.45 28.0	21.8	22.1	21.6	21.9	16.6	17.0	23.0 26.4
3,440 3,280	2,740	2,520 2,520	1,680	1,610	1,550	1,550	1,135	1,070	1,650 1,560
35	.....		31.1		34		30		45
112,500	77,250		50,000		44,800		40,500		48,500
576,000	309,000		200,000		179,000		162,000		291,000
450,000	309,000		200,000		179,000		162,000		194,000
56,250	51,500		50,000		29,830		40,500		48,500
329,000	174,000		120,300		95,000		102,000		172,000
247,000	135,000		79,700		84,000		60,000		119,000
4 ft. 8½ in.	4 ft. 8½ in.		5 ft. 3 in.		5 ft. 6 in.		4 ft. 8½ in.		4 ft. 8½ in
8	6		4		6		4		4
GE-253-A	GE-278-A		GE-267-A		GE-255-B		GE-229-A		GEA-614
1,500/3,000	1,500/3,000		1,500/3,000		1,000/3,000		1,200/2,400		
Twin Gear, Springs	Twin Gear, Springs		Twin Gear, Springs		Single Gear, Solid		Twin Gear, Solid		Geared, Side Rod
82/18 = 4.55	90/18 = 5.0		82/18 = 4.55		72/18 = 4		87/18 = 4.83		71/35 = 2.03
Forced	Forced		Fan on Arm.		Forced		Forced		Forced
Yes	Yes		Yes		Yes		No		No

Flexibility of Electric Drive Permits Radical Departures

In discussing the trend of electric locomotive design, Mr. Armstrong stated that the electric motor, with its great flexibility, permits a radical departure from steam engine practice in both the design and operating characteristics of the locomotive. In fact, the electrical engineer is embarrassed in his attempt to arrive at a standard type of electric locomotive for any class of service because of the variety of designs available, any one of which may be successful in operation. The speaker gave illustrations from the experience of his company, describing a considerable number of designs. The principal design features were summarized in a table, which is presented below.

With regard to electric locomotive rating, the speaker stated that a study of many train dispatchers' sheets, showing trailing and engine tonnage actually hauled by locomotives of different types, indicate that the total gross tractive effort exerted at the driver rims agrees approximately to 18 per cent of the total driver weight. Starting effort may reach as high as 25 per cent or even 30 per cent under favorable conditions. Mr. Armstrong presented a table showing that the continuous tractive effort of a number of modern electric freight locomotives averages 14.06 per cent of the driver weight, that of electric passenger locomotives averages 7.35 per cent and of electric switching locomotives 9.53 per cent.

With regard to wheel arrangement, the speaker concluded that this is apparently not a matter of much concern in its effect on riding qualities of the electric locomotive for speeds below 50 m.p.h., i.e., the field of the freight locomotive. For the higher speeds incident to passenger train operation a four-truck construction has found favor on account of its minimum effect upon track and flange wear.

There are, apparently, two broad lines being followed in the development of the electric locomotive: First, direct application of the motor to the driving axle, and, second, the interposition of jack shaft and side rods. Geared axle drive for lower speeds and both geared axle and gearless drive for higher speeds have been so successful in meeting every railroad requirement that they may be regarded as accepted standards with direct-current motor equipment, Mr. Armstrong said. The bipolar gearless motor drive is restricted to direct-current motors, but geared axle drive is available to both direct-current and alternating-current motors, provided the axle weight in the latter case does not much exceed 40,000 lb.

Geared quill and side rod drive are favored for single-phase motor application to heavy duty locomotives, as providing the additional space required for the best design of such motors. The

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latter construction, especially, apparently finds its best expression in very high driving axle weights and long rigid driving wheel base, thus possibly restricting the application of such locomotives to roadbeds most favorable for their operation. These same forms of construction are also open to direct-current motor applications, but apparently find little favor as compared to the simpler and more efficient direct axle drive which is employed in nearly every locomotive equipped with direct-current motors.

Midwest Association Program

THE following program has been announced for the annual meeting of the Midwest Electric Railway Association to be held in the Fontenelle Hotel, Omaha, Neb., on June 11 and 12:

JUNE 11

Morning Session

The Future of City Transportation.

"Traffic and Congestion," by R. J. Lockwood, St. Louis, Mo.

"The Economics of City Transportation," by E. R. Stenger, Denver, Col.

Open discussion on "The Bus and Its Place."

Afternoon Session

"Indirect Taxes and the Car Ride," by S. B. Irelan, St. Joseph, Mo.

"Service and the Man Who Sells It," by F. G. Buffe, Kansas City, Mo.

JUNE 12

Morning Session

"The Interurban Railway—Its Past, Present and Future," by Bruce Cameron, Pittsburg, Kan.

DATA FOR NEW WESTINGHOUSE ELECTRIC LOCOMOTIVES

Railroad	Number in Service	Class of Service	Contact Voltage	Conductor Type	Type of Loco.	Class. by Wheels	Driving Wheels No.	Driving Wheels Diam.	Truck Wheels No.	Truck Wheels Diam.
Paulista Railway (1)	2	Passenger	3,000	Catenary	d.c.	2-4 + 4-2	8	63 in.	4	36 in.
Paulista Railway (2)	2	Freight	3,000	Catenary	d.c.	0-6 + 6-0	12	40 in.	..	.....
Chilean State Railways (1)	6	Express passenger	3,000	Catenary	d.c.	2-6 + 6-2	12	42 in.	4	30 in.
Chilean State Railways (2)	11	Local passenger	3,000	Catenary	d.c.	0-4 + 4-0	8	42 in.	0	.....
Chilean State Railways (3)	15	Freight	3,000	Catenary	d.c.	0-6 + 6-0	12	42 in.	0	.....
Chilean State Railways (4)	7	Switcher	3,000	Catenary	d.c.	0-4 + 4-0	8	42 in.	0	.....
N. Y., N. H. & H. R. R.	12	Passenger	600	d.c. 3d rail	d.c. &	2-6-2 + 2-6-2	12	63 in.	8	36 in.
			11,000	a.c. Catenary	a.c.					
Norfolk & Western	8 Motive Power	Freight	11,000	Catenary	a.c.	2-8-2	8	62 in.	4	33 in.
The Virginian	36 Power Units	Freight	22,000	Catenary	a.c.	2-8-2	8	62 in.	4	33 in.
			11,000							
Pennsylvania (1)	2	Passenger	650	3d rail	d.c.	2-8-2	8	80 in.	4	33 in.
Pennsylvania (2)	1	Freight	11,000	Catenary	a.c.	2-8-2	8	80 in.	4	33 in.

Railroad	Articulated Trucks	Wheelbase Rigid	Wheelbase Total	Weight in Pounds Total Road Weight	On Drivers	Per Driving Axle	Mech. Parts	Equipment[1]
Paulista Railway (1)	Yes	8 ft. 4 in.	41 ft. 2 in.	283,800	205,800	51,450	165,400	118,400
Paulista Railway (2)	Yes	14 ft. 0 in.	37 ft. 0 in.	234,300	234,300	39,050	144,050	90,250
Chilean State Railways (1)	Yes	14 ft. 5 in.	48 ft. 4 in.	259,800	210,000	35,000	153,966	105,834
Chilean State Railways (2)	Yes	8 ft. 4 in.	26 ft. 0 in.	160,000	160,000	40,000	93,000	67,000
Chilean State Railways (3)	Yes	13 ft. 9 in.	37 ft. 0 in.	230,000	230,000	38,333	138,400	91,600
Chilean State Railways (4)	No	8 ft. 6 in.	27 ft. 4 in.	137,000	137,000	34,250	80,900	56,100
N. Y., N. H. & H. R. R.	Yes	14 ft. 3 in.	59 ft. 6 in.	358,000	240,000	40,000	175,200	182,800
Norfolk & Western	No	16 ft. 6 in.	37 ft. 6 in.	414,000	300,000	75,000	251,500	162,500
The Virginian	No	16 ft. 6 in.	37 ft. 6 in.	414,000	300,000	75,000	.....	.....
Pennsylvania (1)	No	22 ft. 3 in.	54 ft. 11 in.	approx. 400,000	300,000	75,000	225,100	174,900
Pennsylvania (2)	No	22 ft. 3 in.	54 ft. 11 in.	408,000	300,000	75,000	225,100	182,900

[1] Includes sand, air brakes, etc.

Railroad	Dimensions Length Over All	Dimensions Width Over All	Dimensions Height Trolley Down	Regen. Control	Motors No.	Motors Method of Drive	Gear Ratio
Paulista Railway (1)	52 ft. 11 in.	10 ft. 7 in.	14 ft. 10 in.	Yes	4 Twin	Geared quill	28 : 86
Paulista Railway (2)	50 ft. 2 in.	10 ft. 6.5 in.	14 ft. 10 in.	Yes	6	Geared	16 : 63
Chilean State Railways (1)	58 ft. 5 in.	10 ft. 6.75 in.	14 ft. 4 7/16 in.	Yes	6	Flexible gear	21 : 56
Chilean State Railways (2)	38 ft. 9.5 in.	10 ft. 7 in.	14 ft. 2 1/16 in.	No	4	Flexible gear	21 : 56
Chilean State Railways (3)	49 ft. 9.5 in.	10 ft. 6.75 in.	14 ft. 4 7/16 in.	Yes	6	Flexible gear	15 : 63
Chilean State Railways (4)	40 ft. 0 in.	10 ft. 6.75 in.	14 ft. 2 3/16 in.	No	4	Gear	16 : 63
N. Y., N. H. & H. R. R.	68 ft. 6 in.	10 ft. 2.5 in.	Over d.c. Trolley Down 14 ft. 9½ in.	No	6 Twin	Geared quill	25 : 89
Norfolk & Western	48 ft. 7 in.	10 ft. 5 in.	16 ft. 0 in.	Yes	2	Flexible geared jack shaft and side rod	21 : 100
The Virginian	.....	10 ft. 5 in.	16 ft. 0 in.	Yes	2	Flexible geared jack shaft and side rod	.....
Pennsylvania (1)	68 ft. 2.5 in.	10 ft. 3 in.	15 ft. 6 in.	No	4	Flexible gear and side rod	50 : 98
Pennsylvania (2)	68 ft. 2.5 in.	10 ft. 3 in.	15 ft. 6 in.	No	4	Flexible gear and side rod	30 : 118

Railroad	Tractive Effort in Pounds One-Hour Rating F. V.	Per Cent Coefficient of Adhesion	Continuous Rating F. V.	Per Cent Coefficient of Adhesion	Starting
Paulista Railway (1)	20,960	10.0	14,240	6.9	54,400 maximum
Paulista Railway (2)	32,400	13.8	21,600	9.2	77,310 33 per cent adhesion
Chilean State Railways (1)	25,800	12.3	19,800	9.4	70,800 maximum
Chilean State Railways (2)	17,200	10.8	13,200	8.3	47,200 maximum
Chilean State Railways (3)	31,200	13.6	24,360	10.6	75,900 33 per cent adhesion
Chilean State Railways (4)[2]	23,000[2]	16.8	11,000[2]	8.0	45,210 33 per cent adhesion
N. Y., N. H. & H. R. R.	23,160	9.66	16,200	6.66	52,500 maximum
Norfolk & Western (8 Poles)	108,000	18.0	90,000	15.0	185,000 maximum
(2 M.P.U.) (4 Poles)	63,000	10.5	52,500	8.75	110,000 maximum
The Virginian	.....	.....	.....	.....	.....
Pennsylvania (1)	44,000	15.47	36,000	12.64	86,000 maximum
Pennsylvania (2)	59,000	19.72	50,000	16.66	100,000 33 per cent adhesion

[2] Self-ventilated. F.V. = force ventilated.

Railroad	Speed, Miles per Hour One-Hour Rating	Speed, Miles per Hour Continuous Rating	Speed, Miles per Hour Maximum Safe	Horsepower of Locomotive One-Hour Rating F.V.[3]	Horsepower of Locomotive Continuous Rating F.V.[3]	Builder of Mechanical Parts
Paulista Railway (1)	42.8	47.2	65	2400	1800	Baldwin
Paulista Railway (2)	20.8	23.4	42	1800	1350	
Chilean State Railways (1)	36.0	39.75	63	2460	2040	
Chilean State Railways (2)	36.0	39.75	56	1640	1360	Baldwin
Chilean State Railways (3)	21.5	23.0	44	1800	1500	
Chilean State Railways (4)	10.5	12.75	35	640	384	
N. Y., N. H. & H. R. R.	32.6	38.4	77	2016	1656	Baldwin
Norfolk & Western (8 P)	14.10	14.20	38	4060	3400	American
(2 M.P.U.) (4 P)	28.30	28.40	..	4750	4000	
The Virginian	.....	.....	..	4060	3400	American
	.....	.....	..	4750	4000	
Pennsylvania (1)	35.9	37.8	70	4100	3630	Penna. R. R
Pennsylvania (2)	21.00	23.0	35	3300	3070	

[3] F.V. = force ventilated.

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"Bringing the Latest and Best to the Railway Men," by R. F. Carbutt, New York.

On the evening of June 11 those attending will be guests of the Omaha & Council Bluffs Street Railway at a dinner and entertainment. A banquet will be held at the Fontenelle Hotel on the night of June 12. The speaker is to be H. G. Taylor, who is a member of the Nebraska State Railway Commission and also president National Association of Railway and Utility Commissioners.

American Association News

Get Ready for the Railway Exhibit

BY FRED C. J. DELL
Director of Exhibits American Electric Railway Association, New York

APPLICATIONS for exhibit space and diagram of the space layout on Young's Million Dollar Pier for the forty-third annual convention of the association went out from association headquarters on June 2 by registered mail. The date limit set for the return of space requests is June 30. All applications received up to and including June 30 will be given preference as far as possible in priority of receipt. All applications that arrive after June 30 will be allotted space by the director of exhibits in the order in which they are received.

Now is the time for manufacturers to begin to plan their displays in detail. There were instances at the last convention where companies were assigned certain spaces and a month prior to the opening of the convention these same companies wanted additional space adjacent to that already assigned. Needless to say they were disappointed. Other companies were late in getting applications in, with the result that they had no choice whatever in the matter of space location.

Each year the convention has grown in size, and it is interesting to note the following figures from the attendance standpoint as well as from the number of square feet of exhibition space occupied by manufacturers for actual display purposes:

Year	Convention Location	Total Registration	Square Feet of Space Sold
1916	Atlantic City	3,271	57,392
1917	New York	Conference only	No exhibit
1918	New York	Conference only	No exhibit
1919	Atlantic City	3,166	62,219
1920	Atlantic City	3,300	59,529
1921	Atlantic City	1,189	No exhibit
1922	Chicago	4,200	61,895
1923	Atlantic City	4,404	75,681

In a survey made by various members of the committee on convention location earlier in the year the preference expressed was decidedly for Atlantic City this year and with exhibits. In the first issue of the ELECTRIC RAILWAY JOURNAL this year "a great year for the electric railways" was predicted, and from actual observation during the first quarter the prophecy seems to be running about true to form. Manufacturers will again have the opportunity to show what they have been accomplishing in the way of new things for the benefit of the industry.

The maintenance show in Chicago last March had on display over 100 new devices and products—a great record for manufacturers who in the period of one year could demonstrate 100 new things which had been perfected and patented for the safety, economy and better operation of the steam roads. We wonder what will be the answer of the manufacturers of material for electric properties. Will they equal this record?

The question will be answered next October, and in the meantime, we say begin right now, Mr. Manufacturer, to plan your display; get your space applications in to association headquarters on or before June 30. The exhibit committee will meet early in July to make the initial space assignment, and for the good of the industry and for the advancement of the art it is your duty to show what you have to the 4,000 or more delegates who will go to Atlantic City next October prepared to see, study and take home with them new thoughts and ideas that will make for better transportation.

From May 19 to 22, inclusive, the first exhibit of the National Automotive Service convention was held in Detroit, at which there was an exhibit of 103 automotive maintenance equipment manufacturers. This convention was held under the auspices of the National Automobile Chamber of Commerce in co-operation with the Society of Automotive Engineers, Motor and Accessory Manufacturers' Association, National Automobile Dealers' Association, Automotive Equipment Association and the Service Equipment Association.

It was the first exhibition on a comparatively large scale ever held and the manufacturers' exhibits included portable tools, machine tools, instruments for inspection and stockroom equipment. The 103 concerns exhibiting comprised the most representative companies engaged in creating automotive service equipment. Every tool, whether power driven or manually operated, was shown in actual use and visitors were afforded an exceptional opportunity to study advanced facilities for increasing the efficiency of service work.

There are now 141 railway companies operating motor buses as auxiliaries or feeders to existing lines. The question of maintenance is one of decided interest to the superintendents of equipment, master mechanics and shop foremen. The association will extend to the manufacturers of automotive maintenance equipment an invitation to join the association and have an exhibit of their products at the October convention, and it is felt many will avail themselves of the opportunity to participate.

This should prove of decided interest to the executives of these 141 companies operating buses and it is confidently hoped that they will recognize the value of such an exhibit and authorize their subordinates to attend the convention this year.

Joint Committee on Engineering-Accounting

A MEETING of the joint committee on engineering-accounting was held at the headquarters of the association on May 27. The following committee members were in attendance: P. R. Jacques, Leon R. Brown, chairman of the engineering committee, and George F. Dinneen, chairman of the accounting committee.

The advisability of modifying the classification submitted by the committee to the association at the 1923 convention was discussed, and it was decided to prepare three classifications for roads, depending upon the amount of annual gross receipts, using the classification submitted with last year's report as a basis to work upon. The chairmen will prepare the classifications and are to submit them to the members of the committee for consideration.

Convention Plans Shaping Up

RAPID progress is being made by the convention committee of the American Electric Railway Association. Subjects to be discussed have been agreed upon, speakers are being obtained, and transportation and exhibit arrangements perfected.

Outstanding subjects to be discussed are: Financing of electric railways, including a discussion of customer ownership; co-ordination of motor vehicle and electric railway service; necessity of electric railway service to communities, to be discussed by the mayor of a large city, a real estate man of national prominence, a United States Chamber of Commerce representative, a public utility commissioner, and a national manufacturer; management and modernization, and traffic problems.

The "Management and Modernization" discussion will be led by regional vice-chairmen of the city and interurban operating committees. These fourteen men, during the last year, have been conducting a survey of electric railway properties throughout the United States in an effort to unearth the most progressive practices.

An innovation of setting aside one day wholly for the inspection of exhibits has been suggested by the committee on meetings and subjects. If this suggestion is carried out, no meetings of any associations would be held on Wednesday and a Friday morning session of the American Association would be held.

Encouraged by the success of the inspection and exhibits by a special committee headed by the president last year, the meetings and subjects committee has suggested that the plan be carried out again.

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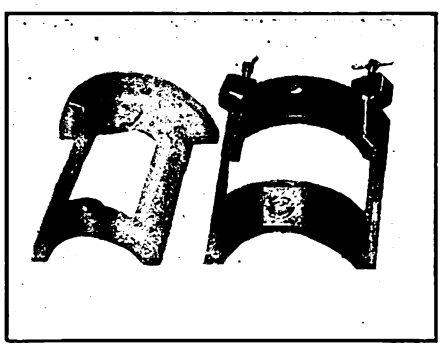
Maintenance of Equipment

Jig for Drilling Axle Bearings

THE axle bearings used by the Eighth Avenue Railroad, New York, N. Y., require drilling for dowel pin holes. A convenient jig has been designed in the shop for accurately locating the holes and saving time in the drilling operation.



The Axle Bearing at the Left Has Just Been Drilled for Dowel Pins in the Jig at the Right

An accompanying illustration shows the jig at the right hand side of an axle bearing, which has just been drilled.

The jig has two extension arms at the end which fit over the flange of the axle bearing. These arms are provided with thumb screws, so that with the axle bearing in place in the jig, these are tightened down to hold the bearing firmly in position. This method of clamping insures that the dowel pin holes are accurately located from the flange of the bearing. The holes in the jig are bushed with case-hardened bushings.

Armature Bearing Shells Turned on Special Centers

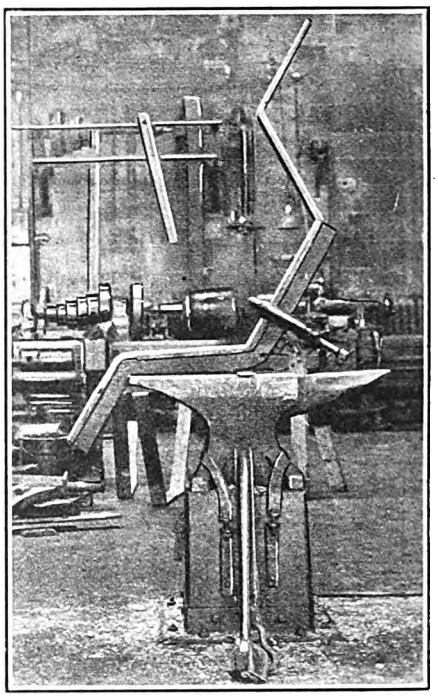
TURNING the outside of armature bearing shells in a lathe is facilitated in the shops of the Pittsburgh Railways by the use of special lathe centers. These eliminate the practice of putting the bearing on a long mandrel and driving it through a dog. The drive to the bearing in this "set-up" is through the live center. This permits the cutting tool to travel the full length of the shell without reversing the work.

Both centers are tapered to a 60-deg. angle and are larger at the base than the bore of the armature shell. The live center is three-sided, while the dead center is conical. This type of center aligns the shell with the inside bore. The three corners of the live center are forced into the rim of the shell by pressure applied by the tail stock through the dead center.

Inasmuch as the usual type of friction bearing between the dead center and the shell would cause slipping of the driving teeth of the live center, a thrust bearing has been incorporated in the design of the dead center.

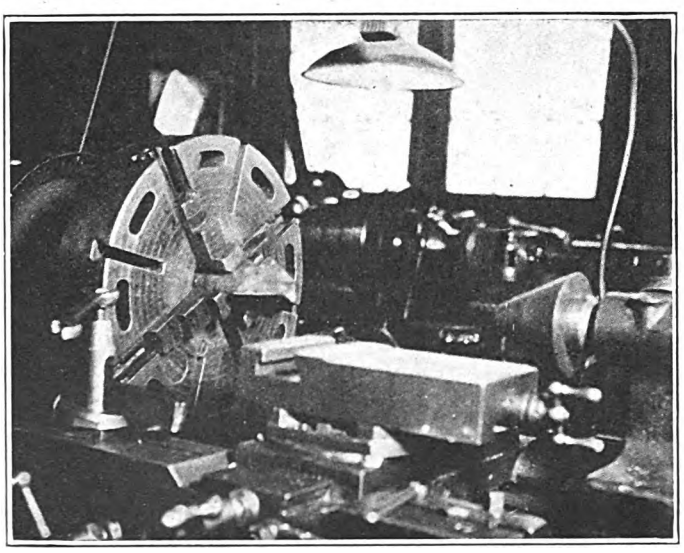
Convenient Form for Bending Arch Bars

IN REPLACING the arch bars on trucks where these have become broken, the Philadelphia & Western Railway, Norristown, Pa., uses a

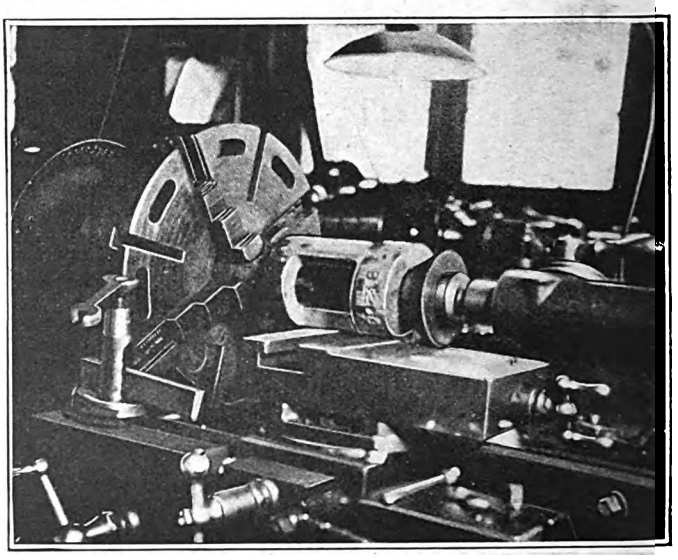


Completed Arch Bar in Position After Bending

convenient form for bending the new bars to shape This form is made of square steel stock of the same size as



Live and Dead Centers Are Tapered to 60 Deg., the Live Center Being Three-Cornered and the Dead Center Conical and Containing a Thrust Bearing



Tapered Centers Hold Armature Bearing Shell, the Live Center Driving the Shell Through Contact of Triangular Live Center

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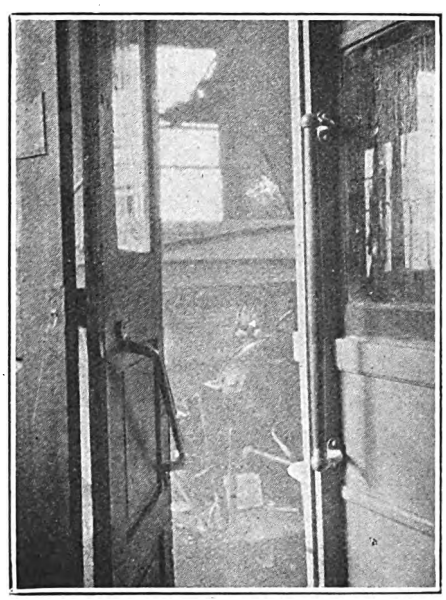
the longer dimension of the arch bar. A piece of mild steel of the required dimensions is heated in a forge at the point where the bend is to take place. This is then clamped to the form by a C-clamp, and the bar is then hammered to the required shape to fit in the form. In order to insure that the arch bar fits squarely on the form so as to have the bend at right angles to the edges a small piece extends along the edge, and the piece of steel bar fits up against this while it is held for bending. By use of this form the time for shaping the arch bar has been reduced enormously.

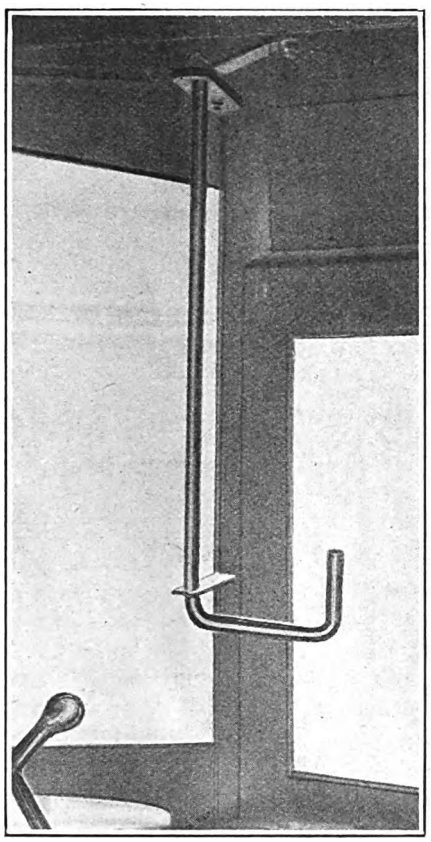
Improved Door Arrangements in Remodeled Cars

THE New York & Queens County Railway, Long Island City, N. Y., is remodeling ten of its closed cars for one-man operation. These cars originally had inclosed platforms and folding doors and the remodeling changes consist principally of changes in the platform to facilitate one-man operation.

Two sliding doors located at the bulkhead have been removed so as to facilitate passenger movement and the folding doors at the front left-hand side and rear right-hand side have been permanently screwed shut. A platform seat for two passengers has also been installed across these doors. A new stanchion has been installed just to the right of the operator's position for holding the fare box. This is a short stanchion extending about 3 ft. above the floor and it is braced to the hand brake staff support. The register rod has been extended out on the platform and a pull strap added, so that fares may be rung up conveniently by the operator.



Arrangement of Grab Handles on Inside of Platform and on Folding Door



Operating Mechanism for Hand Control of Folding Doors

The platform doors originally were arranged to fold against the bulkhead. These have been changed with hinges added on the opposite side, so that as remodeled they fold against the dash. This arrangement provides less interference with passenger movement and also makes a more convenient installation for hand operation of the doors.

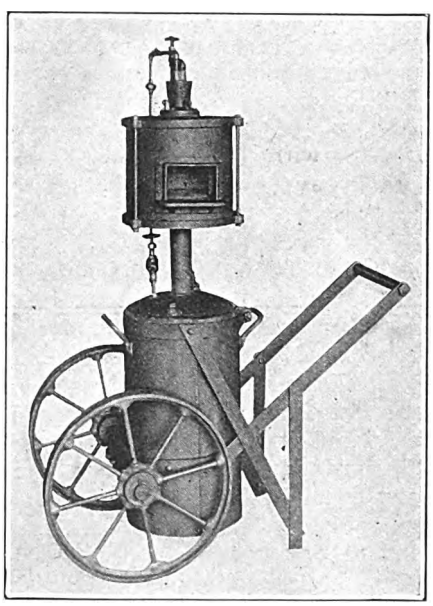
An accompanying illustration shows the mechanism added for the door operation. A 1-in. iron rod bent so as to provide a handle and lever for operation extends from a point just above the hand brake staff to the vestibule headlining. This is supported by brackets to the vestibule window post. The upper end of this rod has a bell crank lever and connection to the doors. To open the doors the operator pulls the handle toward him. In order to lock this mechanism at the rear end of the car a pin is provided with a chain fastening which fits into a recess in the top support just ahead of the bell crank lever. With the pin inserted, the door-operating mechanism cannot be moved.

These cars originally had grab handles on the outside of the doors. These have been removed and one of them installed at the bulkhead side of the door opening, inside the platform vestibule. An additional grab handle has been added to the inside of the door nearest the bulkhead. When the door is in the open position the handle is in convenient position for passengers who are boarding or alighting, and when the door is closed this handle is on the inside of the car, so that no support is provided by which passengers might hang onto the outside of the car.

New Equipment Available

Improved Oil Burning Rivet Forge

IMPORTANT changes made in the construction of the oil-burning rivet forges manufactured by the Buffalo Forge Company, Buffalo, N. Y., include an extension of the fireproof liner through the fire opening in the steel shell and a redesigned bottom plate made with a liberal shelf extension to receive hot rivets.



Portable Oil-Burning Rivet Forge

In the old rivet forge a cast-iron frame, attached to the shell with six rivets, constituted the fire opening. The brick hearth itself extended only to the inside edge of this opening. The shelf for the rivets was cast as part of the frame piece and extended direct from the opening

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and on a level with the fire. This design, however, was at times unsatisfactory. The heat generated invariably resulted in a loosening of the rivets holding the frame, and this in turn was followed by a burning of the edges of the shell itself. In addition burning of the rivet shelf resulted. With the new design the fire-clay liner extending over and around the edges prevents a direct contact of the fire with the sheet steel casing, and the placing of the shelf on a lower level, in one piece with the bottom plate of the fire chamber, prevents all possibility of a burnt-out shelf.

The forge consists essentially of a welded steel oil tank on which is mounted a head, or fire chamber. This head is made up of a circular steel plate housing held between the cast-iron top and bottom plates by means of three bolts. The lining of the fire chamber is a one-piece, circular section of firebrick 2 in. thick at the sides and 2½ in. thick at the bottom.

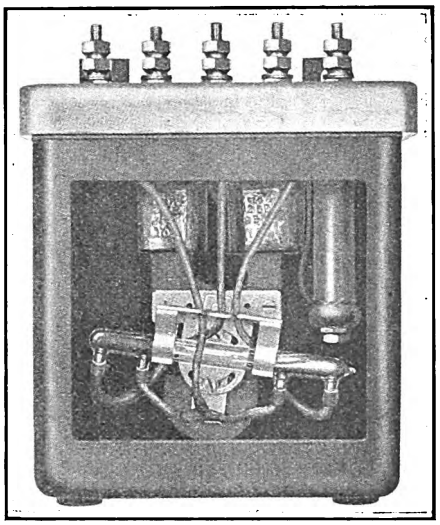
The oil tank is tested under a pressure of 125 lb. to insure against leakage. Air is supplied by a single connection which furnishes pressure for the oil supply, as well as for the atomizer. Kerosene, distillate or any fuel oil is burned in this forge.

The unit illustrated is portable and especially adapted for use on construction work. It can be moved about by one man.

Automatic Signal Flasher Relay

AN AUTOMATIC electric flasher designed for railway grade crossings and highway signals has been placed on the market recently by the Bossard Railway Signal Corporation, Troy, N. Y. The device is registered under the trademark "Bossard Flashmore." This company supplies the flasher relay only and the signal itself may be of any kind of construction requiring two lights to flash alternately upon the approach of a car or train.

The distinguishing feature of this relay is the absence of metal contacts. As the current is broken through a mercury contact within a sealed glass tube, in which the air has been replaced by inert gases, there is no possibility of oxidation of mercury. The relay has an armature oscillating between the poles of an electromagnet. To this armature shaft



New Flasher Relay with Mercury Contact

is fastened a pendulum which is oscillated by the electric current in one direction. With the opening of the circuit, the pendulum returns automatically to its original position by gravity. The glass tube is mounted on this pendulum and has four contact pockets, into which leads are sealed for carrying the current.

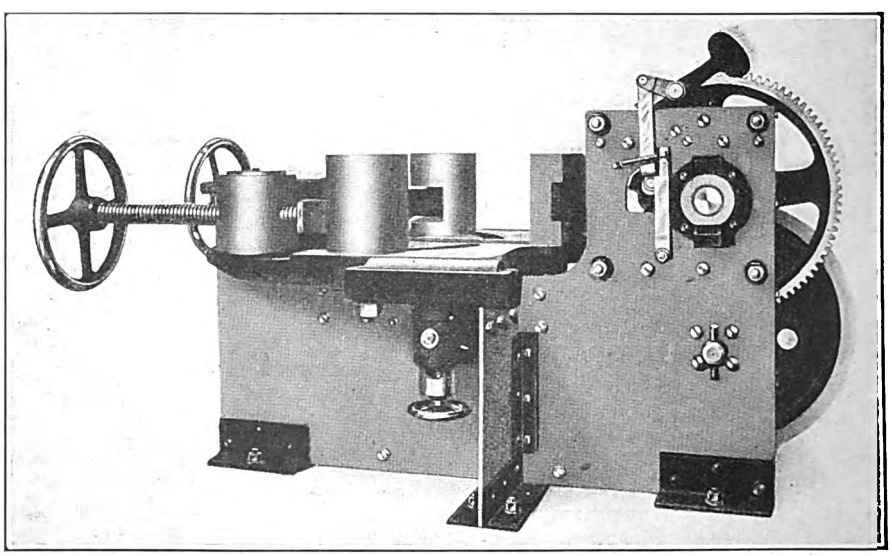
The magnetic field is independent from the load current and therefore constant under all conditions of the load circuit, regardless of how few or how many lamps are being used. The burning out of lamps or the adding of more lamps, therefore, does not affect the brilliancy of the light or the speed of the flasher.

The weight of the pendulum holds the contact tube in such a position that both contact pockets, which control the air circuit through one set of lamps and through the magnet coils, are closed. This provides a safeguard in case of failure of the operating mechanism as it displays a set of lights as a warning. Where the flasher is used in connection with electric railway installations which use direct current for propulsion, it can be set in operation by means of interlocking relays operated by alternating-current track circuits, superimposed upon the direct-current propulsion circuit.

New Bending and Straightening Machine

A NEW horizontal eccentric bending and straightening machine, particularly adapted for bending rails, bars, angles, beams, etc., is being offered to the trade by Henry Pels & Company, Inc., New York, N. Y. This machine has a very heavy steel plate frame, steel gears, and forged shafts and pinions.

The table is especially wide and has a horizontal roll on each side which facilitates handling of material. The bending blocks are adjusted independently of each other by hand wheels and screws that move them in the arc grooves. The bending blocks move forward or backward on an arc, the center distance thus being shortened when near the ramhead and lengthened as they recede. This movement automatically accommodates the varying sizes of sections and lengths of radius. The arc line of travel of the bending blocks has been determined from the moment of resistance of various sections figured theoretically and combined with results of actual tests. When bending track rails or similar heavy sections it is advisable to use filler blocks between the ramhead and the section with the bending blocks well separated. Any length of rail can be run through the machine as is found necessary.



Horizontal Eccentric Bending and Straightening Machine

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The News of the Industry

Mayor Ready to Act

Chicago Executive Said to Be Prepared to Pay $162,000,000 for Surface Lines

Events indicate that Mayor Dever of Chicago is ready to recommend to the City Council that the city buy the Chicago Surface Lines at the price set in the 1907 traction ordinance—$162,000,000 as the capital account now stands—now that conferences with the Surface Lines officials have been suspended, while similar negotiations with the officials of the Chicago Rapid Transit Lines are ready to proceed.

At the eleventh conference between city officials and bankers and Surface Lines officers it was virtually agreed that the bankers and the security holders would stick to their contention that the full price should be paid.

The bankers, particularly, are reported to have informed the Mayor that a dangerous precedent would be established if the security holders were requested to repudiate a part of their holdings. Inasmuch as a market for the Schwartz municipalization certificates must be created, the city officials would be virtually unable to proceed with the municipalization project without the bankers' co-operation. That co-operation, it is reported, would not have been forthcoming unless every security was taken up dollar for dollar.

Included in the $162,000,000 purchase price is $6,000,000 in new rolling stock and extensions which has not increased the price to the city. In addition, the lines will turn over to the city their renewal fund of $14,000,000 and the personal-injury fund of $5,000,000, thus bringing the actual price down to $141,000,000.

Upon the completion of the negotiations, Mayor Dever, in a special message to the City Council will set forth his reasons for believing that the municipalization of the traction properties is desirable. The Mayor was one of the leaders in the municipal ownership fights twenty years ago in the Council, and he is hopeful that the Council as now organized will give him friendly support in what he regards as the most important problem before the administration.

Queens Abandonment Hearing Adjourned

Before Supreme Court Justice Joseph Aspinall, in Long Island City, on June 4, the political aspect of the transit situation in New York city was brought out with prominence when the argument was heard on the motion of Gen. Lincoln C. Andrews, receiver of the New York & Queens County Railway, for an order permitting him to abandon service on the lines and to surrender the company's franchises.

Col. William N. Dyckman, associate counsel with H. P. Williams, representing the receiver, objected to an adjournment for a week that had been asked for by Assistant Corporation Counsel Vincent Victory unless the court would grant the adjournment on conditions.

One of these conditions, as stated by Colonel Dyckman, was that the members of the Board of Estimate of the city of New York would go with representatives of the railway to the Transit Commission and join in a request for an increased fare. Mr. Dyckman said:

> We know the feelings of the members of the Board of Estimate, and the head of this city, and the board's willingness to destroy railway property in this city. We want a condition made in the order of this court granting the adjournment that the Board of Estimate must go to the Transit Commission and ask them for an increased fare. We believe that with such an order in his hand to back him up, Borough President Connolly can make some headway with the Board of Estimate.

Justice Aspinall granted the request of the city authorities for a week's adjournment, but refused to impose the conditions requested by representatives of the railway. So it would appear that maintenance or abandonment of lines serving 40,000 a day after that date depends upon Mayor Hylan.

Borough President Connolly has announced that he will bring the matter before the Board of Estimate on June 9 when it meets as a committee of the whole.

Railway Rejects Cleveland Wage Award

Men Granted Twelve-Cent Advance, but Company Asserts Finding Is Not Fair Because of Proved Prejudice of Fifth Member of the Board of Arbitration—Situation Appears Tense

PLATFORM employees of the Cleveland Railway, Cleveland, Ohio, numbering some 3,000 motormen and conductors, were on June 3 awarded a wage increase of 12 cents an hour by a board of arbitration, from which the company withdrew its representatives after the first session following the submission of evidence and arguments The men had sought a 15-cent increase. The wage increase means that dating back from May 1 the men are to receive 67 cents an hour for the first three months of service, 69 cents an hour for the next nine months and 72 cents an hour after the first year, instead of 55, 57 and 60.

Representatives of the Cleveland Railway assert that the award of the board of arbitration will not be carried out. William Polk, president of the local street car men's union, says that a strike will be called if necessary to enforce the award.

After four days of public hearings the work of taking evidence from both the men and the company was ended on May 26. Arguments were heard on May 27 by attorneys representing both sides. After a private meeting by the arbitrators on May 28 Attorney Carl Higley and Thomas P. Schmidt, representing the company, declared their intention to withdraw from the board on the ground that the fifth man on the board, James W. Holcomb, formerly city street railway commissioner, instead of being neutral, was actually prejudiced in favor of the men.

John J. Stanley, president of the railway, notified Mr. Holcomb that the company considered that he had disqualified himself and that the company would not participate in the deliberations of the arbitration board. Directors of the Cleveland Railway met and approved of Mr. Stanley's stand, pointing out that the company would repudiate any decision arrived at by Mr. Holcomb and the two representatives of the union on the board.

The company based its repudiation of the arbitration board and its award upon Mr. Holcomb's attitude during the taking of evidence, his comments during the hearings and the fact that four days after he had been agreed upon as the fifth man in the arbitration proceedings a letter had been sent by John G. Owens, secretary of the Cleveland Federation of Labor, to the Senators from Ohio at Washington indorsing Mr. Holcomb for the position of United States Collector of Customs at Cleveland. In this letter Mr. Owens stated that Mr. Holcomb was qualified for the post, that the labor federation of Cleveland indorsed him and that he had been named as the arbitrator in the wage dispute between the railway and its employees.

In announcing the wage increase of 12 cents an hour, the three members of the board of arbitration participating in the award also allowed the company platform employees fifteen minutes' time for making out accident reports, but rejected all other demands of the union for changes in working conditions. Union officials say the award is satisfactory.

In a statement appended to the award, Mr. Holcomb and his two colleagues representing the union, United States District Attorney A. E. Bernsteen and Max Hayes, editor of a Cleveland labor publication, said that they would back the car men in getting the award and that the decision was reached without bias or prejudice.

The statement also asserted that the award would cost the company approximately $966 400 additional each year and that the fifteen minutes' pay

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allowed for making out accident reports would cost an additional $12,000. The statement claimed that the company could offset the increased charges against it by reason of the higher pay if it managed to reduced the amount of damage claims paid annually and if it consented to a reduction in its allowance for maintenance, depreciation and renewal.

Accident and damage claims paid by the company last year were $1,582,595, or nearly 10 per cent of the gross earnings, while according to the majority of the board of arbitrators the cost of damage claims in Detroit is only 1.26 per cent of the gross earnings; Boston, 1.75 per cent; Cincinnati, 1.85 per cent, and Chicago, 2.5 per cent.

The statement of the majority of the board also pointed out that by reason of an increase in the company's maintenance fund from 10 to 12 cents a car-mile in the latter part of 1921, the company in 1922 not only wiped out a deficit of $240,000 but piled up $1,182,252 as a reserve fund in this account and stocked up with materials and supplies to the amount of $1,158,235.

According to the majority report, the company could pay the increased wage allowed if it made the saving the board felt it could in its claims for damages and in its maintenance fund and still have a balance left of more than $742,363.

If the company insists upon not signing a new contract with the union containing the increased wage award, union officials say that a strike vote will be taken, but that they will attempt to prevent a cessation of service in Cleveland until after the Republican national convention, which is set to start June 10.

Decree Signed in New Jersey Fare Case

Federal Judge Rellstab of the United States District Court at Trenton, N. J., on May 28 signed a final decree permanently enjoining the Board of Public Utility Commissioners of New Jersey from enforcing its order of July, 1921, fixing fares at 7 cents, with 2 cents for a transfer, on lines of the Public Service Railway. Accordingly, the present fare schedules, including the zoning system, will continue in effect.

The decree also contains a clause setting forth that counsel shall be heard in the United States District Court at Trenton June 9 on the question of costs of operating the lines. Included in the costs is $25,000 which the railway by direction of Judge Rellstab, has paid to former Federal Judge Thomas G. Haight of Jersey City, as special master.

Reference to the ruling of the court in this connection was made in the ELECTRIC RAILWAY JOURNAL for May 31, page 869.

Five-Cent Fare With Tickets in Tacoma

The Tacoma Railway & Power Company, Tacoma, Wash., has arranged with city officials for a 5-cent ticket fare, with the $1 weekly pass to be continued in effect. The new fare does not include transfer privileges. It became effective on June 1. On its part the city has agreed not to issue any more permits for buses other than those which the Mayor might see fit to allow the company to operate during the experimental period of six months while the new fare is being tried out.

At an early conference, other details of the proposed agreement, including the question of paving between tracks, will be threshed out. City officials will co-operate with the company in an effort to cut down its expenses in paving.

Railway officials say that only the operation of the new system over an experimental period will settle the question of whether or not the system of selling tokens at the rate of twenty for $1 will have a satisfactory appeal in view of the proposed continuance of the weekly pass at $1.

Cincinnati Contract Renewed for Two Years

Members of the carmen's union, Local No. 11, recently voted to renew their present contract with the Cincinnati Traction Company, Cincinnati, for a term of two years. The vote was 826 for the renewal and 265 against. The present agreement is based on a maximum wage of 53 cents an hour, with 7 cents an hour additional for operators of one-man cars. The clause concerning schedules of "owl" cars refers to the time that their operators start to work. Formerly the men on the "owls" reported for work at 7:45 p.m. and went off duty at 5:45 a.m. Under the present schedule they start to work at 11 p.m. and quit at 8:15 a.m. The men believe that the former schedule is preferable. A clause regarding regular crews on regular cars refers to the fact that the men wish to be supplied with a regular car and be permitted to use it daily as long as it is in running order.

Several weeks ago the men turned down a proposition submitted by the union's board of directors in which it was proposed to renew the present agreement for one year.

Group Insurance Policies for Roanoke Employees

A group life insurance policy under the terms of which the 315 employees of the Roanoke Railway & Electric Company, Roanoke, Va., receive protection of $1,000 each has been placed with the Metropolitan Life Insurance Company. A total of approximately $350,000 in insurance is involved in the policy. The premiums will be paid on a contributory basis, with the employers and workers sharing in this cost. In the event of illness, an insured employee of the company may summon a Metropolitan nurse who will assist in the care of the patient and see that the instructions of the attending physician are followed. In addition to this service, the Metropolitan will distribute to these new policyholders at frequent intervals the instructive pamphlets published by that company. These, compiled by experts, deal with timely health and sanitation subjects.

Want Five-Cent Fare in East Boston

Like several of the other zones in Boston which have obtained a 5-cent local fare from the Elevated, the East Boston district desires to be classed as a zone on the system, so that the 5-cent fare may be granted. It wants a 5-cent fare through the tunnel at least as far as Devonshire Street. James F. Jackson, chairman of the board of trustees, has explained that the question whether to grant a 5-cent fare within the limits of East Boston from one section to another may not take very long to decide, but the idea of granting it on the rapid transit system is entirely new to the service. The 5-cent fare thus far applies entirely to the surface cars. The trustees say that under the law they cannot make the general reduction now suggested until the company has liquidated the advance made by the communities which helped the company take care of its deficit during the year 1919.

Seattle Tax Case Reviewed

Three judges in the United States District Court at Seattle took under advisement on June 2 applications of the Old Colony Trust Company and the Puget Sound Power & Light Company for temporary injunctions restraining the Sheriff of King County from selling the power company's holdings to satisfy street railway taxes assessed for 1919. The details of the purchase by the city of Seattle from the power company of the street-railway lines were reviewed, as well as the court proceedings subsequent thereto and recent action taken to obtain payment of taxes. The Old Colony Trust Company received permission to file a supplemental bill, and motions of the defendants for dismissal were taken under advisement.

James B. Howe, representing the power company, argued that the county authorities had no right to levy upon the power company's present property, on which all taxes have been paid for 1919, for taxes on the street-railway property, on which property the state Supreme Court and the United States Supreme Court have held the taxes to be a specific lien. By the terms of the contract and deed conveying the car lines to city, Mr. Howe asserted, the company and the city agreed that each should pay taxes for that portion of the year 1919 during which title to property was held by it, the city being thus obligated to pay three-fourths of the taxes, with interest and costs, and the power company one-fourth. The Corporation Counsel of Seattle asserted that the city was not properly a defendant in the action and moved for dismissal. The intimation that the city and the county were in collusion to force company to pay the entire taxes for the year 1919 was vigorously denied.

On June 5 the three United States District Court Judges who heard the arguments dismissed the corporation's application for an injunction. The court held that it had no jurisdiction in the case of the trust company and that in the case of the utility the company had an adequate remedy in law.

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Hearing for Increased Fare Petition

The Maine Public Utilities Commission has issued notice for a hearing on a petition filed by the Androscoggin Electric Company, which operates the Lewiston and Portland interurban system, asking for increased fares. Under the proposed schedule the fare between Lewiston and Portland would be raised from 93 cents to $1.00, with corresponding adjustments on intermediate fares; the charge for special car service would be increased from 75 cents to 85 cents per mile, with a minimum charge for such service raised from $10 to $15. These new rates have been suspended until Aug. 15 pending hearing and investigation.

Effort to Stop Fare Increase in Baltimore Fails

An effort to prevent the United Railways & Electric Company, Baltimore, from putting into effect the 8-cent cash fare for single fares or two tickets for 15 cents, recently granted by the commission, failed in court on May 31 and the fare order became effective on June 1. The attempt to have the court halt the increase was made by Mayor Howard W. Jackson, who sought both a temporary and permanent injunction as a taxpayer and also in the name of the Mayor and City Council.

City Solicitor Philip B. Perlman contended that the Public Service Commission had no right to fix fare rates without a valuation of the company's property except in an emergency. This valuation has been ordered by the commission and will require several months.

Judge Charles F. Stein in Circuit Court ruled that to grant the injunction he must find the order void because it is unreasonable or unlawful. He said that he must assume that the Public Service Commission acted upon the evidence presented. The court made it plain that in acting upon the application for a temporary injunction it was not expressing any opinion on the evidence.

A hearing date will be set in the near future on the appeal for a permanent injunction.

Bus Project in Syracuse Still Pending

Syracuse, N. Y., is apparently no nearer having bus lines in operation than it was months ago. Several firms have applied for franchises or licenses to operate lines on James Street, one of the best residential sections of the city, but the Common Council has opposed granting the permits.

The Syracuse Railroad Co-ordinated Bus Lines, Inc., a subsidiary of the New York State Railways, has been formed to operate bus lines. No decision has been reached as to what fare is to be charged or what form the bus lines will operate under, franchise or license. The city insisted a short time ago on a 5-cent fare and transfers, but this stand has been modified. The railway is understood to feel that a 10-cent bus fare would be necessary under its proposal if the bus lines are to be made self-supporting from their start, while the other interests that have signified their desire to be permitted to operate bus lines have indicated that they believe an 8-cent fare would prove sufficient to return a profit under the proposal advanced by them.

Ten New Buses Being Run by Indiana Interurban

The Indiana, Columbus & Eastern Traction Company, which operates bus lines paralleling its railway from Dayton to Columbus, Ohio, and from Springfield to Lakeview, Ohio, has increased its bus service by placing ten new Fageol buses of the latest design in service on its two bus divisions. Each of the new cars accommodates twenty-two passengers. The new buses replace 7-passenger Studebaker cars.

Despite the fact that they are slower than the electric cars with which they compete, many persons seem to prefer the buses in summer, according to F. A. Healy, treasurer of the company, and since the company sells transportation it was decided to give the riding public what they want. There are several competing bus lines which cover the same territory.

Reports Favorably on Investigation Into Boston "L" Additions

The joint rules committee of the Massachusetts Legislature has reported favorably a joint resolve providing for an investigation into methods for financing additions, extensions and improvements of the Boston Elevated Railway systems and of the advisability of terminating or continuing public operation. The resolve was recommended by the Metropolitan Planning division when it appeared that the system was unable to finance needed improvements and was favored at the hearing before the committee by H. Ware Barnum, general counsel for the trustees of the road. Mr. Barnum said the road would need $1,500,000 for additional equipment in the extension of the Shawmut branch in Dorchester. He also informed the committee that the extension of the Boylston Street subway was under consideration and the extension of the rapid transit service from Lechmere Square to North Cambridge. He said that 125 additional steel cars were needed for replacements and 400 modern semi-convertible cars, at a total cost of $10,000,000.

Relief from Congestion Suggested in Chicago

Conference of Transportation Interests There to Agree on the Terms of Traffic Order from State Commerce Commission to Go Into Effect in Loop District on July 1

Plans for reducing loop traffic congestion in Chicago through a rerouting of both surface line cars and west side buses have been tentatively agreed upon by city officials and representatives of both the Surface Lines and the Chicago Motor Coach Company, in a hearing called before the Illinois Commerce Commission.

In opening the hearing, Col. Frank A. Smith, chairman of the commission, said the commission felt it to be its duty to co-operate with the city to the end that transportation facilities, especially in the loop district, might be speeded up and made safer for the public.

Maj. R. F. Kelker then explained to the commission members the plan which has already been tentatively agreed upon by representatives of the Surface Lines and the city, by which it is hoped that service on the lines can be increased by about 30 per cent and at the same time create a clearer passage for other vehicles.

Installation of the plan, described in detail in this paper, issue of May 3, page 683, will entail the expenditure of approximately $100,000 on the part of the Surface Lines. Among its features are:

1. Twenty left-hand turns in the loop district bounded by Wabash Avenue, Wells Street, Lake Street and Harrison Street, will be eliminated, leaving only five left-hand turns within the same district.
2. At the same time the right-hand turns will be cut from thirty-eight to twenty-six within this district, and two of the present sub-terminals in the loop will be eliminated, leaving only one.
3. Changes will be made in the routes of thirty-two car-lines.
4. Washington Street buses will turn on Clark Street instead of on State Street, according to the agreement.
5. State Street is to be left clear for through traffic, and except in emergencies, the third track on State Street is not to be used.
6. West side street cars will use Dearborn Street as a turning point instead of State Street.

"In a normal twenty-four hour period," Maj. Kelker told the commission, "street cars in the loop proper at present make just 6,092 left turns. Under the proposed plan, these left-hand turns in that period would be reduced to 1,920. Similarly, the right-hand turns will be reduced from 16,486 to 14,225.

"An actual check of the flow of pedestrians and vehicles at the corner of State and Madison Streets in one hour of the afternoon showed 46,600 pedestrians and 2,000 vehicles entered that intersection. It is the right- and left-hand turns of street cars and buses in State Street that blocks this traffic constantly, and under the proposed plan many of these turns are to be eliminated in the loop area."

The benefits of the new plan will come about through the construction of eight new curves and the removal of four or five elevated structure columns from the middle of the street to behind the sidewalke line, Maj. Kelker explained to the commission.

Attorneys for the three interested parties were instructed by Chairman Smith to agree on the terms of an order which will be submitted to the commission within a few days. After that, the new traffic plan will be submitted to the Council for changes in the city ordinances, permitting the plan to go into operation, which it is hoped will be about July 1.

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Hornell Traction Goes Back to Eight-Cent Fare

The Public Service Commission permitted the Hornell Traction Company Hornell, N. Y., on June 2 to return to an 8-cent fare which it had charged in its operating zone up to May 1. The commission, on the request of Receiver Page, permitted the company to reduce its fare to 7 cents, believing that the smaller fare would attract more patronage and increase the revenues of the company. This move, the receiver learned, was not a successful one, and he asked that the road be again permitted to charge the 8 cents if operations were to continue. The receiver says that under the 8-cent fare the average daily earnings of the company from Jan. 1 to May 1 were $150.70, while from May 1 to May 13 the average daily earnings under the 7-cent fare were $115.25. Since May 13, the receiver says, the revenues of the company has continued to go down until they run from $90 to 100 per day.

Ottawa Wage Agreement Continued

An agreement was entered into on May 19 between the Ottawa Electric Railway, Ottawa, Canada, and its Amalgamated employees whereby the contract signed in 1922 will continue in effect until May 1, 1926, with the following principal changes.

All permanent employees who are paid by the hour except shop hands and apprentices will receive 1 cent an hour increase for the period from May 1, 1924, to April 30, 1925, and 2 cents an hour increase for the period from May 1, 1925, to April 30, 1926, over the wage rates in effect on April 30, 1923.

The wage rates for conductors and motormen beginning May 1 are 44 cents for the first year, 46 cents for the second year, 47 cents for the third year and 49 cents for the fourth year and thereafter. On May 1, 1925, these rates will be increased to 45 cents, 47 cents, 48 cents and 50 cents respectively.

The other clauses of the agreement signed in 1922 continued in effect until May 1, 1926. The important items which are not changed are time and one-half for overtime on week days for a standard day of nine hours, time and one-quarter for work on Sundays and legal holidays and one-half cost of uniforms for first year and free thereafter.

Wage Contract in Toledo Remains

After three weeks of negotiations a new contract has been worked out between the Community Traction Company, and officials of the car men's union at Toledo which is substantially the same as the one which expired on May 21, 1924.

Wages remain the same. They were 50 cents an hour for the first three months, 52 cents for the succeeding nine months and 55 cents an hour thereafter. One-man car operators are granted 5 cents an hour extra. Only minor changes were made in some of the working conditions.

The men had asked for a 20 per cent wage increase and changes in working conditions, including two weeks' vacation with pay and closed shop on the entire property. At one stage the company had proposed a compromise vacation of one week with pay to men with the company more than five years, but that was voted down by the men.

Parking Rules Suggested

New York State Conference of Mayors Would Fix Drastic Limits on Trolley Traveled Streets

A committee appointed by the New York State Conference of Mayors has just reported to that body on the parking evil. The committee is headed by Mayor John A. Giles of Binghamton. It believes that in congested districts no parking should be allowed in a street in which surface cars operate unless there is room for at least one line of travel 10 ft. in width between the street car area and a line of vehicles parked at the curb. In streets in which trolley cars do not operate parking should be prohibited unless there is room for one line of travel in each direction or 20 ft. in width to accommodate both lines of travel, between cars parked at either curb or between the curb and one line of vehicles at the opposite curb. This is the very minimum under which parking should be allowed. The committee says this will not, however, solve the parking problem, for traffic will be impeded and often interrupted and the fire hazard will be great.

The committee says that under such conditions, and with parallel parking, the minimum width of roadway should be as follows:

Streets with a single trolley line, 47 ft. roadway.
Streets with a double trolley line, 57 ft. roadway.
Streets with no trolley line, 38 ft. roadway.

It is the belief of the committee that traffic will not be seriously affected and fire hazards will be practically eliminated if parking is allowed only in a congested street the roadway of which will accommodate two lines of moving traffic and one line of parked cars between the street car area and the curb or two lines of traffic in either direction between cars parked at either curb in streets where trolley cars do not operate. Under such conditions and with parallel parking, the committee feels that the minimum width of roadway should be as follows:

Streets with a single trolley line, 67-ft. roadway.
Streets with a double trolley line, 77-ft. roadway.
Streets with no trolley line, 58-ft. roadway.

The committee says that whether parking should be prohibited absolutely or in part in streets whose widths are greater than those previously specified depends upon traffic conditions. It says that no general recommendation can be made for such streets.

The committee says that time limits on parking should be established on all streets where parking is permitted to prevent all-day and all-night storage of vehicles. The length of the parking period should be determined by the demand and need for parking capacity.

The committee says:

We believe that cities either should provide parking space in or near the congested district or should encourage private capital to do so, either before parking is prohibited or greatly curtailed or as soon afterward as possible. When minor or side streets, vacant lots, parks and squares and interiors of blocks will no longer meet the needs there should be provided garages, either privately or publicly owned, and operated for half-day and day storage. Our data show that as long as parking is allowed private capital hesitates to invest in large downtown garages. Cities should also encourage the construction of garages in sub-center districts.

Additional Bus Permits Sought by New Jersey Railway

The Board of Public Utility Commissioners of New Jersey has set June 9 as the date for a hearing on the request of the Public Service Railway to take its cars off what is known as the Fifth-Broadway line in Camden, a crosstown service. Two buses of the Public Service Transportation Company, a subsidiary of the railway, are now rendering service in the area.

Effective on June 8, the railway has notified the commission that it will reduce from 7 to 5 cents its single fares on eight bus lines in the city of Camden and environs.

The railway will abandon service on the Kenilworth line, operating between Westfield Avenue and Kenilworth. The Public Service sets forth that for the year 1922 the gross receipts from the line were $10,571 and that the cost of operation, including taxes, but excluding fixed charges or any return on capital invested, was $25,139. In the last three months of 1923 the gross receipts were $874 and costs $6,000.

Fort Wayne People Save Weekly Passes and Get Prizes

As the hundredth week of the successful régime of the weekly pass in Fort Wayne, Ind., approached, it was rumored that the Indiana Service Corporation intended to give a prize to everyone holding the complete set of ninety-nine passes. The railway, of course, had nothing of this kind in mind, but the rumors became so prevalent that the company sensing the value of such publicity, made a formal announcement that prizes would be given. It was thought improbable that many people had saved the entire ninety-nine passes and therefore the company made the offer a little more lenient by extending the prizes to those who had saved fifty consecutive passes.

To the surprise of the officials of the company, fifteen people presented themselves at the cashier's office the morning the prizes were awarded. Eleven had fifty consecutive weekly passes and each received a prize of $1. Four had the entire one hundred passes and each of these four received $2.

The announcement of the intention to award the prizes and the later announcement of the winners were made in a quarter page advertisement in the local newspapers. As indicated before, the company was led into the matter indirectly by the rumbling rumors, but the stunt afforded an opportunity for some splendid publicity, and produced considerable favorable comment and increased the good will among the riders.

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Mr. Storrs Will Attend Advertising Meeting in London

L. S. Storrs, president of the Connecticut Company, New Haven, will go as a delegate from the American Electric Railway Association to the international convention of the Advertising Clubs of the World in London beginning on July 16. At that meeting the Public Utility Advertising Section of the Advertising Clubs of America will participate in the deliberations. Lord Ashfield, chairman and managing director of the so-called underground group of transportation interests, who began his railway career in the United States as Albert H. Stanley, will welcome the American delegation. Mr. Storrs will respond on behalf of the American utility delegation.

News Notes

Will Fight for More Subways.—The Brooklyn Chamber of Commerce is concentrating all its efforts in bringing before Mayor Hylan and Borough President Riegelmann the need for the speedy construction of the Brooklyn crosstown subway and the completion of the Fourteenth Street-Eastern District line. The chamber is now proceeding under a new slogan, called "Throw Dirt, but Not the City Hall Kind." At a recent luncheon at which this principle was advocated more than fifty representative business men pledged support to the movement.

Wants Increased Fares.—The Washington, Baltimore & Annapolis Electric Railroad, maintaining service from Washington, Baltimore and Annapolis, has petitioned the Maryland Public Service Commission for permission to increase its fares 20 per cent on single tickets and round trip tickets and 10 per cent on commutation books.

Railway to Substitute Bus. — The Aurora, Plainfield & Joliet Railroad has petitioned the Illinois Commerce Commission for permission to discontinue railway service between Joliet and Aurora. It is the purpose of the company to operate buses between the two cities. No opposition is expected on the part of Joliet or Aurora to the company's plan, but it is understood that the two cities will insist that the commission, if it sees fit to grant the permit, shall insist that the tracks be removed and the roadway restored.

Railway Man Heads Jury in Slayer's Case.—F. D. Hoffmann, assistant secretary and assistant treasurer of the Chicago Surface Lines, is foreman of the Grand Jury which has before it the case of Leopold and Loeb, confessed slayers of Robert Franks.

Eight-Cent Fare in Kingston. — The Public Service Commission issued an order on June 4 permitting the Kingston Consolidated Railroad, Kingston, N. Y., to increase its cash or ticket fare to 8 cents. No change is made in the present regulation as to transfers, school or other reduced rate tickets.

Fare Testimony Closes.—At the conclusion of the presentation of the last evidence bearing on the question of fare rates in the state of Connecticut the Public Utilities Commission on May 26 ordered the Connecticut Company, which is petitioning for approval of a rate advance in Bridgeport and corporation counsels of several cities opposing an advance already put into effect outside of Bridgeport, to file briefs by June 16. The briefs were ordered submitted simultaneously. The commission, however, extended until June 23 the time for the filing of rebuttal briefs by both sides.

Bus Company Authorized to Compete with Railway. — The Richmond Rapid Transit Company, Richmond, Va., has been authorized to operate over Broad Street for thirty blocks through the heart of the city in competition with the Virginia Railway & Power Company's electric lines and over the protest of the railway. Formerly touring cars of independent operators competed with the railway, but these were legislated off street car routes.

Negotiating on Wages.—Negotiations are in progress looking toward a settlement of the wage controversy between the Rochester, Lockport & Buffalo Railroad, Rochester, N. Y., and its employees. The men claim they are being paid 4 cents an hour less than the employees of the Rochester & Syracuse Railroad, which operates between Rochester and Syracuse. John Pallace is representing the employees and is conferring with William W. Foster, general manager. If they fail to agree formal arbitration will take place.

Mr. Sawyer Entertains Veterans.—The East St. Louis & Suburban Railway Twenty-five-Year Club held its second annual meeting recently in the offices of W. H. Sawyer, president of the company, who is an honorary member of the club. Tribute in the form of a memorial was paid to the memory of D. S. Van Houten, a charter member of the club, who died in February. Eight new members who had attained the coveted twenty-five years of continuous service were admitted to the club rolls. The business session was followed by an automobile trip through beautiful Forest Park in St. Louis, after which the club members went to the Missouri Athletic Club for dinner. Place cards were in the form of checks for $25 each.

"Claims Department" Abolished as Title.—The name "Claim Department" was abolished on June 1 by the Chicago Surface Lines. For it has been substituted the "Department of Accident Investigation." Frank J. Gatrell, who has had the title of "General Claim Agent," is now known as "Superintendent Department of Accident Investigation." The new title is not so suggestive as the old one and really much more fittingly describes the scope of the activity of this particular department of the company.

Bill Provides for Eight Hours in Eleven.—The Massachusetts House instead of ordering an investigation into the question of eight hours in eleven for street railway employees recently substituted a bill providing for eight hours in eleven. The vote on the roll call was 137 to 62. The bill was originally filed by Representative George E. Keegan, Lawrence, an official of the union of the Eastern Massachusetts Street Railway. Although the committee on street railways reported against it, the bill was adopted in the Senate over the recommendation of the committee, but the Senate later voted for a resolve for an investigation by the Department of Public Utilities. When the matter came before the House the ways and means committee reported in favor of the investigation, but when the resolve came up in the House Representative Keegan and the other spokesmen for the carmen and labor were able to swing the House for the bill over the objection of the ways and means committee. The bill now goes back to the Senate.

Cancellation of Commutation Asked.—The San Diego Electric Railway, San Diego, Cal., has applied to the Railroad Commission jointly with the San Diego & Coronado Ferry Company for authority to cancel the present monthly commutation ticket between San Diego and Coronado, which is sold at the rate of $4. It is alleged that since the weekly passes were installed on the San Diego Electric Railway by authority of the Railroad Commission the sales of commutation tickets do not justify the cost of printing them.

Fares Higher in Rhode Island.—The United Electric Railways, Providence, R. I., on June 1 introduced an 8-cent cash fare or a token rate of 7 cents. From Pawtucket to Providence a distance of four miles, the fare is sixteen cents. From Pawtucket to Cumberland, six miles, the fare amounts to thirty-two cents.

Buses to Replace Railway for Trial Period.—The City Council of Oskaloosa, Iowa, has passed a resolution which permits the Oskaloosa Traction & Light Company to operate motor buses instead of street cars. M. G. Linn, local manager of the Illinois Power & Light Company at Oskaloosa, which controls the railway there, has explained that the bus service is to be a trial, subject to the restoration of the railway service, if the citizens desire it. Better service with buses than with street cars is promised by the company. There are 8 miles of electric railway in Oskaloosa.

Bus Franchise Granted.—The City Council of Jamestown, N. Y., has granted a twenty-year bus franchise to the Jamestown Motor-Bus Transportation Corporation, a recently formed subsidiary of the Jamestown Street Railway. The franchise calls for operation at an 8-cent fare and a 7-cent ticket charge. Transfers are free from bus to bus, but cost 3 cents from bus to trolley. Bus service on the north and south side of the city, which was discontinued early this winter, is to be resumed within three months.

Complaints Dismissed. — Complaints of the cities of Oakland, Berkeley, and San Leandro, against the Key System Transit Company, successor of San Francisco-Oakland Terminal Railways, alleging discrimination in the matter of school children's fares in favor of the city of Richmond, have been dismissed by the California Railroad Commission. The alleged discrimination was removed through acceptance by the company of uniform school children fares in the East Bay district as recommended by the commission.

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Financial and Corporate

$863,646 Net for Detroit United

President Stevenson Optimistic—Has Important Expansion Program Under Way—Doesn't Fear Buses

The Detroit United Railway, Detroit & Port Huron Shore Line Railway, Detroit, Monroe & Toledo Short Line Railway, Detroit, Jackson & Chicago Railway and the Detroit United Railway Trucking Company report income for the year ended Dec. 31, 1923, of $863,646 before making provision for depreciation or contingencies transferred to surplus account.

STATEMENT OF EARNINGS OF DETROIT UNITED RAILWAY AND SUBSIDIARY COMPANIES FOR THE YEAR ENDED DEC. 31, 1923

		Amount
Gross earnings from operations:		
Passenger		$7,257,895
Freight and express		1,548,389
Mail		19,194
Special car		38,121
Total gross, earnings from operations		$8,863,599
Deduct—Operating expenses before providing for depreciation		7,243,271
Net earnings from operations		$1,620,328
Add—Proportion of interest received with respect to balance owing by city of Detroit for purchase of company's city properties	$220,832	
Other income	652,751	873,583
Gross income, less operating expenses		$2,493,911
Deduct—Interest on funded and floating debt	$1,789,387	
Less—proportion of interest received with respect to balance owing by city of Detroit credited upon the books of the company to interest on funded debt	732,787	$1,056,600
Taxes		573,665
Together		$1,630,265
Balance—Income for the year before making provision for depreciation or contingencies transferred to surplus account		$863,646

President Elliot G. Stevenson has reviewed at considerable length the affairs of the company, particularly details with regard to transactions conducted with the city over the purchase of the lines. He says that his statement as to the ability of the company to continue to pay dividends at the present rate is based not upon speculations but upon facts that seem to him to warrant the forecast. He says it must be borne in mind that during 1923 there was a large increase in the rate of wages of platform men and other employees. This increase in the wages of the men became effective, by agreement, on Aug. 1, 1923, but the increases were made retroactive to May 1, 1923. These increases are reflected in the operating costs of the company for 1923. They aggregate $400,000.

It was not until the end of 1923, says Mr. Stevenson, that the company got any relief by way of increases in rates of fare to compensate for this increased expense. Indeed, as to the Rapid Railway, one of the company's principal properties, the new rate had not become effective on March 18 this year. From experience to date, as to passenger traffic carried and revenues received therefor, the indication is that the increase in the passenger revenue from the increased rate of fare will amount to about $600,000, more than double the amount of the profits that are being realized on the city purchase contract.

In addition the company has formulated plans to alter, in some important respects, its present method of operation and confidently expects that this change will save the company from $300,000 to $500,000 a year. It will take from three to six months to give effect to these plans.

Mr. Stevenson says that he does not, in any way, wish to minimize the effects of bus competition, but with an experience now extending over nearly two years in dealing with this competition, he feels that it is not going to defeat the expectations of the company of profitable operation of its properties.

IMPORTANT FREIGHT PLANS UNDER WAY

The statement is made that the company has under consideration the development, principally by the construction of some new connecting lines, of another source of revenue that promises to be almost, if not quite, as important as the passenger revenue. The reference is to revenue from express and freight, the increased profits from which will, Mr. Stevenson believes, more than offset any reduction in passenger revenue due to bus competition. During the year 1923 the revenues of the company from this source amounted to $1,548,388. When certain financing, referred to in detail in the report, has been completed, the company will have available about $2,500,000 to provide for needed extensions—filling in gaps. Mr. Stevenson is confident that the revenue from freight and express traffic will be doubled within a year. He says that the study and formulation of the plans in this connection have consumed much time, but that they are now well matured and ready to be carried forward to execution. Limitations of space prescribed by the annual report prevented him from telling the story in detail.

TRACK MILEAGE OF DETROIT UNITED RAILWAY DEC. 31, 1923

	1923	1922	Increase
Detroit United Railway	264.3645	260.2763	4.0882
Rapid Railway System	142.8816	142.8375	0.0441
Detroit, Monroe & Toledo Short Line Railway	84.8458	84.0946	0.7512
Detroit, Jackson & Chicago Railway	111.6987	111.6782	0.0205
Total	603.7906	598.8866	4.9040

PASSENGER STATISTICS OF DETROIT UNITED RAILWAY, YEAR 1923

Revenue passengers carried	53,671,114
Free transfers	3,895,242
Employees	930,785
Total	58,497,141
Receipts per revenue passenger	13.52 cents
Receipts per total passenger	12.41 cents

MILEAGE STATISTICS OF DETROIT UNITED RAILWAY, YEAR 1923

Revenue car mileage	18,999,260
Earnings per car-mile	46.65 cents
Expenses per car-mile	38.12 cents
Net earnings per car-mile	8.53 cents

$105,000 Offered for Charleston-Isle of Palms Property

Peronneau R. Rivers, special master for the Charleston-Isle of Palms Traction Company, Charleston, S. C., recently offered the property at public auction. Confirmation of the sale appears to depend on purchase by the ferry commission of the two old steamboats and two wharves and the bridge connecting Mount Pleasant with Sullivan's Island.

J. D. Ernest Meyer offered $15,000 for the purely railway property. As chairman for the ferry commission, John P. DeVeaux offered $105,000 for parcel No. 1, two steamboats, two wharves and a bridge, provided the commission is declared to have authority for proceeding.

Arthur R. Young, offered $20,000 for parcel No. 2, the electric railroad and its appurtenances, provided the ferry commission purchase parcel No. 1. Mr. Young also offered $23,000 for parcel No. 3, the lighting plant, provided the ferry commission purchase parcel No. 1. Mr. Young, again acting for others, offered $2,000 for some real estate holdings.

The Charleston-Isle of Palms Traction Company has not been operating since the Sheriff of Charleston County took custody of the ferry boats because of non-payment of a verdict for damages.

The pavilion and some other properties at the Isle of Palms, the terminus of the electric railway, are not owned by the traction company.

It has been reported for some time that the Cooper River Ferry Commission was planning to make a bid for the two boats, and for the wharves and bridge. Meanwhile, the constitutionality of the act creating the commission is before the courts.

1924 Quarter of New York State Line Shows Improved Net

Increased profits for the quarter ended March 31, 1924, compared with the same period a year ago are shown in the official report of the New York State Railways, Syracuse, N. Y. A net income of $331,735 is shown, after interest, rents and other charges had been deducted. This is equivalent after the payment of preferred dividends to $1.42 a share on the $19,952,400 common stock outstanding. The net income figure for the same quarter a year ago was $274,302, or $1.13 a share on common stock. Operating revenues were $2,993,567 for the March, 1924, quarter. The operating expenses for the first quarter of the present year were $2,053,467. Lower taxes and lower non-operating income debit are factors in the increased net income.

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Augusta Railway's Note Extension Requested

The Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., through President Brown, has requested an extension of notes in a letter to the holders of the 5 per cent bonds and the 5 per cent notes, due June 1, 1924. He states that payment of interest on bonds can now be resumed provided the payment on notes is extended, into which the coupons were funded. He reminds the holders that five years ago and again two years ago they were requested to defer interest on their bonds by funding the coupons into an interest bearing note maturing this June. Holders of nearly 94 per cent of the bonds outstanding in the hands of the public agreed to this request. By their action he said the corporation had been brought through the difficult years following the war without receivership, and that out of the earnings the bank loans of $160,000 had been liquidated, and cash had been provided for necessary capital expenditures aggregating $540,000 for the five years.

He said though that some $722,000 of the notes were still outstanding. As a consideration for the extension it was proposed to pay interest on these notes at the rate of 6 per cent per annum instead of 5 per cent per annum as before. The extension is to be until Dec. 1, 1935, when the bonds fall due. He said that both securities could then be provided for by the same funding operation. Large bondholders had been consulted by the directors and had approved the extension, and agreed to co-operate in carrying the plan to completion. He said further that when sufficient notes had been deposited the extension would be declared effective, and there would be issued, instead of the deposited notes, bonds dated June 1, 1924, and maturing Dec. 1, 1935, carrying 6 per cent interest payable semi-annually and callable at any time at par and interest and secured by deposit of funded coupons.

Offer Made for American Electric Power Properties

The American Gas & Electric Company and the Appalachian Power Company are seeking control of the American Electric Power Company. Van Horn Ely, president of the American Electric Power Company, announced on May 29 that a contract had been signed whereby the two companies named have agreed to buy the common shares of that company at $62.50 a share.

The agreement provides that the contract will be binding if within fifteen days certain representations by the vendors are verified to the satisfaction of the purchasers, and also that not less than 75 per cent of the 189.200 shares of outstanding common stock of American Electric Power is deposited for delivery to the purchasers against payment. It is further said that a separate company may eventually acquire the electric railway lines of the American Electric Power Company.

The American Electric Power Company succeeded the American Railways Company, which was incorporated in New Jersey in 1900, representing a consolidation of the old American Railways Company and the United States Electric Railway & Light Company. It has an authorized capital of $17,000,000 common stock and $8,000,000 preferred.

Lake Shore Electric Railway Has Surplus

A surplus of $172,461 in 1923 was realized by the Lake Shore Electric Railway System, Cleveland, Ohio. In 1922 the surplus was $175,053. These facts are contained in the twenty-third annual report. The system comprises the Lake Shore Electric Railway, the Lorain Street Railroad, the Sandusky, Fremont & Southern Railway, the People's Light & Power Company and the Bellevue Illuminating & Power Company. By far the biggest part of the system is the Lake Shore Electric Railway, which alone spent $155,709 for additions and improvements chargeable to capital account. The first consolidated 6 per cent bonds of this company, $1,600,000 par value, matured on Jan. 1, 1923, and were extended for ten years at 6 per cent.

STATEMENT OF EARNINGS OF LAKE SHORE ELECTRIC RAILWAY ALONE

	1923	1922
Gross earnings	$2,235,662	$2,064,608
Operating and taxes	1,709,889	1,548,530
Net earnings	$525,772	$516,078
L. & C., T. F. & N. and 1st cons. interest	205,975	191,475
	$319,797	$324,603
All other interest	135,024	136,468
Surplus	$184,773	$188,134
Per cent of operation	76.48	75.05
Car-miles	4,055,508	3,770,237
Income per car-mile	55.12c	54.76c
Operating and taxes per car-mile	42.16c	41.07c
Net earnings per car-mile	12.96c	13.69c
Passengers carried	6,967,058	6,963,861
Earnings per passenger	22.03c	21.64c

Of the total gross earnings of $2,235,663 in 1923 the Cleveland division contributed $1,102,383, the Toledo division $916,885, the Sandusky-Norwalk division $55,989 and the city lines $160,406. Total passenger revenue for the year was $1,521,283 against $1,493,255 for the year previous. The biggest item included in operating expenses was for transportation, which amounted to $542,677, an increase of $68,308 over transportation expenses in 1922.

An evidence of the company's growth in business is seen in the comparative statement of gross earnings from 1902 to 1923. In 1902 the gross earnings were $466,051 and have been steadily increasing in practically every year up to 1923, when they were $2,235,663. It is to be noted that the banner year was 1920, when the gross earnings totaled $2,699,342.

The Lorain Street Railroad, a subsidiary of the Lake Shore Electric Railway System, carried 3,676,080 passengers in 1923, against 2.899,331 in 1922. The company finished the year, however, with a deficit of $33,441. The deficit the year before was $33.958.

The Sandusky, Fremont & Southern Railway carried 293.500 passengers in 1923 against 299,551 in 1922. Operation on that property resulted in a deficit in 1923 of $25,609 against $19,338 in 1922.

$400,000 of Notes Sold Direct in Four and a Half Days

The Galveston-Houston Electric Company, Houston, Tex., recently sold, locally, $400,000 of 7 per cent bond secured notes, as a means toward improving public relations and at the same time raising money to expand the street railway system in Houston. The improvements to be made are in accordance with a recent agreement between the city and the company, under which jitneys were eliminated, and certain improvements are to be made in the railway system.

The notes were issued in $100, $500 and $1,000 denominations. They were sold at par and accrued interest, either for cash or on the partial payment plan.

The partial payment plan was open to the public as well as to employees, but different methods were used in handling the accounts. The public was allowed to make ten monthly payments, the first to be paid when the notes were ordered. They were also allowed interest at the rate of 6 per cent until the principal had been paid in full, and 4 per cent if the order is concelled before making final payment. Employees were allowed to make twenty semi-monthly payments with installments deducted from the payroll checks and an allowance of interest at 7 per cent until final payment. Even if the employees subscription is cancelled before final payment is made by him he is allowed 7 per cent interest.

On the first day of the sale, meetings of all employees were held, the issue explained in detail, orders taken from members of the company, and all were urged to assist in promoting the sale of the notes. The trainmen were very active in talking to friends and passengers and other employees to people with whom they came in contact. In this manner, the names and addresses of prospective buyers were obtained, turned in to the office and some one sent to see each individual. When possible the person securing the prospective customer was allowed to complete the sale if possible. This method served a double purpose, that of stimulating the interest of the employee in the affairs of the company and also affording a quick follow-up system.

Advertising of the note sale was done by the company and a few of the local brokers. Company advertising was carried out by mailing circulars to 20,000 telephone users, stating the purpose of the issue and showing the financial status of the company, and by means of newspaper ads and news items, car ads—both dash signs and cards on inside of cars—and handbills distributed on the cars. In addition to this advertising, several local brokers ran notices of the sale in their regular advertising space.

The entire issue was sold in four and one-half selling days. Statistics showing the distribution of notes sold follow:

	Number	Amount
Public bought for cash	248	$333,400
Public bought on partial payment	118	7,000
Employees bought for cash	30	12,500
Employees bought on partial payment	450	71,700
Total	846	$424,600

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New York & Harlem Has Deficit in First 1924 Quarter

It was brought out at the annual meeting of the New York & Harlem Railroad, New York, N. Y., that for the first quarter of 1924 the operation of the surface lines had produced a deficit of $7,169. In 1923 the deficit was $71,931. The total deficit since the return of the lines to their owners by the New York Railways on Feb. 1, 1920, is $311,769.

An agreement was reached with the receiver for the New York Railways entitling the company to have thirteen cars additional to 156 delivered to it on Feb. 1, 1920, besides additional material.

The claims of the company against the New York Railways aggregating more than $1,300,000 are on file with the receiver, but it is considered unlikely that any funds will be available from the sale of the New York Railway's property for distribution to general creditors. The reorganization plan of the New York Railways approved recently by the court does not contemplate the inclusion of the Harlem lines, but it is stated that securities of the new company may be reserved for such acquisition later.

The company owes the city special franchise taxes from 1920 to 1923 inclusive, amounting to $235,017. The company has paid $225,244 taxes accrued prior to Feb. 1, 1920, and left unpaid by the lessee, and $137,059 in taxes subsequent to that date. It has borrowed and now owes $912,000. Including that item total current liabilities on March 31 last were $1,936,597, against total current assets on that date of $668,326.

Winona Interurban Sold to Bondholder

The Winona Interurban Railway, extending a distance of 70 miles between Goshen and Peru, Ind., was sold on May 29 at a receiver's sale in Elkhart, Ind. James P. Goodrich, former Governor of Indiana, who held about 95 per cent of the outstanding bonds, was the only bidder. The property will be taken over immediately by the Winona Service Company, organized by Mr. Goodrich, his son Pierre and Samuel J. Mantel, a law clerk. The company is incorporated with 10,000 shares of no par value stock. As indicated previously in the ELECTRIC RAILWAY JOURNAL it is proposed to tie in the road with the lines of the Interstate Public Service Company for through operation of trains from Louisville through Indianapolis to South Bend and Chicago.

Net Income of Detroit Street Railways Increases in April

For the thirty days ended April 30, 1924, the City of Detroit, Department of Street Railways, reports a total revenue from transportation of $1,918,766, against $1,693,924 for the similar period in 1923. The total operating revenue, including that derived from the transportation, rent of track and other miscellaneous sources, was $1,961,012 in April, 1924, and $1,794,327 in April, 1923. Expenses for the month of April showed an increase, being $1,299,077 in 1923 and $1,388,299 in 1924. The net revenue was $572,713 in April, 1924, against $495,250 in April, 1923. The net income increased from $80,978 in April, 1923, to $99,969 in April, 1924. The number of passengers carried in April of this year was 41,228,817, while in April a year ago 41,685,537 passengers were carried.

Declares Lines Unprofitable. — In a statement before the Public Utilities Commission of Maine M. A. Williams, manager of the Portland Railroad, Portland, Me., operated under lease by the Cumberland County Power & Light Company, asserted that the Old Orchard and Saco lines were unprofitable and should be abandoned. At the same time the commission heard the petition of the Checker Cab Company for a bus license to operate to Old Orchard.

Rehabilitated Road Doing Well.—At a meeting of the directors of the New Haven & Shore Line Railway held in New Haven recently, the treasurer's reports showed the financial condition of the road to be very satisfactory. The committee which was appointed to investigate for the spur track into Hammonassett Park appeared before the Public Utilities Commission recently in Hartford. The commission has changed the original layout and after the park commission approves of this arrangement the work of tracking will begin at once. The company has been operating since July 17, 1923, the rehabilitated portion of the Shore Line Electric Railway from New Haven to Madison, Guilford and Saybrook.

Public Benefits $6,343,000.—The total tax bill of the Chicago Surface Lines, Chicago, Ill., this year, including the city's 55 per cent of the net receipts, amounts to nearly $5,000,000, according to an announcement made by G. A. Richardson, vice-president of the lines. Other public benefits, such as street paving, maintenance and cleaning of pavement, bring the total up to more than $6,343,000 for the year ended Jan. 31, last.

Tax Arrears Met.—The Public Service Railway's tax arrears for Newark, N. J., for 1917 and 1918 were cleared up recently by the payment of $190,558. The check represented a personal property tax of $158,182 and interest of $37,376, figured at a compromise rate of 4½ per cent.

Accumulated Surplus $16,938.—The Petaluma & Santa Rosa Railroad, operating from Petaluma, Sebastapol, Santa Rosa, Forestville, reports to the California Railroad Commission for the year 1923 that its operating revenue was $593,865, and operating expenses $440,885, giving a net operating revenue of $152,980. Interest, rent, taxes and other deductions totaled $103,365. The net corporate income for the year was $87,719. The surplus at the beginning of the year amounted to $8,224. Miscellaneous additions to surplus for 1923 amounted to $10,496 and miscellaneous deductions were $55,884. The company declared dividends of $33,616 during the year, leaving an accumulated surplus at the end of the year of $16,938.

Short Brooklyn Line Discontinued.—The old Montague Street surface line in Brooklyn has been discontinued under an order signed by Federal Judge Julius M. Mayer. Representations were made to the court that this line carried only about 150 passengers a day and was being operated at a loss of about $6,000 a year. The line runs from Court and Montague Streets to the old Montague Street ferry, a distance of about one-third of a mile. It is the last line operated by the Brooklyn Heights Railroad and virtually ends the receivership, which, however, will be continued until after proper legal proceedings have been carried out for its discharge.

Seeks Abandonment Permission.—Application has been made by the Peekskill Lighting & Railroad Company for approval by the Public Service Commission of its plan to abandon part of the railway system beginning on East Main Street in Peekskill, N. Y., and terminating at the end of the road on Five-Mile Turnpike, in Yorktown. The petition sets forth that the village of Peekskill desires to improve East Main Street. The improvement would cost $17,250, it is estimated, and the railway asserts that the travel on the line does not warrant the expenditure.

Piedmont Power & Light Absorbed.—The North Carolina Public Service Company, Inc., Greensboro, N. C., one of the subsidiaries of General Gas & Electric Corporation, has purchased outright all the property of the Piedmont Power & Light Company, operating in Gibsonville, Elon College, Burlington, Graham, Haw River, Relbano and adjacent territory. In February, 1924, the General Gas & Electric Corporation purchased the North Carolina Public Service Company. This was the first entry into North Carolina of the General Gas & Electric Corporation.

Will Vote on Sale.—The stockholders of the Jackson Railway & Light Company, Jackson, Tenn., will vote on June 23 on authorizing the sale of all the assets, properties and franchises of the company.

City Joins in Valuation Work.—The city of Fort Smith has decided to join the Fort Smith Light & Traction Company, Fort Smith, Ark., in making a valuation of all the properties in the city, including traction lines, electric and gas distribution, preliminary to possible rate changes. Burns & McDonnell, consulting engineers of Kansas City, have been employed by the city to work with the valuation engineers of the company in making a complete inventory of all the physical properties.

Defunct Line Bought.—The Pennsylvania & Ohio Traction Company, which ceased operation this winter, has been sold to Jacob Levine & Sons Company, junk dealers of Newcastle, Pa. The purchase price was $46,115. The company owned and operated the trolley line between Connaught and Jefferson, through Ashtabula. The sale included all of the personal property, including practically all the equipment. When the commission authorized discontinuance on the line this past winter it found that for the past five years the company had had a loss of more than $100 a day.

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Legal Notes

DISTRICT OF COLUMBIA — *Automobile Driver May Assume Car Will Stop at Regular Stopping Place Where Passengers Are Waiting.*

The driver of an automobile saw a car approaching but expected it would stop at the regular stopping point, where passengers were waiting. The motorman did not do so, whether he was behind time or the car was fully loaded does not matter. He should have kept his car under control in such circumstances and the company was held responsible for the resulting collision. [George vs. Capital Traction Co., 295 Federal Rep., 965.]

FEDERAL COURTS — *Railroad Not Obligated to Pay Wages Under "National Agreement," as Modified by Labor Board.*

The "national agreement" between the railroads and their employees as to wages, etc., and the modifications thereof by the Railroad Labor Board, when accepted by a railroad, cre an implied contract to pay its employees accordingly. But as there is no agreement to continue these payments for any specified time, when the railroad reduced the wages. and these wages were accepted by individual employees, there was no contract or legal obligation on the company to pay higher wages. [Pennsylvania R.R. Federation No. 90, v. Pennsylvania R.R., 296 Federal Rep., 220.]

INDIANA—*Duty of Traveler at a Railway Crossing.*

The track at a railroad crossing is a warning of danger, whether the cars are operated by electricity or steam. One crossing such a track must use his eyes and ears, he must stop within a place of safety if a train is approaching and he must exercise ordinary care. [Guion vs. Terre Haute, Indianapolis & Eastern Traction Co., 143 N. E. Rep., 20.]

IOWA—*Damages Caused by Negligence Separable from Damages Non-Recoverable.*

Where an automobile, through the negligence of the driver, came into collison with a street car, the automobile owner could recover for damage caused by the motorman's negligence in backing his car after the collision, provided he could separate the amount of damages so sustained from the damages caused by the collision. [Tesdell vs. Des Moines City Railway, 197 N. W. Rep., 629.]

NEW JERSEY—*Utilities Board May Enjoin Unlawful Operation of Jitney.*

Where a state act requires the approval of the utilities board for the operation of a bus line, which is parallel to a railway line, the order of the board to the jitney line to cease operation is enforcible. The board may choose its remedy in law or equity, whichever may more speedily and effectively produce relief. Consequently, it is entitled to an injunction. [Board of Public Utility Commissioners vs. Sheldon et al, 124 Atlantic Rep., 65.]

NEW JERSEY—*Company Liable to Passenger Injured When Ejecting Fellow Passenger at Conductor's Request.*

A conductor called upon a passenger to aid him in ejecting a negro passenger, but after the latter drew a knife, the conductor withdrew from the attempt, and the assisting passenger was injured. The company was held liable. [Frazier vs. Public Service Railway, 123 Atlantic Rep., 867.]

NEW YORK—*City Track Employee May Be Engaged in Interstate Commerce.*

An employee was injured while putting in and tightening up bolts on a section of city track. The railway company sells through tickets good over its lines to Queenston, Canada, and it is possible for a passenger with one of these tickets to transfer to the city line on which the employee was injured. The Appellate Division held the employee was engaged in interstate commerce. [Borelli vs. International Railway, 203 New York Sup., 704.]

NEW YORK — *Determination of Status as Passenger of Person Assaulted.*

Where a motorman assaulted a person who had placed his foot on the first step of the car and was about to board it, the Appellate Division held that the jury should decide whether the plaintiff was a passenger. [Supple vs. International Railway, 203 New York Sup., 749.]

NEW YORK — *Action Where Engineer Refused to Give a Contractor a Certificate of Satisfaction with Work Performed.*

This case related to construction on a street railway, on which about $30,000 was paid upon progress certificates and $16,000, the balance on the contract, was refused. The Appellate Division held that in a contract requiring the work to be done to the satisfaction of the company's engineer and the work has been done substantially as required, a cause of action will lie, notwithstanding the refusal of the engineer to issue a certificate. On the other hand, the engineer's failure to object to work while it was being performed is no excuse for defective performance. [Hevenor vs. Union Railway, 204 New York Sup., 40.]

OHIO—*Assessment of Street Railway Franchise for Sewer Held Unauthorized.*

The section of the general code authorizing municipalities to levy assessments upon "specially benefited lots and lands" to pay a portion of the cost of public improvements therein named, does not authorize an assessment to pay a portion of the cost of a storm sewer to be levied upon the franchise of an electric railway occupying a portion of the streets. The railway does not have the exclusive use of the streets but uses it only in common with the public for the purposes of travel and in company with other public utilities. The rails, ties, poles, etc., do not constitute "lots or lands" within the meaning of the section. [Ohio Electric Railway vs. City of Greenville, 143 N. E. Rep., 193.]

OHIO—*Punitive Damages Not Collectible for Assault Unless Company Was Negligent in Employing or Retaining Servant.*

In an action for personal injury for an assault upon a passenger by the employee of an electric railway, punitive damages cannot be recovered against the corporation in the absence of evidence that the assault was authorized, participated in, or ratified by the corporation, or that the corporation had failed to exercise due and reasonable care in selecting or retaining its employee. [Columbus Railway Power & Light Co. vs. Harrison, 143 N. E. Rep., 32.]

PENNSYLVANIA — *Liability to Passengers Struck by Automobile When Entering or Leaving Car.*

A street railway company is not liable for the conduct of third persons who negligently injure intending passengers standing on the highway. Hence, it is not liable when such passengers are run down by an automobile in violation of law forbidding the passing of a standing car by an automobile except under special circumstances, though if the railway contributed to the accident by a very dazzling headlight or in other ways, it would be liable. [Klingensmith vs. West Penn Railways, 123 Atlantic Rep., 787.]

WEST VIRGINIA—*Failure of Motorman to Sound Warning Signal Immaterial if Driver Knew Car Was Approaching.*

An electric locomotive was waiting at a corner on a siding and a trolley car approached to pass it. As the trolley car entered the siding, the locomotive started without warning signal and struck an automobile passing from a cross street over the track. The court held that negligence of the company in this case could not be predicated on a failure of the locomotive motorman to give a warning signal if the person injured had knowledge of the approach of the locomotive in sufficient time to avoid injury. A judgment for the plaintiff was reversed and a new trial ordered. [Blackwood vs. Monongahela Valley Traction Co., 132 S. E. Rep., 359.]

WISCONSIN—*Railroad Commission May Take Paving Charges Into Consideration When Ordering Extension.*

Under the Wisconsin law the Railroad Commission has power to require a street railway to extend its line where public convenience and necessity require the extension and the construction and operation of the line will not impair the earnings of the railroad, so as to prevent an adequate or fair return. But where the city's demand that the company pay the cost of constructing the paving within the track zone on such extensions would affect the opportunity for the fair return, the commission should take this into consideration. [Madison Railways vs. Railroad Commission of Wisconsin, 198 N. W. Rep., 278.]

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Personal Items

E. L. Graumlich Acting Commissioner in Toledo

E. L. Graumlich, engineering and operating assistant to Street Railway Commissioner W. E. Cann at Toledo, Ohio, was named by Mayor Brough and the Board of Control of Street Railways at Toledo as acting commissioner, effective June 1.

Mr. Graumlich went to Toledo at the time the Milner ordinance became effective two years ago and has had charge of both engineering and operating details in the commissioner's office. Many of the rerouting plans and schedule changes which have been put into effect were worked out by Mr. Graumlich.

Before that he was in the office of Fielder Sanders, street railway commissioner at Cleveland, Ohio. He entered the office of the commissioner there in 1917, first working on engineering projects. He was in the Coast Artillery Corps in the World War. After the war he was associated with rapid transit studies in Cleveland and with the commissioner there in charge of schedules and routes. His experience of nearly seven years has been entirely devoted to the commissioner's end of service-at-cost operation.

Mr. Graumlich is thirty-two years old. He is a graduate of the Case School of Applied Science at Cleveland.

Hugh Gordon, attorney for the California Railroad Commission for the last four and a half years, has tendered his resignation effective July 1. He will return to Los Angeles to resume the private practice of law. Prior to becoming attorney for the commission Mr. Gordon was assistant county counsel of Los Angeles County.

G. C. Estill, superintendent of way and structures of the New Orleans Public Service, Inc., has resigned to accept the position of vice-president and general manager of the new property of the Electric Bond & Share Company of New York at Miami, Fla.

Carl I. Wheat will succeed Hugh Gordon as attorney for the California Railroad Commission. Mr. Wheat has been assistant attorney for the past two years. Prior to becoming associated with the commission he was connected with a law firm in Los Angeles.

Ross Luellan has been appointed division freight and passenger agent for all the lines of the Union Traction Company from Anderson to Wabash and from Anderson to Muncie, Union City, Portland, Bluffton and New Castle. Mr. Luellan was formerly safety engineer at Anderson, Ind. In his new capacity he succeeds A. J. Hewitt, who was transferred to Indianapolis and will be division, passenger and freight agent for the Indianapolis territory.

Charles F. Lederer has resigned as general supervisor of rail welding of the Metal & Thermit Corporation, New York, to return as superintendent of way to the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., with which he was associated prior to joining the rail welding staff of the Metal & Thermit Corporation.

Daniel W. Snyder Appointed Vice-President of Illinois Traction

Daniel W. Snyder, Jr., who has been general manager of the properties of the Illinois Power & Light Corporation, Bloomington, Ill., since 1916, has been promoted to vice-president and a director of the Illinois Traction System, with headquarters at Springfield, Ill. The appointment became effective June 1. Mr. Snyder has full charge of operations of the interurban system with 550 miles of track operated from Peoria, Springfield, Danville, Decatur and Bloomington to St. Louis, Mo. His jurisdiction also includes the Illinois Valley division of the system operated between Ottawa and Streator and Joliet and Princeton, Ill.

D. W. Snyder, Jr.

C. F. Handshy, for many years manager of the interurban lines of the Illinois Traction System with offices at Springfield, Ill., will continue in that capacity. F. E. Fisher, Joliet, Ill., will continue as manager of the Illinois Valley division of the road.

The selection of Mr. Snyder as one of the leading operating heads of the Illinois Traction System is in line with the policy of the company to choose men from its own ranks for the positions higher up as soon as they are qualified to hold them. He is a young man, but has already had a wide experience in the public utility field in the management of railway, power, light and gas properties.

His first position in railway work was as superintendent of the Northampton Traction Company, Easton. Pa. Later he became general manager of the Clifton Gas & Electric Company, Clinton, Ill. In 1914 he accepted the position of general superintendent of the Jefferson City Light, Heat & Power Company and Jefferson City Bridge & Transit Company at Jefferson City, Mo.

Mr. Snyder became general manager of the Bloomington properties in 1916 which are now a part of the network of utilities operated by the Illinois Power & Light Corporation in five states of the Central West. In 1923 he was president of the Illinois State Electric Association.

E. O. Brown Made Manager at Bloomington

Edwin O. Brown, manager of the properties of the Illinois Power & Light Corporation at Galva, Ill., will succeed D. W. Snyder, Jr., as manager of that company at Bloomington, Ill.

Mr. Brown is well known in electrical activities in central Illinois. He is the son of E. L. Brown, Elmwood, Ill., a pioneer in the building of electric plants in the state. Mr. Brown entered the electric lighting business with his father at Elmwood.

In 1913 Mr. Brown and his father and those associated with them sold out their interests at Elmwood to the Hodenpyl-Hardy interests and went to Galva, Ill., where they built a plant and took over the electrical properties at Cambridge, Altona, Oneida, Victoria and LaFayette. These properties they operated until 1917, when they were taken over by the McKinley interests and Edwin O. Brown was made manager of them. In 1923 they were taken over by the Illinois Power & Light Corporation and Mr. Brown was retained as manager.

"Bud" Brown, as Edwin Brown is known, was born at Elmwood on Sept. 3, 1883. He was graduated from the Elmwood High School in 1901 and studied engineering at the University of Illinois. He entered business with his father immediately upon leaving the university in 1902.

Elmer E. Barnard, engineer of way and structures of the Lynchburg Traction & Light Company, Lynchburg, Va., and the Roanoke Railway & Electric Company, Roanoke, Va., has been appointed to the State Board for the Examination and Certification of Professional Engineers, Architects and Land Surveyors by Governor Trinkle. Mr. Barnard will fill out the term of office of the late Maj. Peyton B. Winfree, which expires July 15, 1928.

Obituary

John Emory Meek, vice-president of Johns-Manville, Inc., New York City, died on May 24. During his active career he served seven years with the Pennsylvania Railroad at Altoona, Pa., later going to Denver, and remaining there for six years, the last three of which he was chief engineer of the power plant. He entered the employ of the H. W. Johns Company, New York City, in 1894, and went with the H. W. Johns-Manville Company on its organization in 1902. He formed the railroad and United States government departments of this company in 1906, and he'd the position of general manager until March, 1924, when he was promoted to vice-president.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Mr. Hoover Urges Coal Storage

Secretary of Commerce Makes Plea for Co-operation in Handling Traffic Similar to That in 1923

Coal is again causing government officials concern. It is not the conditions in the coal industry itself to which department heads are now paying special attention, but the apparent indifference of industry in general to the need for anticipating the writer's requirements sufficiently ahead of the fall traffic movement to avoid a possible car shortage. During 1923 the railways through the co-operation of the manufacturing and distributing trades and the coal operators and distributors were able to handle the national coal traffic in a most efficient manner without car shortages. This was accomplished to a considerable degree by co-operation among the trades for the purchase and storage of coal during the summer season. The great danger point of traffic congestion, of course, is the fall season when the combined crop, winter goods, and household coal movements have always, except through last year's co-operation, combined to create a car shortage.

The fall car shortage always has the effect of increasing the price of coal and of seriously disturbing the whole economic machine. In this connection Herbert Hoover, Secretary of Commerce, points out that security lies in repeating the storage performance of last year, by the manufacturers of the country taking reserves of coal during the months of May, June and July, thus foregoing the necessity of coal shipments during the peak period in competition with the household movement. Outside of strike years, these summer months are universally the period in which lowest bituminous coal prices prevail.

Mr. Hoover has pointed out publicly that the country has a national problem before it in the matter of securing cheaper coal by maintaining more regularity in the production of coal mines through planning out its seasonal fluctuations. He says that this can only be brought about if the consumers are willing to store coal during the low production season.

These considerations Mr. Hoover has reiterated in a letter to the Secretary of the American Electric Railway Association in which he says there is, therefore, every transportation and financial reason for storing coal during the next few months in preparation for the autumn need. He considers it would be a contribution not only in the interest of the consumer but of the railways and the coal industry if the same successful results could be produced this year that the American Electric Railway Association so materially assisted in bringing about last year.

The association in turn is seeking to bring these matters to the attention of the large coal consumers from the point of view of their personal interest as well as a contribution to the mutual good of American business.

Soft Coal Production Lags

The average daily rate of soft coal production has remained for the last several weeks close to the lowest level touched during the entire period for which records exist, excepting only the period during the strikes of 1919 and 1922. Production of bituminous coal for the first 124 working days of the present year was 190,473,000 tons. For the same period during 1923 it was 218,591,000 tons.

There is some evidence that the rate of coal consumption is now somewhat lower than it was in the last quarter of the last year, when coal was being burned and exported at a rate of 10,200,000 tons a week. It is not probable, however, that it has fallen to so low a level as has production, which was only 7,155,000 tons for the week ended May 24. This was 35 per cent below the corresponding week a year ago. It follows, therefore, that consumers must be drawing quite heavily upon their stocks and stores.

General Electric Bookings Hold Up Well

Bookings of the General Electric Company, Schenectady, N. Y., during April and May have been at the rate of approximately $5,500,000 a week. New orders for the second quarter are expected to about equal those of the first, when new business taken on totaled $73,487,903, or about 5,650,000 a week. Bookings for the first six months of this year are expected to reach approximately $145,000,000, or at an annual rate of $290,000,000, which would compare with $304,199,746 actually booked in 1923 and $200,194,294 in 1922.

The company entered 1924 with $87,112,000 of unfilled orders. By June 30, if bookings for the six months reach $145,000,000, orders in the company's hands since Jan. 1, upon which it could work, would be $232,112,000.

Railway Bus Market Strong

B. A. Hegemen, Jr., president National Railway Appliance Company, New York, which is the Eastern selling agent for the Yellow Coach Manufacturing Company and sells buses exclusively to railways and railroads or to strictly non-competitive independent operators, reports that the demand for buses is very active. Mr. Hegemen states that there is a market for more buses than he can supply and hat sales in this department of the Appliance company would be much larger if more buses were available.

Trade Statistics Discussed

A conference was recently held in Washington, D. C., between the new Attorney-General of the United States

ELECTRIC RAILWAY MATERIAL PRICES—JUNE 3, 1924

Metals—New York

Copper, electrolytic, cents per lb.	12.75
Lead, cents per lb.	7.00
Nickel, cents per lb.	27.00
Zinc, cents per lb.	5.725
Tin, Straits, cents per lb.	40.875
Aluminum, 98 to 99 per cent, cents per lb.	27.50
Babbitt metal, warehouse, cents per lb.:	
Fair grade	60.00
Commercial	28.00

Bituminous Coal

Smokeless mine run, f.o.b vessel, Hampton Roads	$4.45
Somerset mine run, Boston	2.25
Pittsburgh mine run, Pittsburgh	1.875
Franklin, Ill., screenings, Chicago	2.175
Central, Ill., screenings, Chicago	1.90
Kansas screenings, Kansas City	2.50

Track Materials—Pittsburgh

Standard Bessemer steel rails, gross ton	$43.00
Standard open hearth rails, gross ton	43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	2.95
Tie plates (flat type), cents per lb.	2.52
Angle bars, cents per lb.	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.00
Steel bars, cents per lb.	2.20
Ties, white oak, Chicago, 6 in. x 8 in. x 8½ ft.	$1.70

Hardware—Pittsburgh

Wire nails, base per keg	2.90
Sheet iron (28 gage), cents per lb.	3.60
Sheet iron, galvanized (28 gage), cents per lb.	4.80
Galvanized barbed wire, cents per lb.	3.70
Galvanized wire, ordinary, cents per lb.	2.65

Waste—New York

Waste, wool, cents per lb.	15
Waste, cotton (100 lb. bale), cents per lb.:	
White	12–18
Colored	9–14

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), per gal.	$0.97
White lead (100 lb. keg), cents per lb.	12.25
Turpentine (bbl. lots), per gal.	$0.84
Car window glass (single strength), first three brackets, A quality, discount*	84.0%
Car window glass (single strength), first three brackets, B quality, discount*	86.0%
Car window glass (double strength) all sizes, A quality, discount*	85.0%
Putty, 100 lb. tins, cents per lb.	4–6

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Copper wire base, cents per lb.	15.25
Rubber-covered wire, No. 14, per 1,000 ft.	$6.35
Weatherproof wire base, cents per lb.	17.25

Paving Materials

Paving stone, granite, 4x8x4, f.o.b. Chicago, dressed, per sq.yd.	$3.60
Common, per sq.yd.	2.95
Wood block paving 3½, 16 treatment, N. Y., per sq.yd.	2.56
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots	53–54
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.85
Cement, Chicago consumers' net prices, without bags	2.20
Gravel, ¾-in., cu.yd., f.o.b. N. Y.	1.75
Sand, cu.yd., N. Y.	1.00

Old Metals—New York and Chicago

Heavy copper, cents per lb.	10.25
Light copper, cents per lb.	8.50
Heavy brass, cents per lb.	6.00
Zinc, old scrap, cents per lb.	3.75
Yellow brass, cents per lb. (heavy)	6.00
Lead, cents per lb. (heavy)	5.625
Steel car axles, Chicago, net ton	$16.25
Cast iron car wheels, Chicago, gross ton	16.25
Rails (short), Chicago, gross ton	16.75
Rails, (relaying), Chicago, gross ton	26.50
Machine turnings, Chicago, gross ton	7.25

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and lawyers interested in trade association activities. The Attorney-General gave no indication concerning any conclusions he may have formed on the subject of trade statistics and association activities, but intimated that he will make a careful study of this matter. It is planned to hold other conferences for the discussion of this subject.

Rolling Stock

Arkansas Central Power Company, Little Rock, Ark., has asked for bids on eight double-truck, double-end, lightweight city passenger cars. Specifications include four 35-hp. motors, total weight 30,000 lb. and seating capacity for forty-four passengers.

Pacific Electric Railway, Los Angeles, Cal., has specified the details for the 50 closed passenger cars and 5 electric locomotives recently ordered.

Date order was placed.....March 22
Builder of car body...J. G. Brill Company
Seating capacity 65
Total weight .....57,800 lb.
Bolster centers, length.....29 ft. 0 in.
Length over all .....52 ft. 2 in.
Truck wheelbase .....6 ft. 0 in.
Width over all .....9 ft. 1⅜ in.
Height, rail to trolley base...10 ft. 11½ in.
Body .....All-steel
Interior trim .....Cherry
Headlining .....Agasote
Roof .....Arch
Air brakes.....Westinghouse type SME
Armature bearings .....Friction
Axles..4½ in. diam. A. S. T. M. Spec. A19-21
Bumpers .....Channel iron
Car signal system .....Faraday
Car trimmings..O. M. Edwards and St. Louis
Center and side bearings.....St. Louis
Control..Westinghouse H. L. multiple unit
Couplers,
Westinghouse automatic air and electric
Curtain fixtures,
Curtain Supply Company ring type
Curtain material,
Pantasote color 86 pattern "J"
Destination signs .....Hunter illuminated
Door operating mechanism....Consolidated
Wheelguards .....Eclipse type F
Gears and pinions...Nuttall grade BP helical
Hand brakes .....Miner Ideal
Heater equipment.Consolidated truss plank
Headlights .....Crouse-Hinds type Z
Journal bearings .....Friction
Journal boxes.....Symington semi-steel
Lightning arresters .....Westinghouse
Motors,
4 Westinghouse No. 532, inside hung
Registers .....Ohmer
Sanders.....St. Louis, air operated
Sash fixtures .....O. M. Edwards
Seats .....Hale-Kilburn type 400-A
Seating material..Pantasote, Spanish finish
Slack adjuster .....Westinghouse
Springs ...Railway Steel Spring Company
Step treads .....Feralun
Trolley retrievers .....Ideal
Trolley base .....U. S. No. 13
Trolley wheels.....Kalamazoo No. 23
Trucks .....Commonwealth cast steel
Ventilators,
Automatic type ARDM Consolidated
Wheels .....24-in. Griffin F. C. S.

The details of the 5 electric locomotives follow:

Date of delivery....March and April, 1925
Builder of body...Pacific Electric Railway
Total weight .....127,000 lb.
Bolster centers, length .....17 ft. 8 in.
Length over all .....34 ft. 0 in.
Truck wheelbase .....7 ft. 4 in.
Width over all .....10 ft. 0 in.
Height, rail to trolley base....11 ft. 10½ in.
Body .....All-steel
Roof .....Arch
Air brakes.....Westinghouse, type EL 14
Armature bearings .....Friction
Axles.....Pollak A. S. T. M. Spec. A19-21
Bumpers .....Local castings C.I.
Center and side bearings.Local castings C.I.
Control.....General Electric type PCL
Couplers ....National Malleable Company
Gears and pinions.General Electric grade M.
Hand brakes .....Miner Ideal
Headlights .....Crouse-Hinds
Journal boxes.....Symington, semi-steel
Lightning arresters.....General Electric
Motors, type and number,
4 GE-251-A-205 hp., inside hung
Sanders...Local manufacture, air-operated
Springs ...Railway Steel Spring Company
Trolley base....Pacific Electric pneumatic
Trolley wheels.....Kalamazoo No. 23
Trucks .....Commonwealth cast steel
Ventilators .....Globe type
Wheels .....38½-in. steel tired

Track and Line

Washington Railway & Electric Company, Washington, D. C., during the present year will spend $400,000 on improvements in northeast Washington.

Portland Electric Power Company, Portland, Ore., is spending $15,000 in installing double cross-over tracks on Union Avenue and Holladay Avenue and at Grand Avenue and East Morrisson Street.

New Haven & Shore Line Railway, New Haven, Conn., has received permission to extend its iine in the town of Madison to Long Island Sound through property owned by the state at Hammonassett Beach.

British Columbia Electric Railway, Vancouver, B. C., has awarded the contract for a tunnel 3,561 ft. long from Alouette Lake to Stave Lake to O. Olson, Maple Valley, Wash., for $331,600.

Binghamton Railway, Binghamton, N. Y., plans new trackage extensions in Binghamton to Johnson City at a cost of more than $100,000.

Power Houses, Shops and Buildings

Albany, N. Y., is to have a central bus terminal with a central station for seventeen interurban systems opposite the Plaza on Broadway in the business center of the city. The expense of constructing a waiting station and its maintenance are to be borne jointly by the various bus companies.

Pacific Northwest Traction Company, Everett, Wash., is planning immediate improvements in Mount Vernon and Skagit County which will cost more than $250,000. The plans include the construction of a large new stage depot and garage, to cost $15,000. The depot will have a platform covering three-quarters of an acre, with an inclosed portion 30x70 ft., for the accommodation of interurban buses. Several new bridges, new rails and miscellaneous improvements are planned on the company's system in Skagit County.

Philadelphia Rapid Transit Company, Philadelphia, Pa., is having plans prepared for superstructure of carhouses at Twentieth and Johnstown Streets at a cost of $300,000.

New York, N. Y.—The Transit Commission recently opened bids for the furnishing and erecting of structural steel for the electrical repair shop in the Coney Island yard for the Brooklyn-Manhattan Transit system. Twelve bids were received, the lowest of which was that of J. P. Clarke of the Grand Central Terminal for $66,137.50.

Atlantic City & Shore Railroad Company, Atlantic City, N. J., is planning to build a substation in Atlantic City, to cost about $75,000. A similar station will be built at Hammonton.

Trade Notes

Lawrence I. Grinnell has resigned as manager of publicity of the Metal & Thermit Corporation, New York, and as associate editor of *Reactions*, published by the company. Mr. Grinnell is now connected with the real estate firm of Douglas L. Elliman & Company, New York City.

Cleaton Company, Montreal, Canada, eastern Canadian representatives of the Conveyors Corporation of America, Chicago, has moved to its new office at 1070 Bleury Street, Montreal. The Cleaton organization handles the sale of American steam jet ash conveyors, American air-tight doors and other power plant specialties in Montreal and eastern Canada.

New York-Chicago.—The sales arrangements whereby the National Railway Appliance Company in New York and Holden & White, Inc., in Chicago, have acted as selling agents for the Drew Electric & Manufacturing Company, Cleveland, have been discontinued.

Economy Fuse & Manufacturing Company, Chicago, Ill., on June 1 removed its Chicago district sales office from 536 Transportation Building to larger quarters at 513 West Jackson Boulevard.

Paul J. Moore retired on June 1 as chief of the fire department at Newark, N. J., to become associated with the Foamite-Childs Corporation of Utica, N. Y., as a special representative of that concern's motor fire apparatus department. Chief Moore holds the distinction of having filled, by permanent appointment, every grade in the fire-fighting service. He will now be actively engaged in the educational work that the staff of the Foamite-Childs Corporation fire protection engineers are doing with the Foamite pumper as their latest development for modern fire fighting.

New Advertising Literature

Walter A. Zelnicker Supply Company, St. Louis, Mo., has issued bulletin No. 320, giving capacities and sizes of new oil storage tanks and tanks for use with air equipment.

Harris, Forbes & Company, New York, N. Y., have issued a booklet on public utilities. It traces the development of the public utility business in this country during the last forty years to its present position as the third largest industry in the United States from the point of view of invested capital.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued a comprehensive publication entitled "The Performance of Instrument Transformers." The new thirty-two-page book, which is known as Special Publication No. 1696, analyzes the factors underlying the performance of both current and voltage transformers and gives complete information for the successful application of these transformers to an electrical system.

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New York, June 14, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 63
Number 24

Transit Facilities Must Increase Faster than the Population They Serve

A POINT made frequently by the telephone companies to explain the high rates in large cities is that when the number of subscribers is increased the plant required to handle the business goes up much faster than in direct proportion. This is easy to prove, as each subscriber must be given a means of connection with every other subscriber.

In a way, the same reasoning applies to street railway and rapid transit lines. Where the population is small, and is located quite close to the business center, the rides are short and the number of lines required is low. As the city grows, the near-by areas are all taken up and the additional residents must live at a greater distance from the center. They spread over a greater area so that not only are they hauled a greater distance, but more lines must be provided proportionally to serve them adequately.

While the greater haul imposes a greater burden of time on the riders, it imposes a greater burden of cost on the railway. It is only by loading the cars more heavily and using all possible economies that the added burden can be carried without an increase in fares over what obtained in the past with shorter hauls and lower unit costs.

That the street railways have been able to do as well as they have in the past few years with post-war inflation, and in many cases vicious competition, is a tribute to the ability of their managements. But the demand for foresight and ability are almost insatiable, as the acuteness of the problems increases still more rapidly than the rapid growth of population. For this reason every street railway man needs to be alive to the idea of modernizing, and not be content even though he feels that he has done a good job with today's problem, as he will be presented with a harder one on the morrow—harder unless he looks ahead and plans his future facilities as do the telephone companies, which are constantly planning 20 years ahead.

Keeping the Purchasing Department "Next Door" to the Engineer

"WE ALWAYS have trouble to get just what we want through the purchasing department," said the engineer of a large railway the other day. "The purchasing agent is an inside man and the difference of a fraction of a cent in the prices of two articles almost always governs his selection. So we often have to take something nearly the same as what we ask for and a little cheaper."

"We never have any trouble of that kind," said the engineer of another company. "The purchasing department is located next door to my office. When I want something special I go in and talk to them about it and I usually get it the way I want it."

Is there not in this actual conversation something that is worth careful consideration? The engineer is the man who is fitted by education, training and experience to make the selection of the material of which the structure is to be built, be it a car, a building or a piece of track. He is the one upon whom rests the responsibility for the performance of the finished work. He should not, and ordinarily he does not, concern himself with the maker of the material. The purchasing agent is the man to consider manufacturers and prices. But the engineer has a real interest in the quality of the material to be used, and after he has drawn up his specifications the difference of a few cents in the cost should not prevail against his judgment as to the particular design. The most satisfactory results are likely to be attained when the engineer is given adequate authority in the selection of his material and the purchasing department co-operates with him to secure what he wants on the best possible terms.

Property Owners Want Assurance of Permanence and Responsibility

WHEN it comes to a question of establishing a permanent transportation system property owners seem to have greater faith in a railway than in a bus line. They like the bus and ride in it when it suits their convenience to do so. But in cases where transportation is a vital necessity, as between the home and the place of business, there is something substantial and confidence inspiring in the sight of rails in the street. They feel that once the rails have been laid the route is established and transportation is there to stay.

This feeling was well illustrated a short time ago when the property owners in the Morningside district of Atlanta, Ga., decided to construct a railway of their own to connect with the lines of the Georgia Railway & Power Company. Because it was apparent that in the beginning such a line would not be a paying proposition, the railway felt that it could not at present undertake to build or operate it. The suggestion was made that a bus line would adequately take care of the transportation needs of this district for several years to come. But the property owners declared that they would have no feeling of security with a bus line as their only means of transportation. They wanted something permanent, something they knew they could depend upon day in and day out. Since the existing railway was not in a position to construct such an extension, the property owners decided that the best way to accomplish the desired end was to build a railway of their own.

Probably these property owners missed the real point. Fundamentally it is not so much a question of whether

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the service is given by railway or by bus as it is a question of whether or not the service is given by a responsible transportation agency. The free-for-all method of bus operation that has been permitted in many places has marred the reputation of the bus for reliability. In this case, if investigation indicated that a bus line would be adequate to handle the traffic, that would probably have been a more economical solution of the problem. But in any case the incident clearly shows that people want transportation service to be furnished by a reliable and responsible agency, such as the railway company.

Two Thousand Miles Apart in Spirit

YOU can hold a nickel so close to your eye that it hides everything else.

Not so long ago a dispute arose in a certain city between a passenger and a conductor. The passenger claimed that he had paid his fare when he boarded the car and that that should entitle him to ride all the way to his destination. The conductor pointed out that the car was then in the second fare zone and that the passenger had paid fare only in the first zone. Words flew back and forth for some time with neither disputant making any progress toward convincing the other. Then the conductor had the car stopped and called the motorman to the rear. The argument gained headway with two against one. The other passengers waited impatiently for the car to continue its trip. Finally a man walked to the rear of the car, remarking that he could not "wait all day for a nickel" and dropped 5 cents in the farebox for the other fellow. Then the car went on.

In another city 2,000 miles away a difference arose between the conductor and a woman passenger over the use of an incorrectly punched transfer. The conductor politely pointed out why the transfer as punched was not valid. On her side the woman contended that the transfer had been given her a few minutes previously on another car and that she should not be the one to suffer because the conductor had punched it wrongly. Acting on the instructions of the management governing cases of this kind, the conductor then accepted the transfer. He explained that the company takes the position that the passenger is always right and that if the woman said the transfer had been given her in that way, he would not question her word but would accept it as fare.

As a matter of fact the railway does not really believe that the passenger is always right, but it has found that it is good policy to take the word of the passenger. In the first case the passenger was obviously wrong, but why penalize all the other passengers and lose their good will because of one nickel and a "dumbbell." In the other town some dishonest people succeed in robbing the railway of a few nickels, no doubt, but only an inconsequential number of riders would be unashamed to rob a company which accepts their word at face value.

Such is the story of the two railways 2,000 miles apart in spirit as well as distance. One wonders if there is any significance in the fact that the first company is having a great deal of trouble to earn its operating expenses and is involved in serious financial difficulties, while the second is happy and prosperous.

Merchants Support No-Parking Rule When They Understand the Facts

IT WILL often be found that the retail merchants are the principal objectors to the passage of a no-parking ordinance for the downtown streets of a city. The average shopkeeper has been taught from his early days that the person who drove to a store usually had more money to spend than the person who walked to it. Hence, carriages standing in front of his entrance were to the old-time retail merchant an indication not only of profit from wealthy shoppers, but that his establishment was being patronized by the élite in his community.

It takes a long time to eradicate a long-held impression like this. Shopkeepers have been loath to have restrictions placed on those who drive to their stores, as compared with those who walk, oblivious of the fact that the conditions in regard to retail shopping described have changed very greatly. Actually now, of course, automobiles parked in front of a store in a city where indefinite parking is permitted do not mean that their owners are within. It simply means that many of those automobile owners have stored their cars there while they went elsewhere. As a consequence the majority of shoppers have great difficulty in finding a parking place and are forced to walk to the stores from considerable distances. Thus the primary effect of congested streets on the shopper is to discourage him (or her) from going downtown. This means that the small neighborhood store and the mail order houses are getting a larger proportion of the total business than has been the case in times past. If the retail merchants in a city really understood these facts, it is believed they would be in the first ranks of those who want the streets kept clear so that the shoppers who come to the shopping district by trolley, which is the vast majority of them, can do so quickly and easily.

The experience of one electric railway man is enlightening. He had great difficulty in persuading a conservative retail merchant in his city that the long row of parked cars each day in front of his store did not belong to patrons of the store. The merchant became convinced of the truth only when he was shown that one of these cars belonged to a rival merchant who used that space because he did not want to block up his own entrance. The effect of this revelation was immediately to make the merchant a strong advocate of parking restrictions.

The columns of this paper have contained a number of references recently to parking restrictions. One of the most extensive of these went into effect in Detroit April 15 of this year. One reason may have been that the railways were owned by the city, so that the city authorities could better appreciate what parking meant to the surface railway system. Another reason may have been that Detroit is the home of automobiles and has a very large number of them in proportion to the population. At any rate, the stringent parking regulation which went into effect last April was supported not only by the retail merchants but by the downtown real estate owners' association, and it has been instrumental not only in increasing the car speed nearly 2 m.p.h., but in reducing street railway accidents about 10 per cent. If Detroit, the home of the automobile, can adopt an ordinance of this kind, there seems no sound reason why other cities should not do likewise.

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Building High-Speed Line at San Diego

Track, Overhead, Signals and Stations Will Cost About $1,625,000—Passenger and Freight Service Will Be Provided—Construction Methods Are Described—New Cars Have Been Bought

By W. O. Anderson
Construction Engineer San Diego Electric Railway

A "Skimmer Skoop" Digging the Trench for the Mission Beach Extension of the San Diego Electric Railway

THE new Mission Beach line being built by the San Diego Electric Railway, San Diego, Cal., from Ocean Beach to La Jolla will have the equivalent of approximately 20 miles of single track, and including overhead construction, signals, automatic substations and passenger stations will call for the expenditure of a sum in the neighborhood of $1,625,000. It is planned to provide not only passenger service for the residents of the outlying suburbs of Ocean Beach, Mission Beach, Pacific Beach, Bird Rock and La Jolla, as well as holiday pleasure seekers, but also freight and express service for the surrounding territory. Such a line has long been needed to serve and develop the beaches and northerly suburbs of the city, as they have heretofore been forced to depend upon automobiles and trucks to supply transportation for both passengers and freight.

This line follows Kettner Boulevard from the Santa Fé depot at Broadway and Kettner Boulevard, in San Diego, north across the lowlands between San Diego Bay and the San Diego River to Ocean Beach, then along Mission Beach Boulevard to Pacific Beach, and from there to La Jolla. A connection will be made at Ocean Beach Junction to the old Ocean Beach line on Bacon Street, and the latter line will be reconstructed. The route is shown on the accompanying map.

In this construction the best modern practice will be followed. The absence of heavy grades, sharp curves, grade crossings, and the use of 128-lb. rail, steel ties and concrete ballast in paved streets, with 75-lb. rail, wood ties and rock ballast in open track, and the installation of a catenary overhead will make it possible to give express service second to none on the Pacific Coast.

Two very dangerous grade crossings where the Santa Fé Railroad, the highway and the present electric line cross each other at Tide Street will be eliminated and a three-level crossing substituted. The highway will pass under both the Santa Fé and the electric line on a lower level. The latter will pass over both the highway and the Santa Fé, thus permitting the operation of high-speed express service without danger of accidents. Operation will be facilitated by the installation of the Nachod block signal system, which will reduce to a minimum the chance of collision.

In paved streets the rail used is 128-lb. girder rail with an M.C.B. flangeway to accommodate M.C.B. equipment for freight service. Steel ties will be used and the whole track imbedded in a concrete slab 16⅝ in. thick. The open track construction will be of 75-lb. A.S.C.E. rail, wood ties and rock ballast. The San Diego Electric Railway was the first company on the Pacific Coast to use the steel twin tie. This feature, while comparatively high in initial cost, is expected to reduce the maintenance cost to a minimum. Moreover, with the present price of timber, steel ties are not much more expensive than the old-fashioned wood ties.

Pavement is broken by pneumatic breakers, and a

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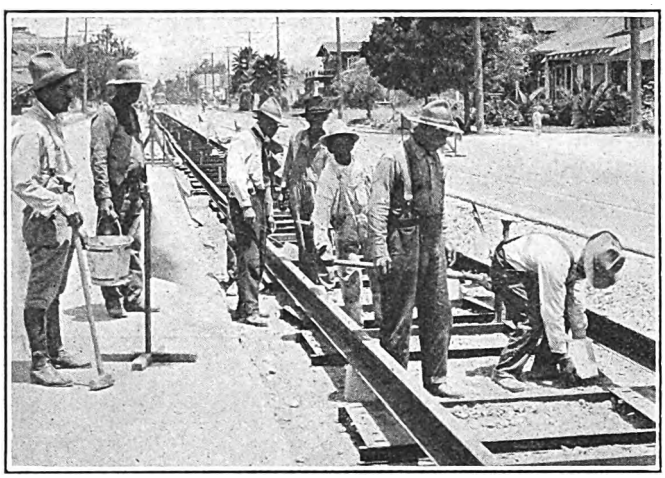
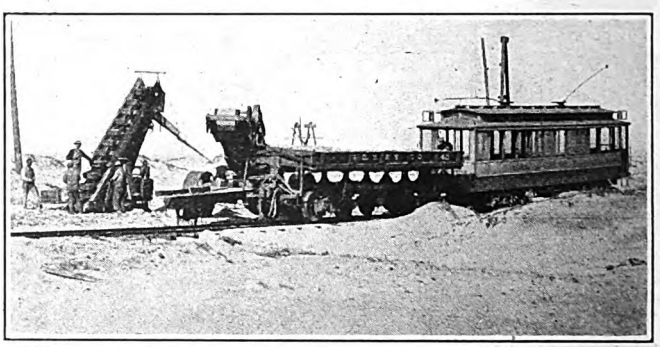


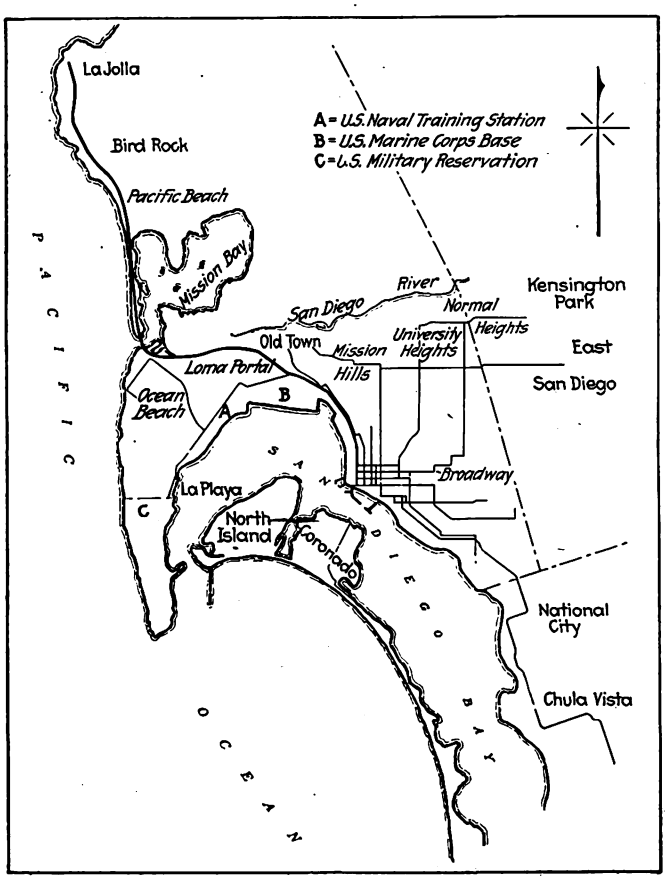
At Left, Placing One of the Concrete Pedestals Which Support the Track During Construction
At Right, Steam Shovel Loading Cars at a Borrow Pit

"skimmer skoop," shown in an accompanying illustration, then cuts a trench to a depth of 14 in. As fast as the trenching is completed, 4-in. drain tile is laid along the outer edge of the trench on a level about 8 in. below the sub-grade and is covered with crushed rock. The drain empties into the nearest available sewer manhole or culvert.

Rail is supported above the sub-grade by concrete pedestals at intervals of 12 ft. After the track is laid, clipped and the joints bolted the latter are welded to the ball and base of the rail. The base of the rail is welded to the tie plate at each joint and midway between, 60-ft. rails being used. Bolts are spot-welded after they have been tightened up sufficiently, as are also the tie clip wedges. Track is then aligned and brought to grade by the adjustment of two cast iron wedges, placed on top of each concrete pedestal. Concrete is placed by a caterpillar-mounted, gasoline-driven mixer, which travels along the side of the trench and deposits the concrete.



Among the Sand Dunes a Barber-Greene Loader Was Used to Fill the Dump Cars



Route of the Mission Beach Extension Being Built by the San Diego Electric Railway

The nature of the territory through which this extension is being built has caused the company to resort to practices unusual for electric railways. Through the salt marshes considerable fill was necessary, and this material was obtained from borrow pits along the right of way. It was loaded by a steam shovel onto air operated dump cars, which carried it to the point on the line where it was needed. When building the line through the sand dunes, a Barber-Greene machine was made use of to load sand on to the dump cars. This operation is shown in an accompanying illustration.

On downtown streets the overhead construction will be double-pole, but in the open a single-pole catenary construction using No. 0000 phono-electric trolley wire will be employed. All special work is bonded by 500,000 circ.mil cable welded at the connections to the rail. It is believed that this bonding, cross-bonding and the welding of joints will entirely do away with electrolysis trouble. Power distribution will be facilitated by new automatic substations at Ocean Beach Junction and at Pacific Beach.

New multiple-unit cars built by the American Car Company will be operated on the Mission Beach division as soon as construction work is completed. They are equipped for operation as single units by either one man or two men. The cars are 48 ft. long and weigh 38,000 lb. Each car will have four motors. Current collection will be by means of a special pantograph arrangement as shown in an accompanying picture.

Double doors and folding steps are operated by Na-

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tional Pneumatic safety interlocking devices and are controlled by push buttons located on the stanchion in the center of the platform as shown in the accompanying illustration. End doors will be an innovation for double-truck cars in San Diego as heretofore all the railway's large cars have been of the center-entrance type.

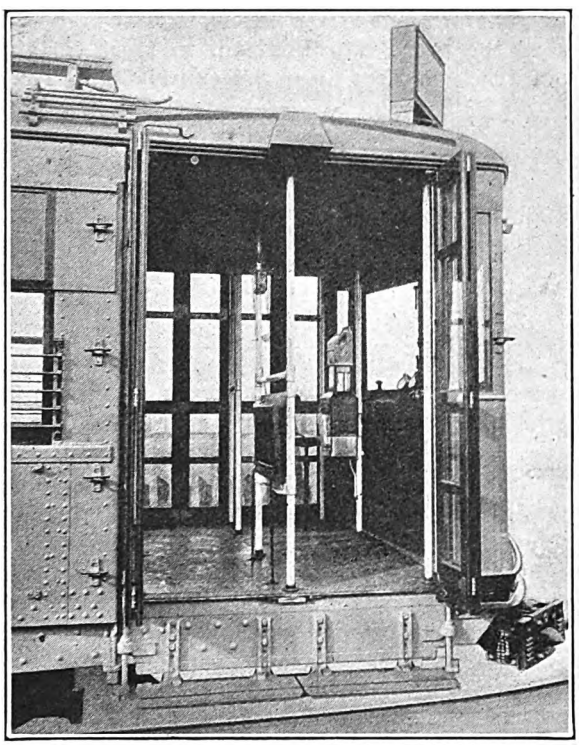
Seats for 56 passengers are provided. A folding seat has been placed between the stanchions near the doors. When one set of doors is not in use this seat can be let down to accommodate additional passengers. The interior of the car is pleasingly free from rods, cords and other devices.

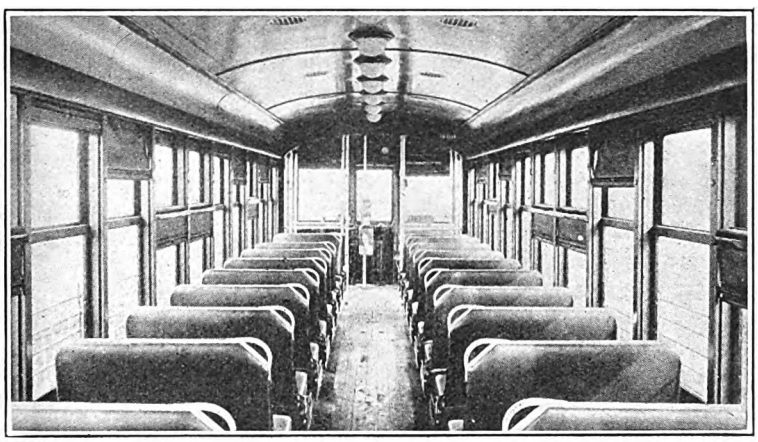
Artificial ilumination is provided by a row of dome lights down the center of the car. Other cars of the same type have been bought for operation in the city of San Diego.

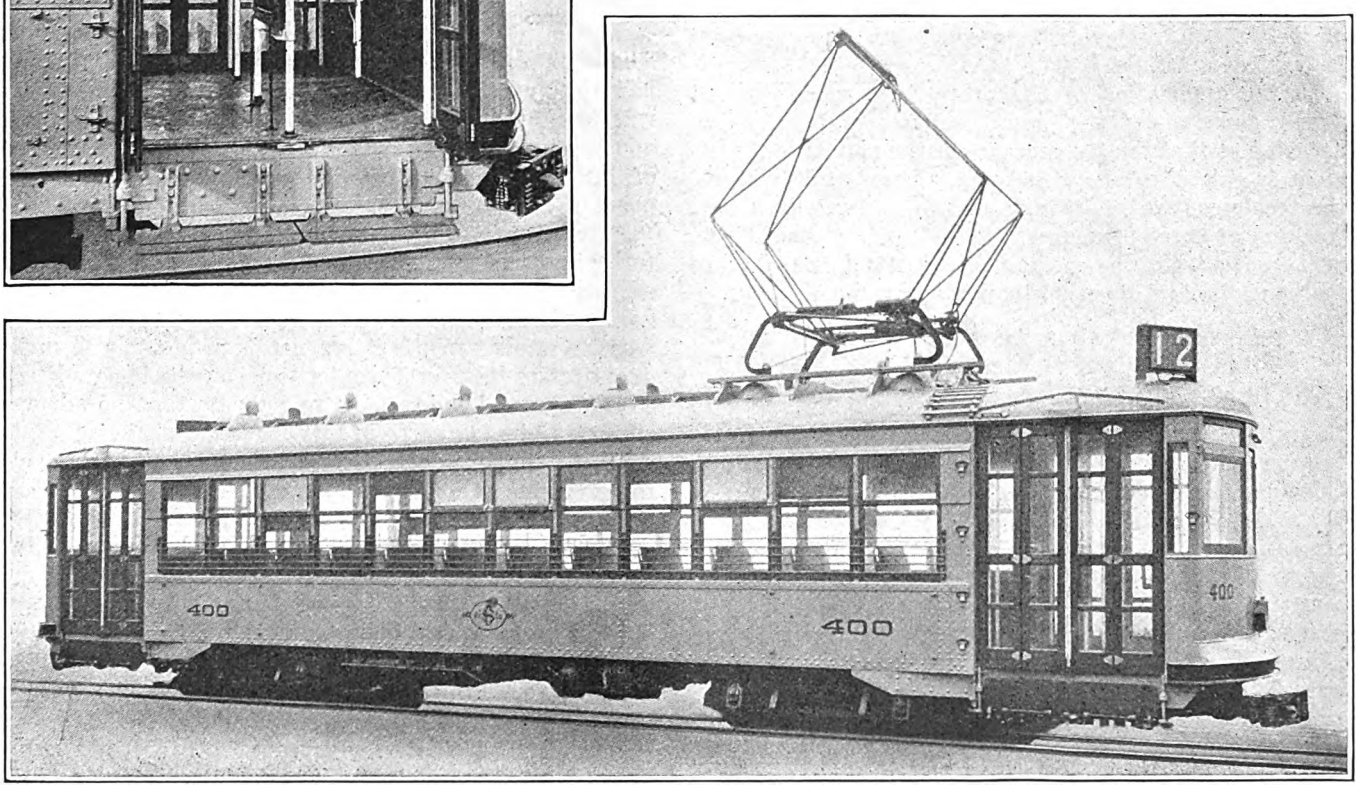
About midway down the neck of land forming Mission Beach an amusement resort is contemplated. This will have the usual features of recreation centers, such as bathing, boating, etc. The popularity of the beach resorts adjacent to San Diego has proved to be such as greatly to overtax the accommodations now available, and the establishment of another recreation center will serve a great number of pleasure seekers who have heretofore been deprived of their amusement because of lack of accommodations and transportation facilities.

In addition to the concessions and amusement features at Mission Beach an enormous bathhouse, larger than any other on the Pacific Coast and containing more than 1,300 rooms, is being constructed. An immense indoor plunge will be built, and bathers will thus have an opportunity of choosing between the indoor pool, the surf bathing on one of the finest beaches known or still-water bathing in Bonita Bay.

An auditorium of steel and concrete will be erected in the near future, with a capacity of about 7,000 people, for conventions, concerts and large public gatherings. A terminal station with a capacity of six six-car trains will be built at the recreation center, with the necessary platforms, turnstiles, shelters, waiting rooms, etc., to handle the large crowd properly. The waterfront on Mission Bay will be dredged and improved. The execution of these plans will probably cost something more than a million dollars.







At Left, Doors and Steps Are Controlled by Push Buttons on the Center Stanchion. At Right, Interior of New Car to Be Operated on the Mission Beach Line. Below, One of 50 New Multiple-Unit Cars for the San Diego Electric Railway

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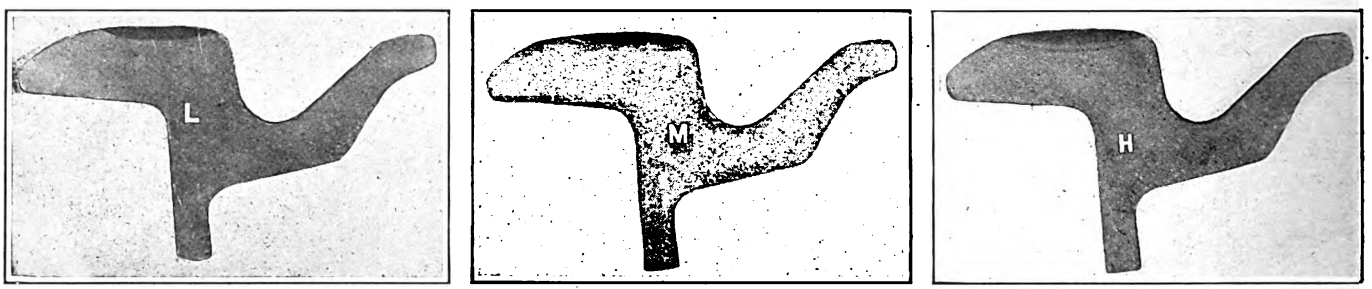
Hardening Rail Surface in the Track

The Toronto Transportation Commission Is Making Experiments with "In Situ" Process Developed in England for Hardening the Running Surface of Rails

THE first application of the *in situ* process for rail hardening to be made in America has been undertaken by the Toronto Transportation Commission, Toronto, Canada, under the direction of A. T. Spencer, assistant to the general manager. The treatment has been made as an experiment to determine the value of the method under North American conditions.

The process consists essentially of a heat treatment similar to that used in hardening tool steel. An oxy-acetylene blowpipe flame is applied to the portion of the rail to be treated and immediately after heating the rail is quenched by means of a jet of water. To make the process continuous the blowpipe is mounted on a small four-wheeled car which also carries the acetylene generator, the oxygen and water tanks and the necessary arrangements for controlling the intensity and position of the flame and the jet of cooling water. On account of the difficulty of controlling conditions, only one rail is treated at a time.



Photographs of Treated Sections of 122-Lb. Girder Rail. L, Treated with Low Pressure Flame; M, with Medium-Pressure Flame; H, with High-Pressure Flame

In the application of the process the car is moved slowly along the track, and the flame and speed are adjusted so that the temperature of the rail under treatment is raised to about 850 deg. C., or slightly above the recalescent point. Single blowpipes have been used working at three pressures, the high being about 60 lb. per square inch, the medium about 45 lb. per square inch and the low about 30 lb. per square inch.

Penetration Varies According to Pressure Used in Treatment

The penetration secured and the extent of area in the rail head affected by the treatment have been found to vary with the type of blowpipe used. This is indicated by the accompanying photographs of etched sections of 122-lb. girder rail that were removed from the track after treatment. The low-pressure treatment shows a maximum penetration of less than 0.2 in., and there is a sharp line of demarcation at the limits of the area affected. The medium pressure treatment shows a maximum depth of treatment of something over 0.2 in., with a much less definite line of demarcation and a somewhat wider spread of treated area on the rail surface. The high pressure treatment indicates a maximum penetration of about 0.3 in. and the area is spread over the entire wearing surface of the rail head. There is also a more gradual transition from the treated to the untreated portion of the metal. Complete hardness tests have not yet been made, but the portion treated is materially harder than the normal rail.

The process is the invention of the Messrs. Sandberg, London, England, who introduced it in England about seven years ago, primarily as a war measure, with the idea of prolonging the life of partially worn rail. It is claimed that the results obtained there are quite successful, and the process has since been used on a number of properties, not only for hardening the rail head but for hardening the guard of much-used curves and the wearing points of special trackwork.

Figures Concerning Wear Not Available

Tabulations of comparative wear on treated and untreated rail in England submitted by the patentee indicate that the wear on the treated rails is about half as great as on the untreated rails. It also is claimed that when corrugations are properly ground out and the treatment applied corrugation does not recur.

In 1922 the Toronto Transportation Commission entered into an arrangement with Scholey & Company, the licensees of the process in England, to treat certain sections of track in Toronto as an experiment. That season a total of about 1 mile of single track was treated, part of which was 90-lb. girder rail having had up to nine years' service, and part on 122-lb. girder rail having had up to one year's service. In 1923 another half mile of track was treated, various sections of rail and previous track life being chosen for purposes of comparison.

After the rail is treated and has carried car service for a few months it assumes a bright, highly polished surface. This condition naturally elicits questions regarding the effect of this hard, smooth surface on tractive effort. While it has not been possible to make quantitative tests in Toronto, tests on the Metropolitan Tramways of London seem to indicate that no adverse effect is to be feared from this source.

Up to the present time no attempt has been made to determine the comparative wear on the treated sections of track in Toronto as compared with the untreated sections. Measurements will probably be taken during the coming summer, but it is felt that several years must elapse before the benefits, if any, of rail treatment by this process can be determined.

Bradford, England, having introduced the weekly pass with satisfactory results, the city of Hull is to try the plan. The charges are from 2s. to 5s. per week, according to the number of zones and routes over which the pass may be used.

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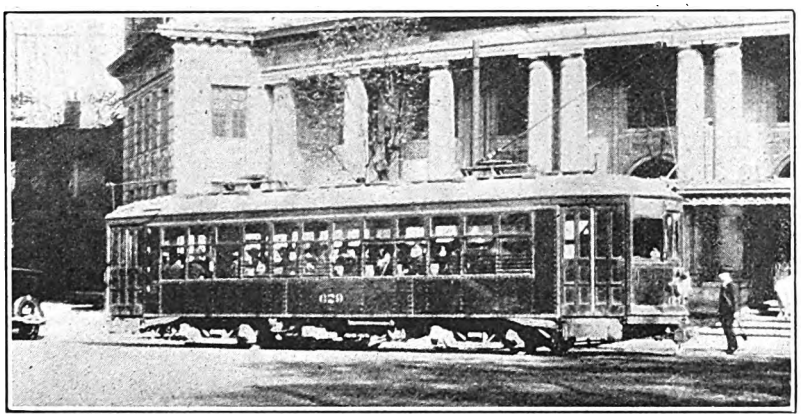
Railway Prospects Brighter in the South

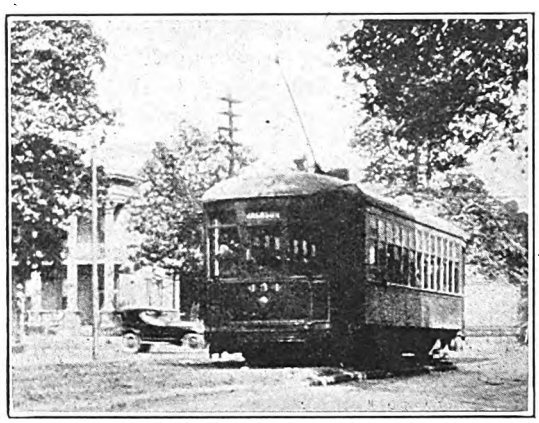
Many New Cars Are Being Operated in the Larger Cities — Repair Shops Have Been Improved — Jitney Competition Is Diminishing — Traffic Signals Are Widely Used

By J. A. Miller, Jr.
Assistant Editor ELECTRIC RAILWAY JOURNAL

ONE of the first things that impresses a visitor in the South is the large number of new electric railway cars on the streets. In the main these are light-weight, double-truck, two-men cars, although one-man operation has been undertaken in some cities, and is under consideration in others. Improvements are being made in the railway shops and a considerable amount of track is being reconstructed. The impression is created that the railways in the Southern states have got back on their feet and are moving forward.

In Atlanta, the Georgia Railway & Power Company has 40 new cars, some of which were built by the McGuire-Cummings Company, while others were built in the railway shops. They are large double-truck cars with arched roofs and have comfortable riding qualities. The New Orleans Public Service, Inc., the successor to the old New Orleans Railway & Light Company, has about 100 new cars built by Perley A. Thomas, another 100 good cars not quite so new, and about 75 more on order. These new cars, which are similar to those in Atlanta, have been helpful in reducing the cost of operation.





At Left, One of the New Cars of the Georgia Railway & Power Company on Ponce de Leon Avenue, Atlanta. The View at the Right Shows a Modern Car on the Jackson Avenue Line, New Orleans

Birmingham, Ala., has new cars also, but they are of a different type. Both center and front doors are provided. All passengers board by the center doors. White passengers leave by the front door, while negroes leave by the center door. The large seating capacity, 62, is an interesting feature of these cars. New cars have been in service in Memphis, Tenn., since the early part of the present year. Although made by a different builder, the St. Louis Car Company, these are quite similar to the ones in Atlanta and New Orleans. It is said that 40 new cars have replaced nearly 100 old single-truck cars. On June 1, a group of new cars was placed in service in Knoxville, Tenn. The Knoxville Power & Light Company purchased seven single-truck curved-side safety cars from the Cincinnati Car Company and also seven similar double-truck cars. They are very much like the light-weight curved-side cars which have been operated for some months by the Kentucky Traction & Terminal Company, Lexington, Ky. Before being placed in service the cars were put on exhibition for three days and were inspected by more than 5,000 citizens of Knoxville.

Except for the new cars at Knoxville most of the new rolling stock in the South is of the two-man type. The race question has a good deal to do with this. Throughout that part of the country it is necessary to divide the car interior into two parts—one for white people and one for colored people. There seems to be no objection to both races entering by the same door, but separate exits are demanded. Otherwise it would be necessary either for the white people to pass through the colored section of the car when getting off, or for the colored people to pass through the white section.

This problem was solved in Birmingham by the center-entrance front-exit arrangement already described. In the Knoxville one-man car, the motorman will control pneumatically a rear exit door, so that any desired arrangement can be made for boarding, alighting and separation of the races. On the other hand, in Richmond, Va.; Charleston, S. C.; Tampa, Fla., and Savannah, Ga., and other places, one-man cars with front entrance and exit are used in considerable numbers, and appear to have the approval of the public.

Yellow or orange is now the color used almost universally for electric railway cars in the South. A few years ago various shades of dark green were to be seen nearly everywhere. At present the Virginia Railway & Power Company, in Richmond, is changing gradually from green to orange. In Savannah the safety cars, which are the newest cars operated, are painted orange instead of dark green, as is the older rolling stock. Birmingham has had yellow cars for some years and still holds to that color. The new cars which the Memphis Street Railway bought the early part of this

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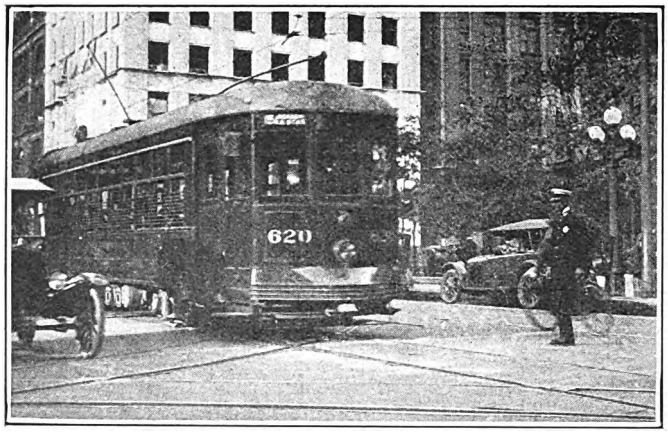


Forty New Cars of This Type Have Been Placed in Service in Memphis Since the First of the Year

year are orange instead of green. Chattanooga, Nashville and Knoxville have also changed to various shades of yellow or orange. On the other hand, Charleston, Atlanta and New Orleans still retain the green.

Other signs of progress also are noticeable. The Georgia Railway & Power Company is planning to adopt the three-wire distribution system. Three new substations, serving both railway and commercial purposes, have recently been built. A particularly good feature of these substations is their attractive architecture and the landscape gardening which has been done around them. So well executed has this been that the buildings are really ornaments to the neighborhoods in which they are located.

In its Fulton County plant this railway already has a modern repair shop, but by the installation of new and more efficient machine tools it is expected to accomplish the repair and maintenance of rolling stock more cheaply than heretofore. Butler barn, one of the largest carhouses in the South, with 42 tracks accommodating 210 cars, has been improved. The pit capacity, which was formerly only 15 per cent of that of the barn, was increased last year to 75 per cent. A Columbia hoist and a pit grinder have been installed.

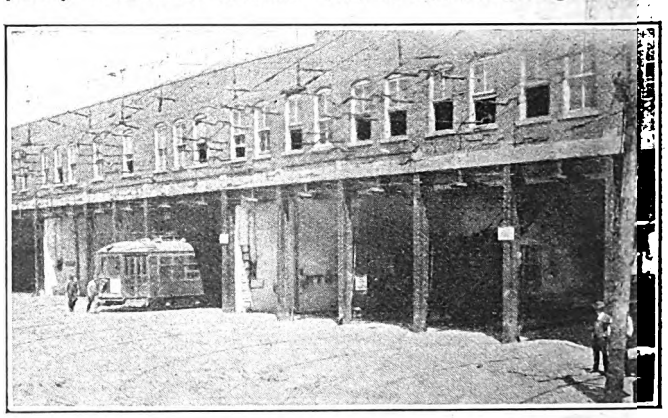
Extensive changes are being made by the railway in New Orleans. The existence of two track gages in that city has been a considerable handicap heretofore. Most of the track is built to a 5-ft. 2½-in. gage, but there are also important lines operating on the standard 4-ft. 8½-in. gage. Recommendations were made a year or more ago by John A. Beeler, consulting engineer, for rerouting and unification of the gages. These recommendations are now in process of being carried out, but the changes will be very expensive and considerable time will be needed to complete them.

One of the complications attendant upon unifying the gages will be the changeover of rolling stock. All cars recently bought have been so designed that the bodies can be mounted on the wide-gage trucks. Improvements and alterations are now being made in the shops, so that all shops and carhouses will be able to accommodate wide-gage cars. In preparation for handling the big job of changing over, new car hoists and overhead monorail systems have been installed in the carhouses.

A system of one-way streets several miles in length has been established in New Orleans. On narrow streets the movement of traffic is accelerated by having all vehicles travel in the same direction and accidents have been reduced by the simplification of traffic movement at street intersections. The double tracks of the railway on streets which are now used in one direction only have become useless and it has been necessary to provide other routes for the cars. The track department of the New Orleans Public Service is busy making these changes and others necessitated by the rerouting and unification of the gages.

At Birmingham interest centers in the reorganization of the old Birmingham Railway, Light & Power Company and the Birmingham Tidewater Railway Company into the new Birmingham Electric Company. This has permitted extensive changes in the routing of the Tidewater line and the elimination of more than 70 grade crossings. To one unfamiliar with the city the number of grade crossings in Birmingham seems incredible. Many still remain, but the rerouting of the old Tidewater line has effected an important improvement. Facilities at the railway shops are being improved by the building of a large car storage yard alongside the present carhouse.

A short time ago the people of Birmingham woke up to the fact that they could not continue to have both railway service and jitney bus operation. As the trolley was more popular than the jitney, the result was to eliminate the latter altogether. In Richmond the jitney is still in evidence but is not inflicting serious



Butler Barn, Atlanta, One of the Largest in the South, Has Been Improved to Facilitate Inspection Work

injury on the railway. On Grace and Franklin Streets 125 miscellaneous jitneys are competing with 25 buses operated by the Richmond Rapid Transit Corporation. These are one-way streets, lying between and parallel to Main and Broad Streets, where the railway operates. It is said that from 8,500 to 10,000 passengers per day are carried by the combined bus services at an 8-cent fare. Probably about 5,000 of these would otherwise ride on the street cars on Broad and Main Streets. Except for this slight loss, the Virginia Railway & Power Company is not affected by the situation, and it can therefore sit back and watch the duel. It is generally understood that the jitneys have almost ruined the Richmond Rapid Transit Corporation. More recently the city has given the bus company permission to operate also on Broad Street and this may result in some loss of revenue to the railway.

The railway franchises on Main and Broad Streets will expire in the near future, and it is uncertain on what basis they will be renewed. The City Council contends that the State Corporation Commission has no jurisdiction within the corporate limits of the city. Inasmuch as the railway lines outside the city limits are now under the control of the state commission, the company desires to get the whole property under the same control. When this is accomplished the com-

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pany will be in a position to make some needed extensions to its lines.

In Norfolk, Va., where the same company operates, the jitney situation is more serious. A promise was made by the City Council during a recent strike of street railway employees that jitney competition would be eliminated so that the company might earn a reasonable return on the investment in street railways. However, after the strike was over the City Council ignored its recorded pledge and no relief has been afforded up to the present time. The personnel of the Council will be altered at the election in June and there is prospect of favorable action being taken to improve the street railway situation.

Application is now pending before the State Corporation Commission to take over jurisdiction and determine the value of the street railway property in Richmond and to fix the fares. This matter will probably be concluded in the near future and will very much simplify the matter of the franchise for the railway in that city.

An appraisal of the whole property of the company was recently completed by Stone & Webster, Inc., and the State Corporation Commission has already fixed the values of the entire light and power system and of the street railways in Norfolk, Portsmouth, Petersburg and the 22-mile interurban line between Richmond and Petersburg. This leaves only the railway in Richmond yet to be evaluated. As soon as this is done, it is reasonable to believe that the City Council will promptly work out the remaining details of a proper franchise.

The jitney still flourishes in Atlanta, but the Georgia Railway & Power Company has presented its case so clearly and forcefully that public opinion is swinging around to a more favorable position. This has been accomplished in large measure by a skillful publicity campaign in which the company frankly laid its cards on the table. A petition has been presented to the City Council outlining the steps which the railway officials believe should be taken to relieve the situation. Not all of these need necessarily be taken at the present time, but only as many as may be required to enable the company to function properly. The reasonableness of these requests has been explained to the public, and the employees of the company have secured thousands of expressions of approval of the company's requests. It may therefore be expected that some solution of the problem will be found in the near future.

In Savannah a number of jitneys are still operating

Gay Street, Knoxville, on a Saturday Afternoon, Showing One of a Number of Traffic Control Towers on that Street

New Cars in Knoxville Were on Exhibition for Three Days Before Being Placed in Service

and are a source of some embarrassment to the railway. However, the number of such buses is not large, and the operation is altogether haphazard. It appears to be a factor of diminishing importance. In New Orleans, Memphis, Nashville and Knoxville the railways are free from jitney competition.

Uphill Fight in Charleston

The topographical situation of Charleston, S. C., which somewhat resembles that of Manhattan Island, complicates the electric railway problem there. Cooper River on the north of the city and Ashley River on the south join in the harbor, just off the Battery. The principal business streets are King and Meeting, which run more or less parallel to the rivers. Unfortunately for the Charleston Consolidated Railway & Lighting Company, most of the city lies within comparatively easy walking distance of the business center. Only North Charleston and the new Hampton Park district are really outside of the 10-minute walk area. Railway traffic is heaviest on Saturday, which is pay day, and decreases day by day (Sunday excepted, when riding is almost zero) until the low mark of the week is reached on Friday. Although the population of the city is about 67,000 only some 30,000 are white. The colored people have money enough to ride only on Saturday, and some few on Monday also. For the rest of the week they walk. The problem therefore is to provide railway service for about 30,000 people, and to make it pay.

Moreover, there are no outlying communities near Charleston. Columbia, Augusta and Savannah are the nearest cities, and each is a center by itself entirely independent of Charleston. There are few industries in the city. During the war, activity at the U. S. Navy Yard and at a near-by government shipping terminal brought many extra people to the city. Now, however, most of these people have left and the situation is about the same as it was before the war.

The city lines of the railway are operated on a 10-minute headway all day and during the rush hours.

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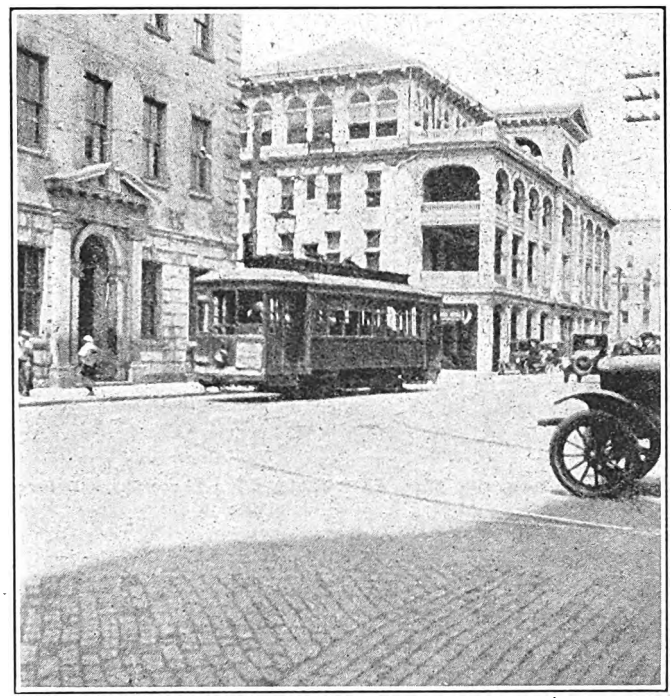
The cars are never crowded. Shorter headways were tried as a means of increasing traffic but failed to produce satisfactory results. Birney cars and rebuilt single-truck cars equipped with safety devices constitute the greater part of the rolling stock, with a few double-truck cars operated on a suburban line. Recent rerouting has reduced operating cost considerably, and although the total number of revenue passengers is



Traffic Congestion Is Not a Problem in Charleston, Except on Saturday Afternoon

less, the revenue per car-mile is greater. Thus, although no large increase in traffic appears likely, the railway has introduced many economies in its shops and operation and by this means expects to get back on a firm foundation in the near future.

A note of optimism prevails and one sees little placards in the windows of many stores saying "Business Is Good in Savannah." After the war Savannah suffered severely from the business slump, and the effects of this were felt by the Savannah Electric & Power Company, operating the railway in that city. Economies have been introduced in the shape of lightweight cars and one-man operation. Prospects seem bright for a business revival in the city and this will help the railway.

The construction of many miles of excellent concrete roads in the vicinity of Savannah is expected to develop the suburbs and increase the population of the city. While these roads may, to some extent, result in an increased use of private automobiles, they are likely to benefit the railway by the development of outlying communities. Construction of the Coastal Highway running through Savannah is another factor which should develop the outlying territory, and will probably bring tourists to the city. All this is likely indirectly to benefit the railway.

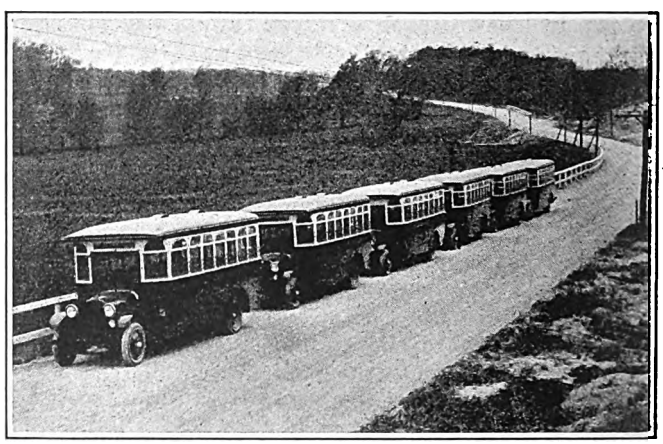
Since New York established a system of colored lights for the control of traffic on Fifth Avenue, this example seems to have been followed by hundreds of cities large and small throughout the United States. The Southern cities are not exceptions. Birmingham has the most extensive system of this kind, and operates it in the most logical way. All the street intersections in the congested district are controlled by colored signal lights operated in unison from a single point. Pedestrians are required to heed these signals, the same as vehicles do. But the signals have been installed at many street corners where vehicular traffic is light and the uninitiated are likely to cross against the direction of traffic. Local people who know the rule observe it surprisingly well, considering the fact that there is no officer of the law on hand to enforce it. The street layout in Birmingham is practically ideal for the operation of such a traffic control system, because it is perfectly rectangular. As a means of preventing accidents the signals may be desirable, but as a means of expediting traffic they do not seem to be a marked success.

Atlanta has installed traffic signals at the "Five Points" and along Marietta Street. These are individually controlled and on that account are better suited to the conditions than a system of interlocking signals would be. At some of these intersections, however, the position of the traffic officer at the curb, instead of being in the center of the street, appears to handicap his work. Similar signals are used in New Orleans along Canal Street, where a number of blocks are controlled as a unit. Although there is here, as always, some time lost because of interlocking signals, the peculiar conditions on Canal Street, with a wide neutral strip in the center where the car tracks are laid, make some such arrangement almost a necessity.

Elaborate traffic control towers have been built in Knoxville, as shown in an accompanying illustration, along Gay Street, its main thoroughfare. These are used only during certain hours of the day, and so far as a casual observer can tell, traffic moves just as well when the signals are not in operation as it does during the period they are in service. Speaking generally, it appears that no thoroughly satisfactory solution of the problem of controlling street traffic by colored lights has yet been evolved.

Reo Buses as Feeders at Akron

FOLLOWING the decision of the city officials of Akron, Ohio, to bring back into operation the cars of the Northern Ohio Traction & Light Company, six new Reo model "W" buses were purchased, to serve



New Buses of the N. O. T. & L. Co.

as feeders to the car lines. These buses seat 21 passengers, and are equipped with four wheel brakes, dual rear wheels, 30-in. x 5-in. pneumatic tires, front and rear bumpers and automatic windshield wipers.

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Speeding Up Traffic in Detroit

A Gain of 1.85 Miles per Hour in the Downtown District Has Been Obtained, Largely Through Anti-Parking Regulations—At the Same Time Accidents Have Been Reduced—Other Means of Increasing the Speed and Otherwise Improving the Service Have Been Introduced

Woodward Avenue Looking North from Michigan Avenue in the Rush Hour
This view was taken at 5.15 p.m. on May 26, 1924, after the anti-parking ordinance was passed. There are still a number of automobiles on the street, but transportation conditions are much better than they were.

AUTOMOBILE parking in a large section of the downtown district of Detroit is now prohibited by ordinance. This is one step in a number which have been taken in that city to improve electric railway transportation conditions.

For some time there have been limitations of daytime parking on a number of the principal streets in downtown Detroit, but the increase in the number of private machines recently has made further restrictions necessary. Recognizing this, the street railway management did much in the way of compiling and publishing data to emphasize the need for clearer streets, particularly during the rush hours. It was not alone, however, in this campaign. The retail merchants within the district affected, as well as the real estate interests, took a very active part in advocating a restriction in parking. In consequence, the City Council adopted an ordinance which went into effect on April 15, 1924, and prohibits parking between 4.30 and 6.15 p.m. within the downtown district as well as on a number of the radial avenues, as shown in the accompanying map. The only places where parking is permitted in the downtown district between the hours mentioned are three short boulevards or squares, namely, Bagley Boulevard, Washington Boulevard and Cadillac Square.

On Woodward Avenue the non-parking district extends north to the Grand Boulevard, on Clifford Street to the intersection of Cass Avenue, on Cass Avenue on the north side to West Grand Boulevard, on Grand River, Michigan, Lafayette and Fort Avenues to West Grand Boulevard and on Jefferson and Gratiot Avenues to East Grand Boulevard. During the hours mentioned, or from 4.30 to 6.15 p.m., according to the ordinance:

"Parking will be allowed for short periods to merchants who are forced to occupy the space in front of their stores for loading and unloading of commercial vehicles. Passenger cars may also stop at the curb to pick up passengers, but must not remain standing for a greater length of time than is required to take on passengers.

"If cars are found within this district within the hours mentioned without an attendant the police are authorized to impound them."

In the campaign bringing about this anti-parking regulation the Department of Street Railways distributed with effect a number of little bulletins called "Transportation Talks." Several of these are reproduced on page 929.

In these published data the point was made that automobile parking really is two kinds, namely, short-time parking, or the temporary stop in front of a store or office while the user transacts his necessary affairs, and the long-time parking, where the owner leaves his automobile on the street for practically the entire day while he transacts his daily business. The latter is the supply of a valuable privilege to a few at the expense of all and should be discontinued. Moreover, even if it is assumed that it is the function of the city to provide free storage in the business district for automobiles, the limits were now reached, and all drivers who enter the downtown district a little late are discriminated against.

Some comparisons were also made of the street areas taken by buses and trolley cars per passenger. It was shown that the street cars in Detroit could haul an afternoon rush-hour crowd with 41.1 per cent less vehicles than if the double-deck buses used in Detroit were employed, and these street cars would require 41 per cent less linear feet of street and 21.3 per cent less area. Moreover, the interest charges and depreciation

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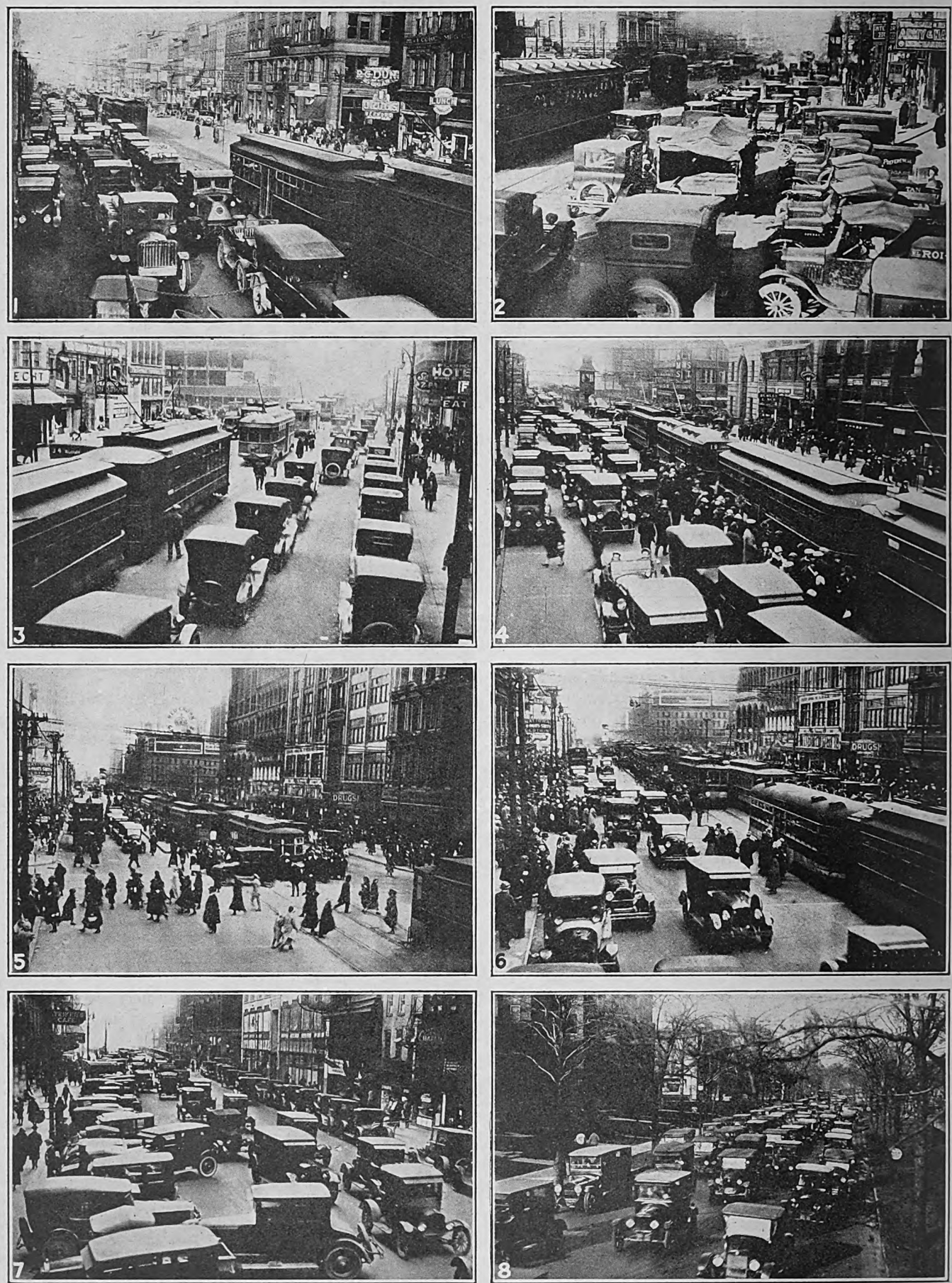

These Views Were Typical of Detroit Streets During the Rush Hour Before the Anti-Parking Ordinance Went Into Effect

These views show: No. 1, Jefferson Avenue looking east from Woodward; No. 2, Jefferson Avenue looking east from Griswold; No. 3, Michigan Avenue looking east from Cass; No. 4, Michigan Avenue looking west from Woodward; No. 5, Woodward Avenue at State Street looking south; No. 6, another view from the same position on a different day; No. 7, Lafayette Boulevard looking west from Griswold; No. 8, West Grand Boulevard looking east from Second Street. Photographs by the Detroit *News*.

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for the cars would be 26 per cent less than for the buses. The statement was also made that experience had shown the police practically could not enforce time limits on parking. Total abolition was the practicable way.

A series of pictures showing conditions on various Detroit streets prior to the passage of the ordinance and published through the courtesy of the Detroit *News* are presented on the opposite page.

A view is also shown of Woodward Avenue, looking north from Michigan Avenue, during the rush hour after the passage of the ordinance. This view was taken on May 26, 1924, at 5.15 p.m. Although some autos are seen, their number is much less than before the passage of the ordinance against parking.

In some of the downtown views on page 928, street loading platforms may be seen, as well as queues of passengers waiting to board cars. Waiting passengers in Detroit follow this plan quite generally and the result is shorter time at stops. They do so not only for the cars but also for jitneys. Jitneys are still permitted to some extent in Detroit, and during the evening rush hours they are sent out by dispatchers from definite leaving points in the downtown side streets and run over definite routes. For the most part they are touring cars holding five or seven passengers each. The fare charged is 10 cents.

STREET RAILWAY ACCIDENTS IN DETROIT

	March, 1924	March, 1923
Total accidents	1,766	2,146
Accidents with automobiles	1,308	1,449
Total accidents per 100,000 car-miles	40.3	48.3

As a result of the anti-parking ordinance mentioned and other improvements described later in this article the scheduled speed of the cars in the downtown districts of Detroit has been increased 1.85 m.p.h.

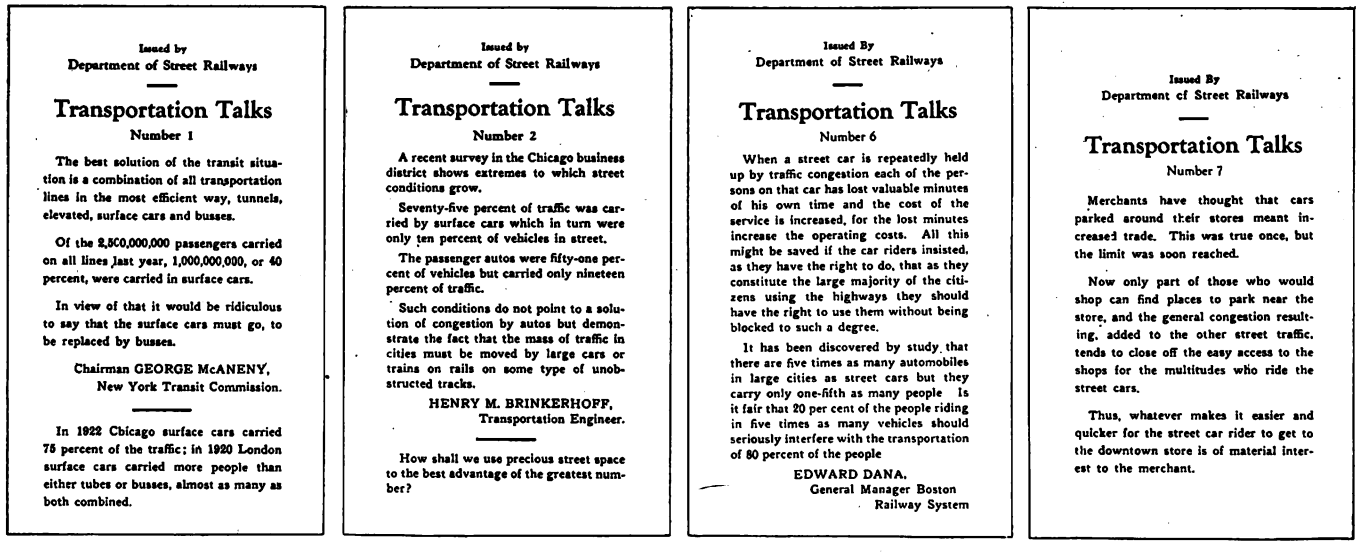
Another ordinance which has helped the traffic situation in Detroit has been the establishment by the Council of a number of streets as "through streets." At such streets every automobile has to stop before entering or crossing. There are seven such streets now, and the tendency is to increase their number. These two ordinances have not only speeded up travel but have helped to reduce the accidents, particularly the automobile accidents.

The above table of accidents during March relates of course to a period before the anti-parking law went into force, but the table shows the beneficial results of the other steps taken to reduce street car accidents in Detroit.

According to the police department reports, there has been an increase each month in the street accidents in which trolley cars are not involved.

A series of moving pictures has been made of traffic conditions and will be shown before real estate associations, clubs, etc.

Map Showing by Black Lines the Portions of Downtown Detroit to Which the Anti-Parking Ordinance Applies



Issued by
Department of Street Railways

Transportation Talks

Number 1

The best solution of the transit situation is a combination of all transportation lines in the most efficient way, tunnels, elevated, surface cars and busses.

Of the 2,500,000,000 passengers carried on all lines last year, 1,000,000,000, or 40 percent, were carried in surface cars.

In view of that it would be ridiculous to say that the surface cars must go, to be replaced by busses.

Chairman GEORGE McANENY,
New York Transit Commission.

In 1922 Chicago surface cars carried 75 percent of the traffic; in 1920 London surface cars carried more people than either tubes or busses, almost as many as both combined.

Issued by
Department of Street Railways

Transportation Talks

Number 2

A recent survey in the Chicago business district shows extremes to which street conditions grow.

Seventy-five percent of traffic was carried by surface cars which in turn were only ten percent of vehicles in street.

The passenger autos were fifty-one percent of vehicles but carried only nineteen percent of traffic.

Such conditions do not point to a solution of congestion by autos but demonstrate the fact that the mass of traffic in cities must be moved by large cars or trains on rails on some type of unobstructed tracks.

HENRY M. BRINKERHOFF,
Transportation Engineer.

How shall we use precious street space to the best advantage of the greatest number?

Issued By
Department of Street Railways

Transportation Talks

Number 6

When a street car is repeatedly held up by traffic congestion each of the persons on that car has lost valuable minutes of his own time and the cost of the service is increased, for the lost minutes increase the operating costs. All this might be saved if the car riders insisted, as they have the right to do, that as they constitute the large majority of the citizens using the highways they should have the right to use them without being blocked to such a degree.

It has been discovered by study that there are five times as many automobiles in large cities as street cars but they carry only one-fifth as many people Is it fair that 20 per cent of the people riding in five times as many vehicles should seriously interfere with the transportation of 80 percent of the people

EDWARD DANA,
General Manager Boston
Railway System

Issued By
Department of Street Railways

Transportation Talks

Number 7

Merchants have thought that cars parked around their stores meant increased trade. This was true once, but the limit was soon reached.

Now only part of those who would shop can find places to park near the store, and the general congestion resulting, added to the other street traffic, tends to close off the easy access to the shops for the multitudes who ride the street cars.

Thus, whatever makes it easier and quicker for the street car rider to get to the downtown store is of material interest to the merchant.

Typical "Transportation Talks" Issued by the Department of Street Railways in the Interest of Clearer Streets

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While in general the near side stop is used in Detroit, a few far side stops have been installed, for the sake of safety and speed, where there is a branch line turnoff. In all such cases the stop point is indicated by a sign, which is usually put two pole lengths down the street to provide for double berthing.

Inspectors Report on How Time Can Be Saved

Another method adopted for reducing the delays in service has been the appointment of a special corps of inspectors to study and report on this matter. These

10M 2-29-24 16767 CITY OF DETROIT—DEPARTMENT OF STREET RAILWAYS D. S. R. 212

DIVISION INSTRUCTOR'S REPORT

DIVISION SUPT._____ LINE_____ DATE_____

Badge No._____ Name_____ Car No._____

Boarded at_____ Time_____ M.

Left at_____ Time_____ M.

☐ Crossing Special Track Work	☐ Operation of Buzzers
☐ " Derailers	☐ " " Sand
☐ " R. R. Tracks	☐ " " Fuses
☐ Unnecessary Conversation	☐ " " Heaters
☐ Running on Time	☐ " " Snow Scrapers
☐ Operation of Doors	☐ " " Fenders
☐ " " Emergency Brakes	☐ " at Elec. Track Sw.
☐ " " Controller	☐ " " Facing Sw. Points
☐ " " Circuit Breaker	☐ " " Section Breakers
☐ " " Brakes	☐ " " R. R. Viaducts
☐ " " Thermostats	☐ " Around Curves
☐ " " Gong	

Operation:-Good.....Fair.....Poor..... Instructor.....

☐ OVER

Blank Used by Division Instructor to Report Points on Which New Motormen Require Further Instructions

inspectors spend their entire time riding on cars to see if there is any way in which unnecessary delays can be cut out. They are instructed to look out particularly for bad street conditions, length of layovers, etc., and if it is found that a run can be cut, say from 3 to 5 minutes, a new schedule is prepared.

The daily reports of these inspectors show the lines they ride, the service delays noticed and the time, duration and cause of these delays. The reports also mention all delays observed at steam railroad crossings and the number of the steam locomotive causing the delay. This permits the street railway management to take the matter up intelligently with the steam railroad officials. The inspectors are also supposed to report on any defects they notice in the track or overhead construction.

Traveling Instructors

In addition to these traveling inspectors the Detroit system has recently put on a corps of traveling instructors, whose service has been very beneficial and has helped considerably to speed up traffic.

The primary duty of these instructors is to follow up the new platform men after they have been accepted into the service and until they receive a first-class rating.

These instructors use two report forms. The first tells what cars they have ridden during the day, with the boarding and leaving time for each car and name and badge number of motorman, and a brief report on the character of the operation of the car. The second blank is a more detailed report of the operation of each new motorman, but so arranged that the important points in connection with each motorman on which a report is made can be indicated by a check mark. This latter blank is reproduced. There is space on the back for further comments.

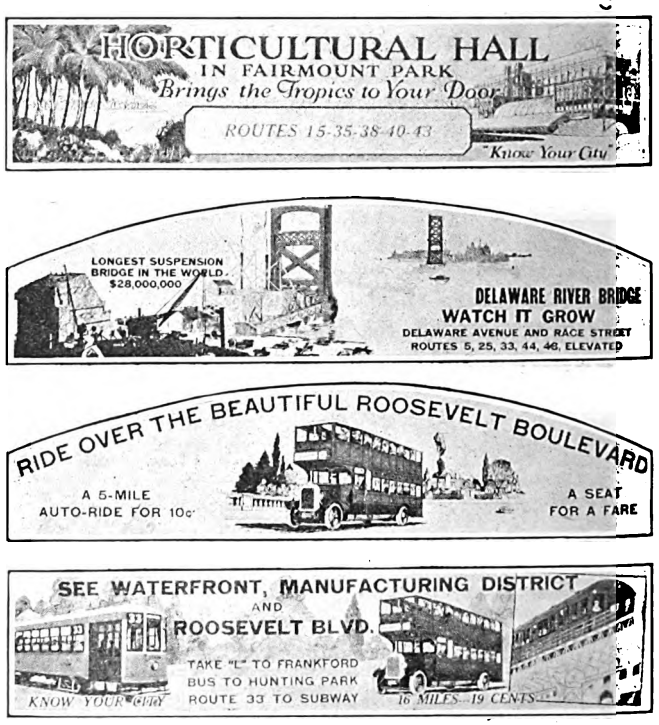
These instructors are also used for pushing campaigns among the platform men, as on economy or safety.

Trolley 'Roun' and Know Your Town

AN ATTRACTIVE series of bulkhead and ceiling rack signs, of which four are reproduced herewith, is being used by the Philadelphia Rapid Transit Company to encourage non-necessity riding. Various points of interest around the city are pleasingly portrayed and

Trolley Hike No. 1 6 Miles **Through the Wissahickon** Route 23-Germantown Ave. Change at Bethlehem Pike to City Line. Walk west-left-to Wissahickon; down stream to Valley Green—3 miles; to Lincoln Drive—3 miles; left, to Rittenhouse Street—Route 52-Chelten Av.	**United States Mint—** **Admission Free** **16th & Spring Garden Sts.** **Routes: 2-21-24-43-48** Largest mint in the world. Processes of coining gold, silver, bronze and nickel coins are shown. Open weekdays only, 9 A.M. to 3 P.M., Saturdays 9 to 11.00 A.M.
Trolley Hike No. 2 3 Miles **The Upper Wissahickon** Route 23-Germantown Ave. Change at Bethlehem Pike to City Line. Walk west-left-to Wissahickon; down stream to Rex Ave.—2 miles; follow Rex Ave. —left—up hill to Route 23 at Bethlehem Pike—1 mile.	**U. S. Navy Yard—Admission Free** **League Island** **Route 20** Usually some of the battleships may be visited between 10 A.M. and 3 P.M. Grounds open weekdays 9 A.M. to 4 P.M. For information about Sunday permits telephone Oregon 6300—extension 53.
Trolley Hike No. 3 4 Miles **Wissahickon—Cresheim Creek** Route 53-Wayne Ave. to Carpenter Lane; follow path north to Allen Lane; left to Hickory Hill road; to Wissahickon; walk up stream to Valley Green; cross to east bank; right, to Cresheim Creek; left, to Route 23-Germantown Ave.	**University of Pennsylvania** **Routes: 11-13-34-37-40-42** Campus and buildings, 34th & Woodland. Franklin Field and Stadium, 33d & Spruce. University Dormitories and Botanical Gardens, 39th & Woodland. Open every day, sunrise to sunset.
Trolley Hike No. 4 2 to 3 Miles **The Lower Wissahickon** Rout. 53-Wayne Ave. to Carpenter Lane; left on Carpenter Lane to Kitchen's Lane, to Wissahickon, down stream to Lincoln Drive; right, along Drive to Ridge Ave.-Route 61; or short cut left, along Drive, to Rittenhouse Street—Route 52-Chelten Ave.	**Zoological Gardens** **Admission** **Adults 35c Children 15c** **34th & Girard Ave.** **Route 15** Stupendous collection of live animals, birds and reptiles. Principal feeding hours 10 to 11 A.M. and 3 to 4.30 P.M. Open every day in the year, 8 A.M. to sunset.

"Trolley Hikes" and Advertisements Printed on Backs of Tickets



Ceiling and Bulkhead Signs Used by P. R. T.

instructions given as to how they can be reached. This is easily done as the P. R. T. designates all its lines by route numbers. The same idea telling the public where to go for amusement or edification is carried out by the use of advertisements printed on the backs of tickets. A list of "trolley hikes" is another feature of this publicity campaign.

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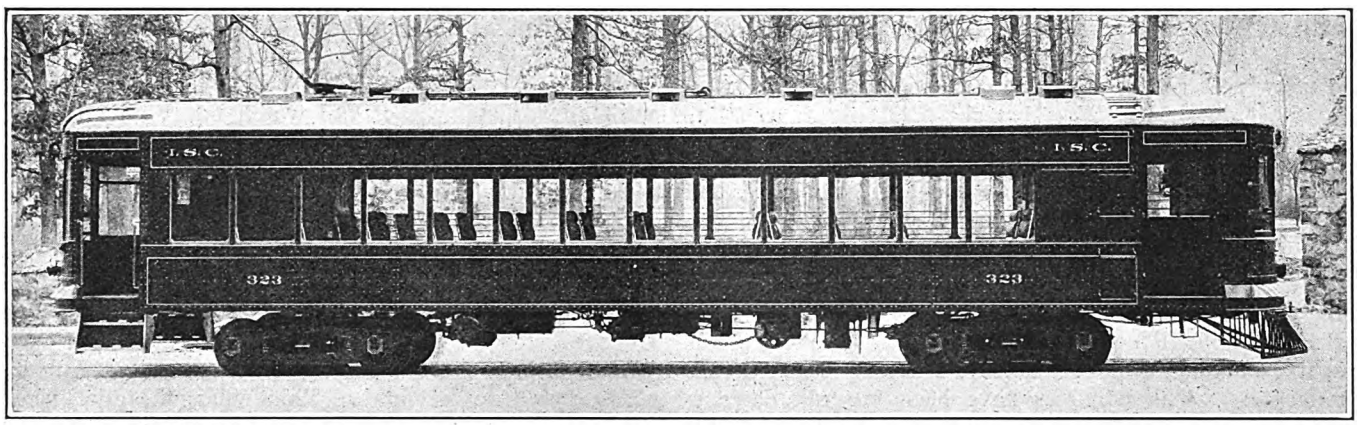
Rider Comfort Features Interurban Car

New Type of Interurban Car Developed by Indiana Service Corporation for Intercity Traffic—Riding Quality and Passenger Comfort First Consideration in Construction—Simplicity of Design of Both Interior and Exterior Produces Attractiveness—Fifty-Passenger Car Weighs 51,700 Lb.



New Type of Car Developed by the Indiana Service Corporation for Use on Its Interurban Lines

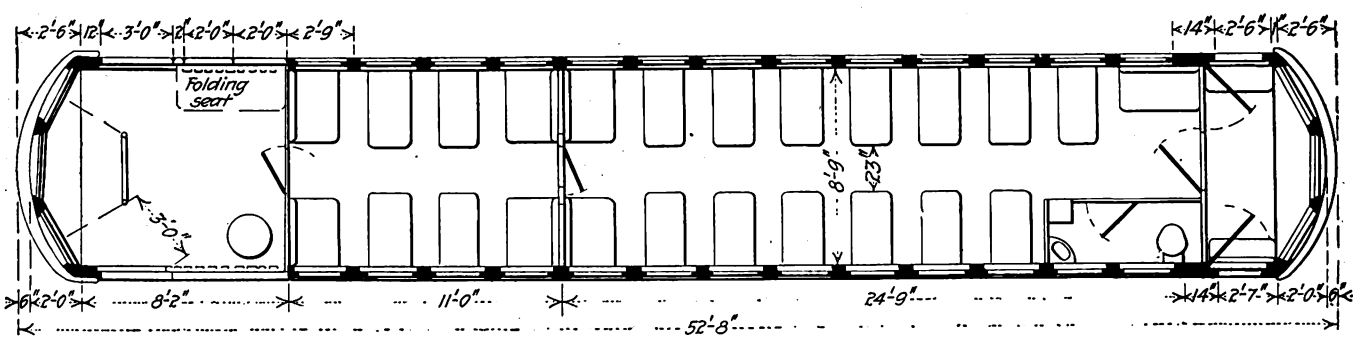
COMBINING the riding qualities and speed of the former type of rolling stock with the flexibility and economy of operation of the modern lightweight interurban cars, the Indiana Service Corporation, Fort Wayne, Ind., has developed a type of car which embodies many features new in interurban car design. Single sash windows, aluminum heating pipes, metal lined baggage compartments and mohair covered automobile type seats are some of the outstanding details of the cars which have been incorporated in the design by A. W. Redderson, superintendent of motive power.

Ten of these new cars built by the St. Louis Car Company have been placed in service, six of them on the Fort Wayne, Van Wert & Lima line, and the other four on lines of the Indiana Service Corporation. These cars are 52 ft. 8 in. long over all and have a height of 11 ft. 6¾ in. from the rail to the top of the arched roof. They seat 50 passengers and weigh 51,700 lb.

The use of 28-in. wheels brings the floor of the car 38 in. above the rail. The height from floor to headlining is only 8 ft. 1¾ in. The low appearance of the car is further accentuated by the single sash windows, the narrow side girder, and the wide letterboard. Attractiveness has been obtained by painting the car a brilliant red and striping it in gold. There is very little decorating or lettering on the exterior, the initials of the operating company at each end of the letterboard and numbers on both sides of the dash at each end of the car being the only lettering, while the striping consists of paneling on the letterboard, side girder and dash at each end.

Being single-end operated, steps have been provided at the rear only, while a sliding door on each side of the car gives entrance to the baggage compartment at the forward end. Directly back of the baggage compartment is a smoking compartment which is separated by means of a partition and swinging door from the main compartment, which is also separated from the rear vestibule by a partition and swinging door. Entrance to the car at the rear is by three steps, 13 in., 12½ in. and 12½ in. height. The rear platform may be completely inclosed by lowering trapdoors over the step wells and closing swinging doors which swing from the vestibule corner posts.

The car is of steel construction throughout. The 5-in. x 3-in. x ⅜-in. side sill angles extend from vestibule corner post to body corner post, while the car is further strengthened by two center sills of 3-in., 6.7-lb. "Z" section, which extend from front to rear bumper. Cross sills are of 3-in. x ⅛-in. channel-shaped steel pressings. The bolsters are cast steel. Anti-telescoping features have been included in the design of the bumper at both the front and rear ends. The 6-in., 8.2-lb. bumper channel is reinforced to resist collision with higher cars by having cast-steel anvils connect the two center vestibule posts with the longi-



Seating Arrangement of New Single-End Interurban Car, Indiana Service Corporation, Fort Wayne, Ind. Comfortable Accommodation for 48 Passengers in Car Body and Two in Baggage Compartment Is Provided

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tudinal center sills. The four vestibule posts are further strengthened by a 2½-in. x 1-in. x ⅜-in. dropper angle bar which extends around the end of the car at the top of the dash crown piece.

Upon this substantial underframing has been built up the car framework of steel sections. The side posts of 1½-in. x 2-in. x ⅜-in. tees are spaced 2-ft. 9-in. centers and support the roof, which is laid on carlines of 1½-in. x ¼-in. steel members set on edge. The corner posts are made up of angles and rolled steel shapes and extend from side sill to top plate. The side sheets and letterboards are riveted to the side posts with the window rest and seat rest angles and belt rails riveted to the side sheet. The side sheet is only 2 ft. 6 in. wide while the letterboard has been made 1 ft. 9 in. wide. This extra width in the latter member has resulted from the elimination of the upper window sash.

INTERIOR APPEARANCE GOOD

The interior of the car presents a well-lighted, pleasing appearance with the white, paneled headlining, long single sash windows, narrow side posts, green plush seats and white maple floor. The interior trim is mahogany. The windows have been brought down a little farther than is usually found in interurban car practice, resulting in an individual window glass area of 30 in. wide by 34 in. high. The arm rest is comfortably low, thus allowing the passenger an extensive view of the landscape. The window glass is set in Rex brass sash. The sash is lowered against a rubber block at the window sill in order to prevent water leaking into the car. With this type of sash and a narrow side post, the obstruction to view has been minimized. A roll shade has been provided for each window. The windows on the left-hand side of the car are provided with a five-bar window guard which is fastened to the outside of the side posts and extends the full length of the car body.

The Pleasing, Cheerful Appearance of the Interior Results from the White Paneled Headlining, Long Single Sash Windows, Narrow Side Posts and White Maple Flooring

Extending above the windows, on the interior, is a luggage rack on each side of the car with ample room provided between it and the arched ceiling for the usual amount of hand luggage. Although advertising sign molding has been provided, no advertising cards have been placed, as the company is undecided regarding the placing of advertising in the new equipment.

Seats for fifty passengers have been provided. Forty-six passengers are accommodated on St. Louis Car Company's stationary high-back seats, two on a straight-back side seat at the rear of the main compartment and two on a folding wooden seat in the baggage compartment. The eight cross seats in the smoking compartment are covered with genuine black leather, while the fifteen cross seats and the one side seat in the main compartment are covered with green figured smooth plush. These seats are 40 in. long with full spring cushion and back construction, having a back 3 in. higher than that formerly used in cars on this property. The seat cushion is of the automobile type and has 7 in. of upholstery. The seat spacing has been made 2 ft. 9 in., which is 3 in. more than that employed in the older type of car. Each seat is provided with an adjustable foot rail which has been arranged so that it can be folded up underneath the seat, allowing the entire space for baggage storage during the trip.

One difference between this car and the cars formerly in service on the property is the absence of straight back seats at the partitions between the several compartments of the car. Seats at these locations are of the same construction as elsewhere in the car. On one side of the aisle at the rear of the main compartment is the toilet room, which occupies the space along two side windows. This enlarged toilet room contains the water cooler and bottle and the usual dry hopper toilet.

Ample illumination of the interior of the car body has been provided by means of five 150-watt lamps with Holophane glass shades. These lamps and a sixth lamp are wired to a Nichols-Lintern selector switch which cuts in an extra lamp if one of the five burns out. These lamps are spaced over the center aisle, two in the smoking compartment and four in the main compartment.

Ventilation has been provided by means of 13 Garland intake and exhaust type ventilators. These ventilators are controlled by means of registers located in the headlining of the car. As is customary in interurban practice, a hot water heating system is used. The Peter Smith heater is located in one corner of the baggage compartment while the heating coils are located adjacent to the truss planks on both sides of the car body. An unusual feature of this installation is the double circulating hot water system with four rows of 1½-in. aluminum pipe. The dual circulation pipes have been provided in order to facilitate the regulation of heat under varying weather conditions. Through the use of aluminum in place of iron pipe a saving of 600 lb. in weight has been effected and at the same time approximately 25 per cent more radiation obtained. In the motorman's cab there is one Consolidated 222 electric cab heater.

A double flooring of ⅛-in. maple laid on ⅛-in. pine, with two layers of building felt in between, has been provided. Agasote of ¼ in. thickness is used as a side lining of the car from the top of the truss plank to the arm rest, and this material is also used for the headlining of the car. The interior of the baggage room is lined with sheet steel and copper and has a ⅛-in. Firm Tread steel floor. This construction was employed in order to reduce the fire hazard should the heater stove upset in case of collision. This type of floor also reduces the work of moving baggage or milk cans about the compartment.

The car is powered by four G.E.-275, 50-hp. motors mounted on Commonwealth steel low-frame trucks with 28-in. wheels. The control of the car is by means of a K-35 controller. The motors are the field tap type. With this electrical equipment and the small diameter

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wheels a quicker acceleration is obtained than was possible with the old type of interurban equipment. Straight air-brake apparatus furnished by the General Electric Company has been installed.

ENERGY CONSUMPTION SHOWS GOOD SAVING

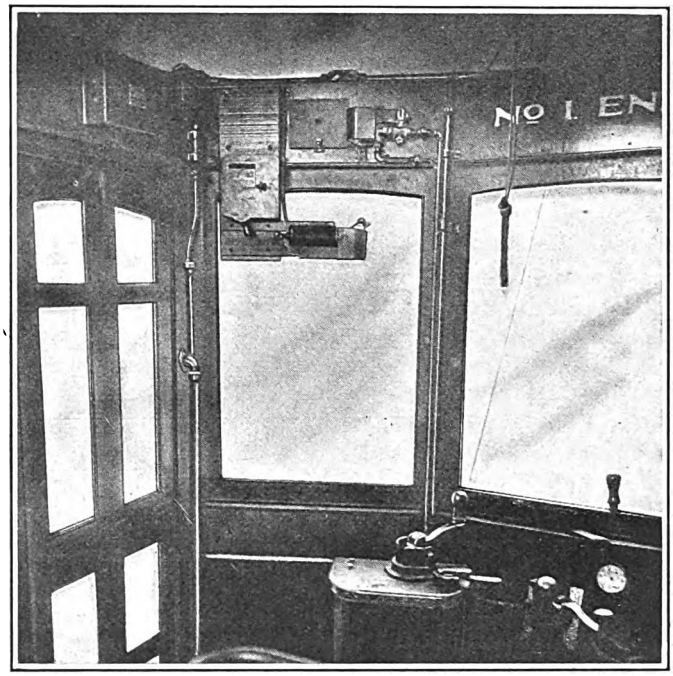
As these cars are equipped with Economy meters, it has been possible to compare the power consumption with that of the old cars. The power consumption for one day averaged 1.95 kw.-hr. per car-mile with the new cars, while for a similar day using old equipment the consumption was 2.41 kw.-hr. per car-mile. Comparable figures on energy consumption for the old and new cars on the Fort Wayne, Van Wert & Lima Traction Company line follow:

OLD 75,000-LB. EQUIPMENT

Date	Kw.-Hr.	Miles	Average Kw.-Hr. Car-Mile
Saturday, April 26, 1924	3,707	1,541.8	2.41
Sunday, April 20, 1924	3,363	1,412.0	2.38
Sunday, April 27, 1924	2,693	1,412.0	1.86
Monday, April 28, 1924	3,092	1,557.0	1.95

The weight distribution of the new cars is as follows:

Body, including control equipment, air brake equipment and hot water equipment, lb.	28,600
Trucks, cast steel, lb.	13,460
Four G. E. 275 motors (with gears and gear cases), lb.	9,640
Total, lb.	51,700



Trial Installation of the Simplex Safety System on a One-Man Car of the Binghamton Railway

Binghamton Railway Installs New Safety Devices

After Six Months' Trial of an Electric System of Safety Control the Company Has Decided to Install It on All of Its One-Man Cars

BY FRANK HAMPSHIRE
Master Mechanic Binghamton Railway

ACTING upon the suggestion of the engineers of the Public Service Commission of the State of New York, the Binghamton Railway in July, 1923, equipped three of its one-man cars with the Simplex Safety System. These cars were then placed in regular service for a period of six months, during which careful checks were made of their operation and weekly reports submitted to the commission. No trouble was experienced with the equipment during this test and at its conclusion the commission approved the installation of the apparatus on all one-man cars of the Binghamton Railway.

To go back to the history of this installation, an article describing this type of safety equipment was read in the ELECTRIC RAILWAY JOURNAL for Dec. 23, 1922. A sample equipment was then secured by the Binghamton Railway and placed on one of the cars, the entire installation being accomplished by three men in about ten hours. During numerous tests made, under every possible condition of operation, the equipment worked satisfactorily, and was considered sufficiently good to warrant an invitation to the engineers of the Public Service Commission to inspect it. Such an inspection was made and resulted in several suggestions for improving the apparatus. The manufacturer took steps to overcome these objections and later the three trial installations of the improved apparatus were made.

The chief feature of the apparatus is the special operating head of the brake valve. This contains an automatic brake setting mechanism in the form of a strong spring, which is kept from functioning by a slight downward pressure exerted by the operator's hand. At first, this was the cause of some complaint from the platform men, who said that it made their wrists tired. To overcome the trouble, an entirely different type of handle was designed, and this has proved so popular among the motormen that the company is considering the installation of handles of the same type on its two-man cars.

As will be seen from the accompanying illustration, the brake handle differs from the ordinary straight lever which swings in a horizontal plane. It is, in fact, somewhat similar to a controller handle, in that a rounded knob is pro-

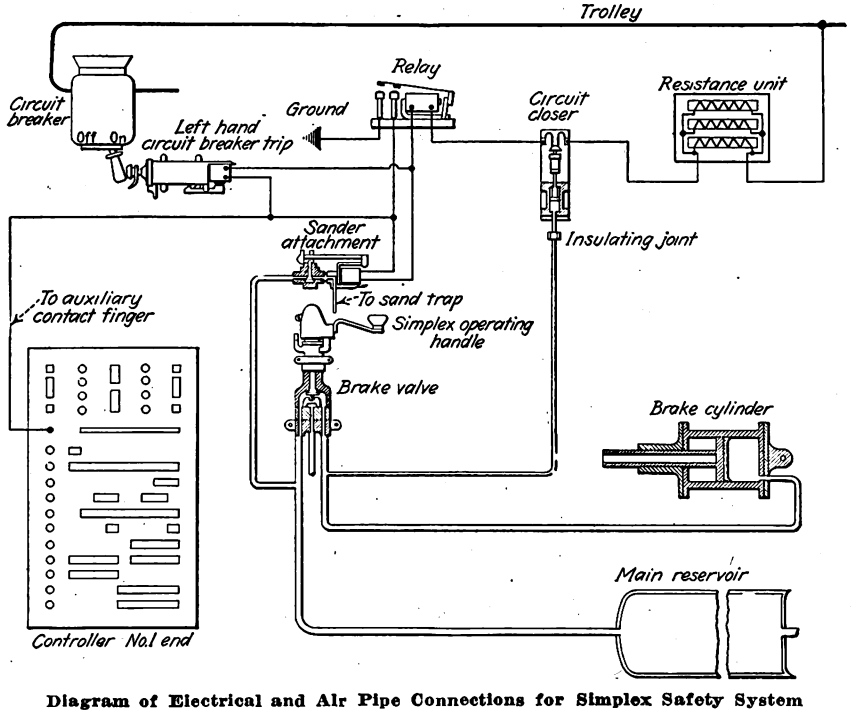


Diagram of Electrical and Air Pipe Connections for Simplex Safety System

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vided on which the operator's hand can rest. Years ago it was customary for the motorman to remain in a standing position while operating his car. At that time the brake valve was located quite low on the dash, so that the motorman's fingers could easily encircle a round lever projecting horizontally from the valve. More recently, however, there has been a tendency to place the brake valve higher and for the motorman to sit down to his work. This makes it rather awkward to grasp a handle of the ordinary type, but with this new handle the difficulty has been eliminated.

The other parts of the apparatus are very simple and easily understood by the average carhouse man. For a double-end car they consist of a resistance box, a circuit closer, two relays, two circuit-breaker trips, two electric sander valves and two special contact fingers and segments in the controller.

The removal of the operator's hand from the brake handle allows the spring to raise the handle, throwing the brake valve to the emergency braking position. This admits air to the circuit closer and also directly to the brake cylinder. The movement of the circuit closer energizes electromagnets in the circuit-breaker trips and in the sander attachments. Electric and air connections of this apparatus are shown in an accompanying illustration.

The apparatus differs from the ordinary safety control system in that the dead man feature is on the brake handle, under the operator's right hand. It is so arranged that he can remove his hand only when the brakes are set. He cannot, therefore, collect fares, make change or perform other duties which would divert his attention from the track ahead while the car is in motion.

Two of the advantages of this system are its ease of application to old cars and its freedom from freezing in winter. The apparatus is so simple that the installation can be made in a comparatively short space of time.

The Binghamton Railway did not lose the use of a car for a single day while putting on this equipment as it was possible to do all the work of installation between morning and evening tripper time. This was important as all of its cars are required for service during the evening peak. There are so few parts used in this equipment that its addition to the cars has not required any additional force of men to maintain it.

Reinforced Concrete for Track Paving

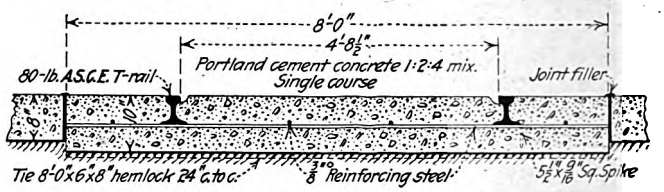
Its Use Has Proved that It Is Beneficial in a Cold Climate Where the Track Is Subject to Heaving from Frost

BY E. W. JENNISON
Engineer Maintenance of Way Bangor Railway & Electric Company, Bangor, Me.

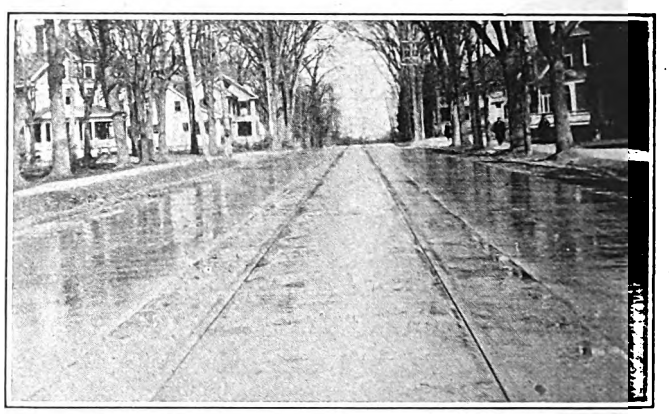
THE reinforced concrete paving of the design shown in the accompanying illustrations was first installed in Bangor, Me., on Hammond Street, five years ago The only improvement in this design since 1919 has been the substitution of thermit welds for bolted joints, which took place in 1923.

There are several reasons for the design shown. The A.S.C.E. section of T-rail was chosen because it is standard, and it offers more wearing value for the money than either high T or girder sections. Since the track and paving structure should be a single unit, its low height enables the thickness of the paving to be kept at a necessary minimum. Cement concrete was chosen as it is the only satisfactory material by means of which the wearing surface and the supporting base for vehicle traffic can be combined in a single course, and it is also much cheaper in first cost than any type of blocks on a concrete base. It has also been found that snow cleaves much more readily from a concrete surface.

The native hemlock ties are used because their first



Section of Bangor Track with 80-Lb. T-Rail and Reinforced Concrete Paving



Appearance of Reinforced Concrete Paving in Bangor After Five Years' Service

cost is low, and when damp and not exposed to the sun we know that they have a life of from 20 to 25 years, which is about the life of the paving. Even should the ties decay and fail to support the rail before the paving is worn out, we feel that the concrete will support the rail inasmuch as we have practically a reinforced concrete tie between each two wood ties. It has been the experience here that when frost action takes place this design has heaved as a unit, and for the most part returned later to its original surface. This frost heaving is probably due to poor drainage. The rails are thermit welded, as this weld, in our opinion, gives absolutely continuous rail and will add years to the life of the rail as well as the whole structure over a type where bolted joints are used.

All the track designs used prior to the one shown in the illustration had two real faults. The paving was broken up by frost action and the rail cupped at the bolted joints, which still further disintegrated the paving and the track structure. All these early designs have shown us that the track structure and the paving must be a single unit, particularly where frost action is experienced. Further, our experience with the type of construction shown, which was placed in 1919, has proved to the writer, who has had charge of the maintenance of way department since November, 1921, that all rail joints which are located in paved track should be welded.

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The Readers' Forum

Air Brake Handle Improvement Suggested by Operating Man

NEW YORK CITY, June 3, 1924.

To the Editors:

As a motorman on the cars on ..... Avenue, I wish to make a little suggestion that will be of interest to the makers of air brake equipment.

I saw an accident a few weeks ago that was caused by the air brake handle slipping up so that the motorman could not stop his car in time. Now, if the air brake handle was made so that it could not slip up it would save many accidents.

A thumb screw might be put on to hold it down. What do your readers think about this question?

MOTORMAN.

[NOTE: The editors are not aware that many accidents have occurred because the air brake handle was lifted out in passing the central position. This would be unlikely to happen if the handle had a snug fit on the stem. Sometimes bushings in the handle or wedges have been used to accomplish that result. Any company that has trouble of the sort this motorman refers to is invited to inform the JOURNAL of its experience and the remedial measures taken so that some measure of the importance of the point raised may be had.]

Thinks No Disadvantage in Selling Auto Owner to Ride Cars

THE BEAVER FALLS TRACTION COMPANY,
NEW BRIGHTON, PA., MAY 28, 1924.

To the Editors:

Your editorial "Seeking Patronage of Auto Owner Is of Questionable Profit" in the May 24 issue of the ELECTRIC RAILWAY JOURNAL is very interesting, especially so in view of our intense activity along the line of securing as many of the automobile owners as possible to ride upon our cars.

I feel that the summary in your closing paragraph is good reason for concentrating in our endeavors to secure the automobile owner.

There is no danger of the automobile being a thing of the past. There is no danger of there being a decrease in the total number of automobiles. They will increase, and the best that we can hope for is to secure a moderation in the use of the automobile.

There is a possibility of having such success that we will create a peak load for our cars which will result in the operation of additional cars and mileage with a decrease in net earnings, but I personally do not think that there is a strong probability of such a situation.

There are so many companies that feel the need of the patronage of the owner of the private automobile that I do not believe we need limit ourselves in our endeavors to secure this patronage. Moreover, I am of the opinion that the extensive use of the private automobile is chiefly in the non-rush periods. This might not be exactly true in the larger cities, because the rush-hour period is more protracted than in the smaller communities, and a mass of automobiles occupy the streets and their owners return home during the early portion of the peak-hour period.

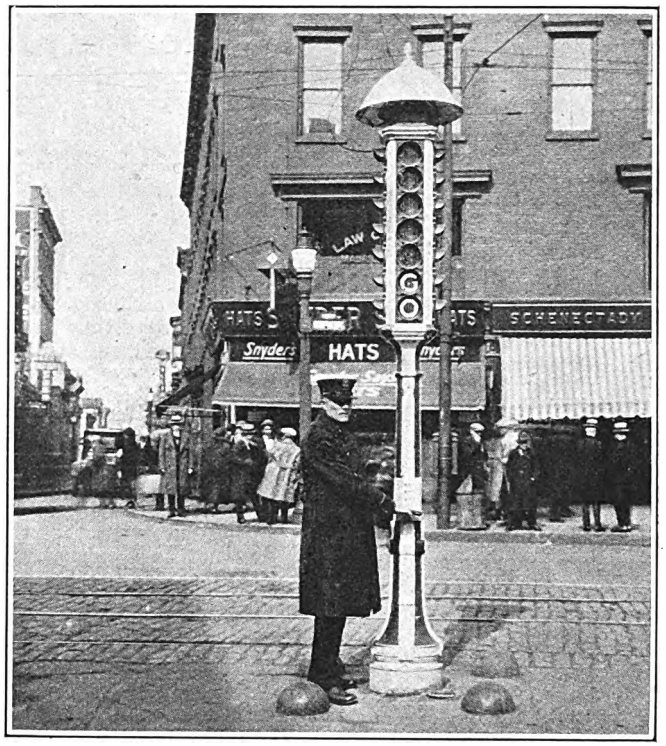
Should it develop that there is an extensive abandonment of the use of the private automobile and a corresponding increase in the use of the street car, it will be accompanied by such betterment to the finances of the street car companies that they will be able to give more serious consideration to the operation of two classes of service—de luxe coach service at a rate sufficiently high to warrant the convenience and the proper number of street cars with a street car schedule that is profitable.

I see no disadvantage whatsoever in going after the owner of the private automobile. The worst that can happen is that the transportation companies will have a monopoly of the business, but it will be under such favorable circumstances that they will be able to finance any class of service that is desired, be it street car, bus or aeroplane.

C. D. SMITH,
General Manager.

Schenectady Has Novel Traffic Signal

THE latest thing in traffic signals is that illustrated herewith, which has been installed in Schenectady, N. Y. In all there are seven lenses mounted vertically on a substantial standard. The four lenses at the top are red and outline the word S-T-O-P when the lamps behind them are lit. The two lenses at the bottom are green and show the letters G-O. When traffic is heavy these six lamps are operated by the traffic officer who is stationed at the corner. The operation is similar to that with an ordinary semaphore signal, as shown in the illustration.



This Illuminated Signal Replaces the Semaphore, and Gives an Automatic Warning When the Officer Is Absent

The fifth lens from the top has an orange indication. When there is no traffic officer at the station, as in the early and late hours, this is operated automatically in place of the "stop" and "go" lights, flashing on and off continuously. The same signal indications are shown on all four sides of the tower, the lamp circuit being interlocked so that when the word "stop" is indicated on the two opposite sides, the word "go" appears on the sides at right angles.

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Association News & Discussions

Safety Work in Providence

Increased Number of Automobiles Means Greater Vigilance—Safety Board Established in Providence

AT THE afternoon session of the New England Street Railway Club, held at the Copley Plaza Hotel on Thursday, May 22, H. K. Bennett, safety manager of the United Electric Railways of Providence, spoke on the automobile hazard and, at the conclusion of his remarks, showed a number of slides which he has used in the safety campaign carried on in Providence. Mr. Bennett spoke extemporaneously, but, among other things, said:

"It is interesting, as well as appalling, in the light of present-day events, to note the growth of the automobile industry in periods of five years. In 1900 we find registered 13,824; in 1905, 77,988; in 1910, 468,497; in 1915, 2,445,666; in 1920, 9,231,941, and in 1923, 15,092,177. Please note that the gain in 1923 over 1922, numerically, was 2,853,802, which is 400,000 more than the total registration in 1915.

"From a mere pleasure vehicle the auto has become a necessity, both for pleasure and business, and it is not so much a question of when the point of saturation is going to arrive as how the rolling stock of the mighty army of automobiles is to be handled on the streets and highways of the country at the present time."

In speaking of automobile accidents, Mr. Bennett said: "In 1923 16,000 lives were lost in automobile accidents alone, an increase of 2,000 over 1922. Yet we call this a decrease rather than an increase on account of the nearly 3,000,000 more automobiles which were on the highways of this country. This figure, of course, does not take into account the large number of persons injured, which would be many times this figure. Sixty-five per cent of all street railway accidents involved automobiles."

Mr. Bennett then referred briefly to the safety work done in Rhode Island. He said that in May, 1923, a general safety board was formed on the property of the United Electric Railways, composed of the president and general manager, vice-president in charge of operations, superintendents of transportation, equipment, power and line, and bus operation, the general freight and general claim agents and the chief engineer (track), with the safety manager as chairman. This board meets twice a month. During the interim, suggestions are received from the employees and, when they are not within the scope of the safety manager, they are referred to the department having charge of such matters. At the meeting of the board, reports are received and the suggestions are either adopted or rejected. In any event, the originator of the suggestion is written to and given the reason why his suggestion is adopted or rejected. Of approximately 350 suggestions received during the first year, one-half were placed in effect, and 75 per cent of the rest were considered good but could not be adopted on account of the expense involved. The remainder were trivial matters. Prizes are given each month for the three best suggestions—$7.50 for the best, $5 for the second best and $2.50 for the third best. These are determined by vote of the board, but no one but the safety manager knows the originator of the suggestion until after decision is made as to prize winners.

The company maintains bulletin boards at its eleven carhouses and other division headquarters, on which are placed from time to time letters and posters which are calculated to aid in the diminution of accidents. There is a monthly paper, published by the safety manager, in which the accident situation locally is reviewed and dangerous locations brought to the attention of the blue uniform men, so that they may be on their guard. There are also contributions from each of the carhouses.

Mr. Bennett was very insistent that motor laws in the various states be standardized and that violations of such laws be punished without fear or favor. He urged the enforcement of existing laws through a sufficient number of officers so that the streets and highways could be adequately patrolled.

Reasons for Increases in Accident Claims*

BY JOHN J. REYNOLDS
Claims Attorney Boston Elevated Railway

FOR the purposes of this brief discussion we may understand that an "accident" is anything that happens or begins to be, without design, or as an unforeseen, undesirable or unfortunate happening, without the concurrence of the will of the person by whose agency it was caused.

It may thus be seen that an accident differs from a mistake in that the latter always supposes the operation of the will of the agent in producing the event, although that act of the will is caused by erroneous impressions on the mind. Therefore, if one applies this test to the generality of so-called accidents, it will not be difficult to classify a great many of them as mistakes and not as accidents.

Hence to refer to many such happenings as accidents is harmful, since it connotes excuse, when something much more drastic is necessary. One often hears the statement that accidents are bound to happen. The fact is, they are not bound to happen. They are usually the penalty of negligence, a blunder of omission or of commission, an error of observation or of judgment, the wrong lever pulled or the wrong button pressed, an order which miscarries, is overlooked or is misunderstood, a rule that is not obeyed, and the accident follows with speed and certainty. Some of the most serious and costly accidents have happened because necessary rules were not observed.

This should be all plain to employees, and it should be equally plain that the same lack of care on the part of the public is responsible for most of the accidents with which it meets. The report of the joint committee on accident prevention, read at the 1923 Atlantic City convention, is a most comprehensive survey on this subject.

To say that all accidents are potential claims does not express even a half-truth, in that the number of claims which may be made depends upon the number of persons involved in a given accident. This is a very important fact for those responsible for accidents and their prevention always to keep in mind.

There is also, strictly speaking, no market price for claims. No two claims are exactly alike nor of the same value. Each claim requires independent decision. Any one can settle claims if he pays enough money for them. To make reasonable compromise and decline others provides one of the most difficult, trying and least understood of all the positions in the railway business.

To understand the philosophy of the increased cost of accidents, frequent inquiry should be made into the conditions beyond the face of the figures, since this history is influenced by changing conditions and by situations over which neither the railway company nor its claims department has much if any control, and which tend invariably to operate to the financial disadvantage of the accident cost account.

It would seem that any economic consideration of this question should not lose sight of the following fundamental causes:

1. Adverse legislation.
2. Attitude of the community. (Agitation and development of ultra socialistic thought, propaganda, etc.)
3. Liberal interpretation of the law by the courts in favor of claimants.
4. Liberality of present-day juries, resulting in larger verdicts.

*Abstract of paper presented at a meeting of the New England Street Railway Club, Boston, May 22, 1924.

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5. Growing reluctance to set aside or interfere with verdicts on the ground of excessive damages or on other grounds.

6. Statutory deprivation of legal defenses existing prior to the enactment of adverse legislation.

7. Increase from $5,000 to $10,000 in the amount recoverable in death cases, with the omission of the requirement of gross negligence of the railway company and with interest from the date of the writ.

8. The enactment of a statute establishing a legal presumption of due care in favor of plaintiffs. (This statute now permits cases to go to the jury which before its enactment were excluded for lack of affirmative evidence of due care.)

9. In enactments of popular legislation there have been those who have been unable to appreciate or justly to estimate the true object or reason for the change. The workmen's compensation law for instance is illustrative of this, in that it produced in the mind of the general public the thought that no matter how an accident happened, the injured person, whether an employee or not, was entitled to receive compensation, the result of course being that accident costs went up.

One of the most striking of the modern causes of the growth of accident costs is the increase in wages of those who receive a weekly wage. For instance, a few years ago a laborer if away from his work for one week on account of injury lost from $12 to $14 in wages. At present, for the same period, he loses from twice to three times if not more than that sum, and all the bills accruing on account of accidents have increased in like if not, indeed, in greater proportion. And this is true, too, all along the line and includes physicians, nurses, medicines, damaged clothing, labor charges in vehicle accidents, including the $1.35 per hour for the automobile repair man, etc.

It was inevitable, of course, that this should all bring with it a sharp jump up in the cost of accidents.

Another great increase in accident costs is found in the case of accidents to the railway employee himself; this is doubtless several times more than the amount expended a few years ago for the same class of accident.

Another cause of the increase in the cost of accidents is due to the difficulties of operation chiefly on account of the density of automobile travel. To cite a single example, take the case of a careless chauffeur who cuts very suddenly in front of a car and forces the motorman to jam on his emergency brakes so suddenly that the electric car is put out of commission, even though the accident itself is avoided. A common result of such a near accident is to throw passengers in the car, injuring them, with resultant claims against the company.

The type of car and equipment is a factor in rising claims costs. For instance, with respect to witnesses, where a team, automobile or pedestrian gets upon the track and is hit by one of our middle-entrance cars, witnesses in the car are of little, if any, affirmative help, since the construction of the car is such that it interferes with passengers seeing what preceded the impact. This makes it a very difficult thing to determine in a great majority of cases, at least, just when the negligence of the vehicle driver or the pedestrian ceases after he has got upon the tracks, and the negligence of the motorman commences. In such cases one of the most important things to know is relative distances. Even with some of our semi-convertible type of cars such accidents at night leave us in the same position. Hence the great importance of getting street witnesses whenever possible.

From a claims standpoint, everything practicable should be done to keep cars from being started too quickly, or from jerking hard enough to throw passengers, whether this is due to poor or weakened conditions of resistance banks or other equipment defects, or to the negligent handling of the equipment by the operator. The type of accident generally classified as "falling in car" is altogether too numerous and is practically indefensible.

The question of the extent to which the type of construction of certain cars has been responsible for particular accidents is a matter which is receiving careful consideration at the present time, therefore need not be further adverted to here.

How to Reduce Automobile Accidents

Now a few words with respect to automobile accidents. In no other class of accidents do we find the elements of carelessness, recklessness and other disregard for the right of others.

Electric railway companies have done everything possible to conserve the public safety, yet there is a tendency on the part of the public to demand protection without making a proper effort to protect itself. Consequently our trouble is mainly from without and not from within. To relieve this condition we must seek measures to protect ourselves from the suffering, from injury and from the expenditure of large sums of money in damages, by throwing around others a safeguard which they are unwilling to provide for themselves, or which they carelessly and negligently refuse to exercise. The time has come when we must prohibit the automobile and motor vehicle driver from using his own judgment (or misjudgment as is frequently the case) and surround him with restraining regulations for the protection of himself and others.

In view of this constantly increasing number of automobile accidents is it not also about time that a law were enacted that all applicants for a license to drive an automobile should have to pass a physical examination by a registered state physician as to their mentality, eyesight, hearing and general physical condition? Uniformity in state, county and municipal laws will help in the prevention of motor vehicle accidents.

In the Boston district it might be possible to have the Metropolitan Planning Board embrace in its study the lessening of this automobile hazard. Such a board might well work in conjunction with the city and town traffic commissions, to designate through intermunicipal thoroughfares, regulate traffic generally, prescribe penalties, etc. One requirement of such an arrangement would be that automobiles would be compelled to come to a full stop before entering a main highway.

Electric Locomotives Discussed by F. H. Shepard

The Types and Characteristics of Electric Locomotives Now in Use Were Classified and Interesting Comparisons of the Particular Types for Best Results Were Given

THE annual convention of the Mechanical Division of the American Railway Association is now being held at Atlantic City. At the session on June 13 F. H. Shepard, director of heavy traction for the Westinghouse Electric & Manufacturing Company, presented a paper on "The Development of the Electric Locomotive." Mr. Shepard gave three reasons why railway electrification in America has been slow. These were, first, the relatively high capital expenditure required together with the difficulties of railroad finance; second, the plentiful supply and the relatively low cost of coal, and third the lack of general understanding or definition of objectives for future railroad service. Throughout the world the number of electric locomotives for main-line service now in operation or under construction is 2,200 units, aggregating some 4,000,000 hp., and a table was presented giving their distribution, nominal horsepower, capacity, weights, and the electric system used.

An analysis of this table shows that 6.2 per cent in number and 6.7 per cent in horsepower are low-voltage d.c. locomotives; 31 per cent in number and 27.3 per cent in horsepower are high-voltage d.c. locomotives; 40.6 per cent in number and 36.2 per cent in horsepower are single-phase a.c. locomotives, and 22.2 per cent in number, and 29.8 per cent in horsepower are three-phase a.c. locomotives. Of the high-voltage d.c. locomotives, 18.7 per cent are in the United States and 48 per cent are in France. Of the single-phase locomotives 21.6 per cent are in the United States, and the remainder in Europe. Of the three-phase locomotives, 98 per cent are in Italy.

Mr. Shepard pointed out that the mechanical parts form the link between the electrical apparatus and the track and that the adequacy of their detailed design and the proper characteristics of the whole are essential to the success of an electric locomotive. He presented two very comprehensive tables giving data as to how the various designs have been made use of to meet

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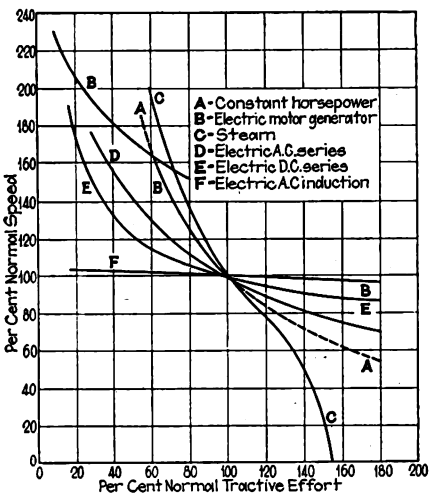
the various requirements, and the various practices which have been evolved. These tables give data of construction, type, capacity and other important characteristics of all the locomotives built or building to date.

In commenting on these tables Mr. Shepard pointed out that within certain limits the electric system adopted and the service for which the locomotive is intended are the chief factors governing the fundamental design of electric locomotives. The electric system that is chosen and the service requirements determine the type of motor, its characteristics, its size and speed. The type of motor and restriction to driver weights determine the drive within limits and the drive will, in turn, together with the absence or presence of critical curvature, essentially determine the configuration of the rigid running gear. The necessity for auxiliary trucks will be determined



Speed-Tractive Effect Characteristics of Locomotives

mainly by the service requirements, chiefly that of speed, and presence or absence of critical curvature; but, in certain cases, this will be determined or influenced by the limit of axle loading or by placement of the driving motors or the placement and amount of auxiliary apparatus.

The type and characteristics of motors were classified under three heads. the direct-current motor, the alternating-current series motor, and the three-phase induction motor. All three types lend themselves to regeneration. Mr. Shepard expressed his opinion that the induction motor is inherently the best for regeneration as it automatically, without additional apparatus for switching, separate excitation or regulation of any kind, becomes a generator whenever the locomotive, while descending a grade, exceeds the synchronous speed. No question of stability, flashing or expert manipulation enters into the matter. An accompanying chart shows the typical characteristics of the direct-current series, the alternating-current series, the alternating-current induction motors, and the direct-current series motors used with locomotive motor-generator sets.

The direct-current series motor, Mr. Shepard said, has certain advantages for certain applications owing to its torque-speed characteristics. As to speed control and as a generator it has disadvantages, all of which by additional apparatus and design have been successfully met. If used with a motor-generator set on the locomotive its limitations are further reduced. It lends itself particularly to subdivided power on account of its size and weight efficiency and it has an ease of grouping which partly offsets its speed-control limitations. The individual drive, therefore, will be found best adapted for the direct-current series motor. This can be the gearless direct drive, geared, axle hung, frame mounted with quill, or with universal rod and pin drive.

With the greater space requirements needed by single-phase series motors their use as direct gearless and for axle-hung mounting is restricted to the relatively smaller sizes, while for frame mounting with geared quill or universal drive, space limitations do not usually govern. The necessity for laminated structure, distributed windings or more brushes, together with the relatively lighter frame sections, adapts the single-phase series motor in its largest sizes to frame mounting with collective drive, by which one motor drives more than one driving axle.

The induction motor is adapted particularly for heavy service where constant speed is desirable due to its simplicity of control and for the attainment of the high weight efficiency with large motors. These make the collective drive the desirable one for this type of motor.

Mr. Shepard gave a very complete classification of the various drives in use on electric locomotives. The various forms outlined have been discussed in connection with details of various locomotive designs in previous issues of the ELECTRIC RAILWAY JOURNAL.

In conclusion Mr. Shepard said that the design and perfection of the electric locomotive are being given intensive consideration universally, and that while the amount of electrification in recent years has been relatively low, yet present activity indicates a continued development for future requirements.

New York Electric Railway Association

EARLY registrations indicate that there will be a large attendance at the forty-second annual meeting of the New York Electric Railway Association, which will be held June 21 at Long Beach, N. Y. The headquarters will be at the Hotel Nassau. There will be a business and technical session in the morning, golfing and other entertainments for the men in the afternoon and a banquet in the evening. A special program of entertainment for the ladies has also been arranged. The program for the morning session, which begins at 9.30 a.m., is as follows:

Convention called to order.
Address of the president.
Report of the secretary and treasurer.
Reports of committees.
Appointment of nominating committee.
Paper, "Public Relations and Publicity," by James P. Barnes, president Louisville Railway. Discussion, led by Philip L. Thomson, publicity manager Western Electric Company, New York.
Paper, "The Motor Bus as an Auxiliary to Street Railway Operation," by L. H. Palmer, vice-president and general manager United Railways & Electric Company, Baltimore. Discussion, led by Vincent E. Keenan, superintendent of bus department United Electric Railways, Providence, R. I.
Paper, "What Electric Arc Welding Means to the Electric Railway Industry," by A. M. Candy, general engineer Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa. Discussion, led by J. W. Hulme, assistant superintendent car equipment Interborough Rapid Transit Company.
Paper, "What the Manufacturer Has to Sell to the Industry," by E. P. Waller, manager railway department General Electric Company, Schenectady. Discussion, led by A. J. Manson, manager transportation division Westinghouse Electric & Manufacturing Company, New York.
Report of nominating committee.
Election of officers.
Unfinished business.
Adjournment.

The annual banquet of the association will be held at 7 p.m. at Castle-by-the-Sea, which adjoins the Hotel Nassau.

The two speakers scheduled at the banquet Saturday evening are Roland B. Woodward, secretary of the Rochester Chamber of Commerce, and Robert S. Binkerd, vice-chairman of the committee on public relations of the Eastern and Southern railroads, New York City.

An especially interesting program has been arranged for the ladies on Saturday morning. Through the courtesy of Major General Bullard, they will have an opportunity to visit Mitchel Field at Mineola to inspect the hangars and flying machines there and to see some exhibit flights. The senior class from the West Point Military Academy will also arrive at Mitchel Field on the morning of June 21 for instruction in aviation. The committee on entertainment announces that buses for Mitchel Field will leave the Nassau Hotel promptly Saturday morning at 9:30.

On Saturday afternoon card games have been arranged for the ladies and there will be dancing following the banquet.

The golf tournament for the men in attendance at the convention will be held at the Lido golf course on Saturday afternoon. Suitable prizes will be awarded.

Iowa State Convention

THE annual convention of the Iowa Electric Railway Association will be held in conjunction with the Iowa section of the N. E. L. A. at the Wahkonsa Hotel, Fort Dodge. The N. E. L. A. will hold sessions June 24 and 25. There will be a joint session Thursday, June 26, and a separate railway session the same afternoon.

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Internationaler Strassenbahnverein

THE 1924 convention of the Internationaler Strassenbahnverein (Street Railway Association of Central Europe) will be held this year at Homburg v.d. Hohe, Germany, on Sept 4 and 5. It will precede a meeting at the same place of the German Street Railway Association on Sept. 6-7. The following program of papers has been arranged:

"One-Man Cars," by T. E. van Putten of Amsterdam, Holland, and E. Hultman of Malmo, Sweden.

"Standardization of Track Construction and Track Maintenance," by Paul Goetz of Leipzig.

"Control Systems," by K. Pforr of Berlin.

"Yearly Car-Mile Performance of Transportation Employees," by K. Norregaard, Copenhagen, Denmark.

"Tendencies in Legislation in Different Countries in Regard to Hours of Labor of Transportation Employees," by Dr. M. Mumssen of Hamburg and Dr. A. Patz of Budapest.

"New Designs of Street Railway Motors with Inclosed Lubrication," by F. G. Wellner of Bielitz.

"Motor Ventilation," by E. Nier of Dresden.

"Lubrication of Gears and of Ball and Roller Bearings," by Dr. E. Vidéky of Budapest and K. Pforte of Hagen.

"Magnetic Track Brakes," by Jorgen F. S. Barth of Christiania.

"Street Railway Fares in Non-Expanding Territory," by A. Winter of Vienna.

"The Destructive Competition of Electric Railways by Automobiles," by Hermann Geiser of Schaffhausen.

"Betterments on the Zürich Railway System," by Carl Wick of Zürich.

American Association News

Equipment Committee

A VERY busy session of the equipment committee was held at the association headquarters in New York, June 6 and 7. Those present were F. H. Miller, chairman; Daniel Durie, sponsor; W. S. Adams, W. W. Brown, R. S. Bull, A. T. Clark, J. M. Hipple, J. F. Miller, E. S. Sawtelle, P. V. C. See, R. B. Smyth, C. W. Squier, W. G. Stuck, J. McCune, J. L. Gould and L. H. Fry. G. L. Schermerhorn represented E. D. Priest and W. H. Phillips was present as a guest of the committee.

Final reports were made by the various sub-committees and these were discussed, corrected and approved for use in the final report of the committee. The subject of car gearing was reported upon and a summary of answers to a questionnaire will be included in the final report. A table of sizes and locations for the web holes in gears was decided upon and will be recommended for standardization. The use of various devices for trolley contact and the effect upon trolley wire have been studied in co-operation with the power distribution committee. A tabulation of replies to a questionnaire will be included in the committee's report, together with a summary of present practice.

A very thorough review has been made of the Manual sections on equipment under the heading of Miscellaneous Methods and Practices, and as a result of it, the following have been revised and rewritten and will be included in the final report:

Inspection of brakes, air compressor maintenance and inspection, comparison of car weights with seating and carrying capacities, repairs of armatures, maintenance of commutators, insulating materials for railway repair shop use, inspection and lubrication of gears and pinions, protective devices for car equipment, lubrication of motors, armature and axle liners, specifications for trolley wheels, carhouse organization and rules for lubrication of various equipment.

Former miscellaneous methods and practices for overhauling and inspection of electrical equipment and rules for inspection of equipment parts were reviewed. Such equipment parts as are not covered in other sections are to be combined into a new miscellaneous method and practice. The section on wires and cables for trolley equipment was examined, but final report cannot be made until the subject of car and carhouse wiring has been disposed of by the National Fire Protective Association. The subject of slack adjusters will not be included as a recommended miscellaneous method and practice, but answers received from a questionnaire on this subject, with a summary of results, will be included as a part of the equipment committee's report. It was recommended that the specifications for wrought-iron bars and limit gages and that for proof testing of forgings to determine their soundness after quenching and tempering be advanced from a miscellaneous method and practice to recommended specifications.

Results of a questionnaire on spring supports for railway motors was presented. This will be summarized for final recommendation. A study was made of existing practices in the matter of inspection periods for car axles and a new set of rules was developed for inclusion in the Manual under the heading of Miscellaneous Methods and Practices.

The report of air brake tests conducted under the auspices of the Central Electric Railway Association has been studied by this year's committee. A report of this study was made by the sub-committee and various parts will be included in the final report as desirable information.

The committee appointed to consider the question of a standard nomenclature for controlling the dimensions of motor coaches has met with a similar committee from the Society of Automotive Engineers and has arrived at certain decisions which will be included as a part of the committee's report.

Considerable time has been spent by this year's committee on a revision of standards. Revisions of the following have been decided upon and will be submitted for consideration: Brake shoes, brake shoe heads and brake shoe keys, limit of wear gage for flanged contours, specifications for refined wrought-iron bars, specifications for quenched and tempered carbon steel axles, shafts and similar forgings. Several other equipment standards have been studied and information tending to their revision has been collected, but the work has not advanced sufficiently so that definite recommendations for revision can be made by this year's committee.

Way Matters

REPORTS of ten sub-committees were discussed and put in final shape for publication at a two-day meeting of the committee on way matters June 5 and 6. The sub-committee on standardization of frogs has this year given attention particularly to limiting the number of branch-off frogs. A simplified system, taking the seven layouts that are now standard for the 40-42.5-50-60-70-90 and 130-ft. center radius curve, and using them for all intermediate radii by holding the alignment up to and through the frog, compounding at that point with the desired center radius, is recommended for standard gage track. For wider gages the alignment is modified so as to hold the same frog angle. This gives a choice of twenty-three curves with only seven frogs and with alignments varying only slightly from those in Ws-10-b. The subject of standardization of frogs for car clearance curves is recommended for study by next year's committee.

The subject of substitute ties has been carefully studied this year by a special sub-committee. Extensive investigations have been made to determine the extent to which substitute ties have been used and the results that have been obtained. Definite conclusions cannot be drawn from the information available, however, and it is recommended that the subject be continued by next year's committee.

In a discussion concerning welded rail joints, J. W. Welsh, secretary American Electric Railway Association, and W. Spraragen, secretary of the committee on welded rail joints, participated. The sub-committee recommended that the subject be continued for consideration next year in conjunction with the committee on welded rail joints. The latter committee is urged to adopt a definite program for future work and to proceed with it as rapidly as possible. It was thought that publicity should be handled as far as possible through the official organ of the A.E.R.A. and the technical press of the railway industry. The executive committee of the welded rail joint committee will be asked to submit monthly bulletins of its activities to members of the main committee. The committee thanked Mr. Spraragen for his attendance at the meeting and for his co-operation in this work.

Some minor changes in specifications

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were recommended by the sub-committee on specifications and design of tie rods. Difficulties found in manufacturing the proposed $\frac{9}{16}$-in. spike were discussed following the report of the sub-committee on design of a hook head railroad spike. A few slight changes were made in the report submitted by this sub-committee at the previous meeting.

Another sub-committee reported as its conclusion that there is no need for narrow groove guard rail and recommended that the subject be discontinued. A crossing such as shown in the report of the sub-committee on manganese crossings was recommended. It was decided that cutting the through-running rail shall be optional on bolted crossings. After considerable discussion it was decided to make the flange bearing in the electric run optional in the bolted crossing design. Charts and diagrams were submitted by the sub-committee on the standardization of switches and mates, but the committee did not attempt to pass on their correctness.

Interesting data were presented concerning experience in various places with surface hardened rail. It is considered, however, that the subject is still in an experimental stage and no definite recommendations were made. A number of minor changes in existing specifications were suggested by the sub-committee reviewing that subject.

After the discussion of the reports of the sub-committees the subject of exhibits at the coming annual convention at Atlantic City was brought up. The question of subjects for study by next year's committee was briefly considered, but the matter was left in the hands of the chairman.

The members present were: H. H. George, chairman; C. F. Gailor, E. M. T. Ryder, W. W. Wysor, V. Angerer, E. B. Entwisle, A. T. Spencer, C. A. Alden, J. B. Tinnon, R. B. Fisher, J. H. Haylow and R. C. Cram, sponsor.

Heavy Traction

A MEETING of the heavy traction committee of the Engineering Association was held in New York on June 5. The meeting was devoted to the annual report to be presented at the Atlantic City convention.

The sub-committee on revision of the bibliography on heavy electric traction, Mr. Brown chairman, reported that arrangements have been made for preparation of the work during the coming summer by Professor Warner.

Mr. Armstrong presented a report of his sub-committee on branch-line electrification and self-propelled cars, which was accepted for incorporation in the annual report.

On the subject of train operation, Mr. Sinclair presented a report on articulated trains, with a number of diagrams. It was agreed that all this information should be published in the report.

Connections between cars, particularly automatic couplers, was the subject of the sub-committee headed by Mr. Daus, who gave a report summarizing replies to a questionnaire that his sub-committee had sent out.

On the subject of revision of standards, Mr. Skelly read a report by Mr. Wells, stating that no changes are contemplated from present practice.

Members present at the meeting were: J. C. Davidson, chairman; A. H. Armstrong, H. F. Brown, Morris Buck, H. W. Cope, A. H. Daus, E. P. Chase representing J. V. B. Duer, Norman Litchfield, J. O. Madison, J. J. Sinclair, J. J. Skelly representing L. S. Wells.

Power Transmission and Distribution

A MEETING of the committee on power transmission and distribution was held at association headquarters, New York City, June 2, 3, and 4. Those present were C. H. Jones, chairman; M. B. Rosevear, sponsor; J. W. Allen, R. L. Allen, James H. Drew, R. W. Eaton, Charles Gilman, C. L. Hancock, H. D. Hawks, C. J. Hixson, Adrian Hughes, Jr., C. P. Nachod, F. McVittie, H. S. Murphy, J. F. Neild, W. J. Quinn, W. Schaake, A. Schlessinger, J. M. Waldron, F. J. White and G. C. Hecker of the association staff. Those present as guests were Mr. Flynn of the Drew Electric Company, D. A. Tomlinson of the Portland Cement Association and L. W. Birch of the Ohio Brass Company.

The subject of inductive co-ordination was discussed, but no report will be made at this time. It was recommended that this subject be carried over for another year. It was decided that certain parts of a report on temporary connections to trolley wire by a senior engineering student at Purdue University be included in this year's report with proper credit. It was decided to recommend continuing this subject.

A brief statement of the status of each standard now included in the Manual will form part of the report of the committee this year. Some further data have been accumulated in regard to the wear on trolley wire and this will be included in the report, with the recommendation that the subject be continued next year.

An attempt has been made to harmonize and standardize the matter of aspects of signals used in overhead contact systems. The work on this subject has not been completed and a recommendation will be made for its continuation for another year.

The committee has prepared new specifications for the manufacture of concrete poles and the formulas and calculations in Manual Section Ds-3c have been checked. The committee will recommend that the specification be submitted for consideration and, if approved, that it be substituted for a corresponding portion of the Manual section.

The sub-committee on ruling dimensions of barn hangers has standardized ruling dimensions of shallow and deep hangers, the distance between bolt holes for support and the distance between the top and end of stud-bolt. The committee considered it inadvisable to standardize the ruling dimensions of the approach ears of bolted types.

The subject of overhead construction of trackless trolleys has been considered by the committee this year and two installations will be reported upon with the recommendation that the subject be dropped until new developments occur. The subject of catenary overhead construction and material will also be recommended for continuation.

Power Generation and Conversion

A MEETING of the power generation and conversion committee was held at association headquarters, New York City, June 9 and 10. The following were present: W. E. Bryan, vice-chairman; C. E. Bennett, C. A. Butcher, H. W. Codding, W. R. Herod, V. H. Mueller, F. W. Peters, R. L. Webber and G. C. Hecker of the association.

A twenty-page report covering the subject of ventilation and noise-proofing of automatic substations was taken up and discussed. This report outlined the general phases of the situation with a description of the method of ventilation used by various companies at the present time. In view of the fact that several tests of various kinds of ventilation will shortly be made on an extensive scale and that the results of such tests should be available during the coming year, the committee recommended that the subject be continued.

The question of codification of power troubles was discussed, but inasmuch as this subject involved distribution and transmission problems it was decided to suggest that the whole matter be referred jointly to the power generation and conversion committee and power distribution committee next year.

A report of the committee on review of existing standards was received, with the recommendation that the specification in Manual Section Gb-2a, "Form of Contract for Purchase of Fuel," be revised during the coming year to bring it up to present practice; that Manual Section Gb-3a on the boiler code have a footnote placed in the Manual approving the 1918 revision by the American Society of Mechanical Engineers. Certain minor changes were presented in the specification for boiler tubes, which are now under review by the American Society for Testing Materials.

Current practice in the design and operation of automatic substations was taken up and discussed, and reports were submitted on shunt-wound and compound-wound synchronous converters for various classes of service, semi-automatic substations, direct-current feeder control and supervisory and remote control systems.

Buildings and Structures

REPORTS submitted by the various sub-committees were discussed and put in shape for publication at a meeting of the buildings and structures committee of the Engineering Association held at association headquarters, New York, June 2 and 3. During the course of the year this committee has been able to cover practically all of the work planned. New subjects suggested for the consideration of next year's committee included terminals for motor buses, garages, carhouses and carhouse standards. The design of buildings for the storage and maintenance of buses, a subject which was studied by this year's committee, will be continued next year. Those present were: N. E. Drexler, chairman; E. D. Eckroad, J. D. Kent, T. H. Stoffel and H. R. Stamm.

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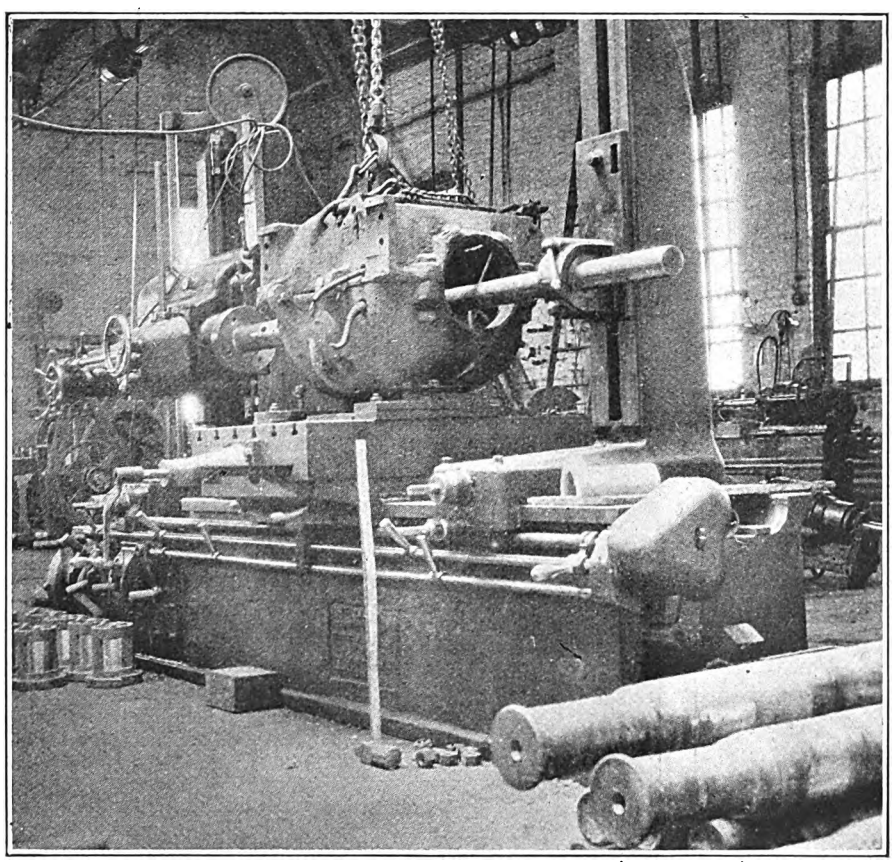
Maintenance of Equipment

New Boring Mill Cuts Cost in Half

A LAMBERT horizontal boring machine, which has been in use in the Fulton County plant of the Georgia Railway & Power Company, Atlanta, Ga., since August, 1923, has reduced by more than 50 per cent the cost of doing certain classes of work. Comparing the boring mill with a lathe, it has been found that the cost for reboring a GE-80 motor is now $5, as against $11.20 by the older method. A saving of 50 per cent has been accomplished in boring axle bearings. Air compressor cylinders are rebored in 7½ hours less time. In cutting keyways a saving of 75 per cent has been accomplished over the work formerly done by a shaper.

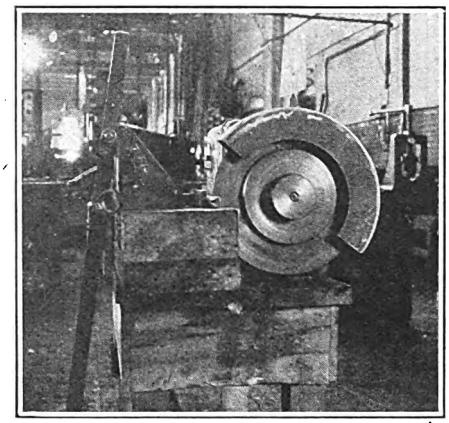
This boring mill is a single spindle machine. The spindle can be raised or lowered and a motor frame can be moved perpendicularly to the spindle on a horizontal plane. Thus axle bearings can be rebored as well as the armature bearings. Approximately 40 GE-80 motors have been rebored recently and similar work is now being done on Westinghouse No. 101 motors. All reboring is done to a larger size than the original hole.



This Boring Mill Has Accomplished Big Savings for the Georgia Railway & Power Company

Convenient Machine for Cutting Conduit

THE New York Central Railroad has found a home-made conduit cutting machine of great convenience in its Harmon shops. A steel disk 16 in. in diameter and ⅛ in. thick is used to cut the conduit. This disk is mounted directly on the shaft of the motor portion of a D2 E G air compressor. The cutting disk is clamped between two larger disks, 10 in. in diameter by ⅝ in. thick. A nut 4½ in. in diameter fits on the end of the shaft for clamping. This is tightened by means of a spanner wrench. The 10-in. disk, which fits on the outside of the larger cutting disk, is also used for grinding off burrs and smoothing the edges of conduit after it is cut.



Cutting Conduit with a Steel Disk

The machine is mounted on a wooden bench and the equipment for feeding the conduit into the cutting disk is also mounted on wooden blocks. The conduit is forced against the cutting disk by a lever with its fulcrum about 12 in. above the center of the cutting disk. This lever extends down to within 3 or 4 in. of the floor and is provided with a pedal, so that the operator can place his foot on this and exert sufficient pressure to force the conduit against the steel disk and cut it without difficulty. The operation of the lever slides a block back and forth and the conduit is placed between this and the cutting disk. The lever provides sufficient movement so that conduit up to 2 in. diameter can be cut. The operating lever is made of 3¼-in. by ½-in. iron and the bracket, which serves as a fulcrum, of sheet steel ⅛ in. thick. The compressor motor is operated on a 500-volt circuit, three heater coils being installed to cut down the voltage and reduce the speed of the motor. An ordinary car hood switch is used for cutting the compressor in and out.

Hinge Provides Rest for Motorman's Foot

A SIMPLE method has recently been adopted by the Nashville Railway & Light Company, Nashville, Tenn., to make the work of a safety car operator easier by relieving him

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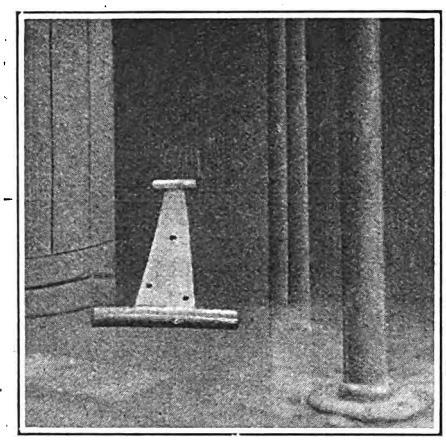


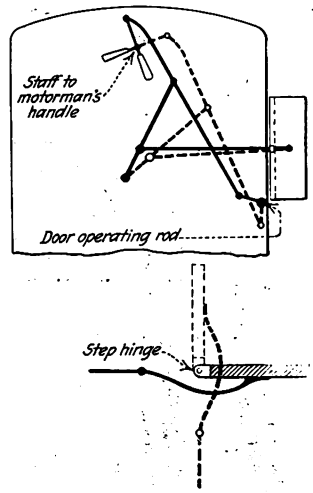
A Light Pressure on This Hinge Is All that Is Required to Keep Down a Safety Car Foot Valve

of the necessity of keeping his foot on the plunger when his hand is removed from the controller handle. A 9-in. T-hinge is screwed to the floor near the base of the controller, with the strap resting against the foot plunger, as shown in the accompanying illustration. A short piece of ¼-in. steel rod has been riveted across the end of the strap. The safety car operator can rest any part of his foot against this hinge and by a light pressure keep down the foot valve with less exertion than would be necessary if his foot were resting directly on the plunger.

Proper Leverage Makes Door Operation Easy

IN REBUILDING some of its single-end cars for double-end operation, the Savannah Electric & Power Company, Savannah, Ga., paid particular attention to making the door operating mechanism work easily. These cars were of a comparatively modern type, with open rear platforms. The reconstruction was simplified by the fact that the rear platforms had control and air-brake apparatus already installed. This had been done to facilitate moving the cars around the carhouses and yards, where it was frequently necessary to back up. Platforms at both ends were closed in and were equipped with manually operated doors and folding steps.

An unusual arrangement of levers designed by E. T. Smith, master mechanic, has been used under the platform to control the movements of doors and steps. The front exit door is controlled by a system of levers as shown in the accompanying sketch. The step is raised and lowered by an auxiliary arm the movement of which is at right angles to the length of the car. This arm is attached to the underside of the



Arrangement of Door and Step-Operating Levers Under the Platform

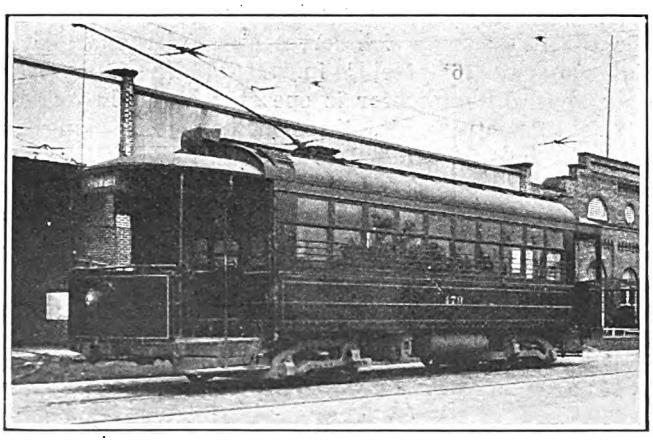
folding step in such a way that an outward push folds up the step and an inward pull lets it down. This method of operating the step requires a minimum of physical effort on the part of the motorman.

On the rear platform double entrance doors and a folding step are controlled by a single bellcrank with three-lever attachment. One goes to each of the two door-operating rods, and the third operates the folding step in a manner similar to that already described. The two ends of the car are identical in door and step arrangement. Since the adoption of this plan, complaints by the trainmen of doors working hard have been entirely eliminated.

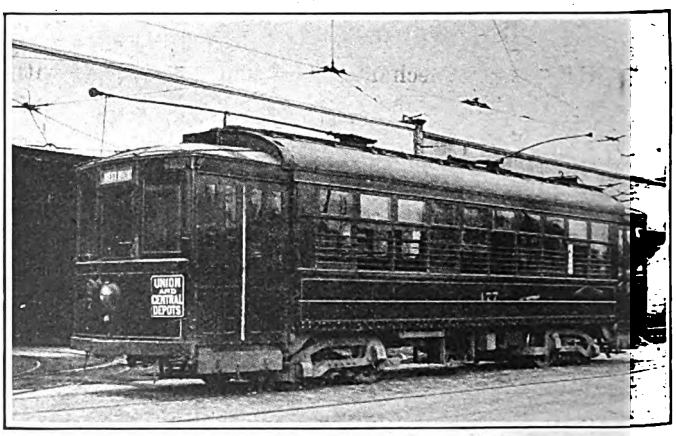
Numerous stanchions are provided around the entrance and exit, so that passengers will not pause to look for a grab handle when boarding or alighting, but will find a stanchion convenient and proceed to get in or out at once. The stanchions have been placed about 6 in. back from the edge of the platform, on the theory that passengers are inclined to pull themselves into the car when getting on.

Tightening Commutators

SOME suggestions for tightening commutators were given by Burton E. James, Westinghouse Electric & Manufacturing Company, in the issue of *Electric Journal* for December, 1923. A good way to test commutators for loose bars is to tap them with a hammer. If a dull sound instead of a ring results trouble will probably develop. Another evidence of looseness is a white, chalky substance sifting out from between bars. This is powdered mica caused by the vibration of the bars and consequent chafing of the mica. This vibration may lead to fatigue cracks and ultimate failure of the bars. Small commutators are best tightened by putting the armature in a lathe and using a special wrench or key to turn the commutator nut or bolts. If it is impossible to get the commutator tight and obtain the desired ring from it



Cars of This Type in Savannah Are Being Rebuilt with Inclosed Platforms



Both Ends Are Identical and Equipped with Folding Doors and Steps

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the mica has evidently disintegrated or been chafed and the only remedy is a new set of bars and mica.

When a small number of bars require replacement this can be accomplished sometimes without removing the commutator from the shaft, but when an entire set of bars or the rear mica V-ring must be replaced, it will be necessary to press the commutator off the shaft. The leads may be removed from the commutator necks by driving a steel drift into the top of the slot and using a gouge to remove the filling pieces and top leads, after which there is room enough to bend one side of the necks slightly and gouge out the lower leads. The melting out of solder with a blow torch is not recommended, as the hard-drawn copper bars are liable to be annealed or the insulation is liable to injury due to getting solder into the winding.

After the leads are removed the commutator or armature should be placed on end, with the commutator end up and ring nut or bolts loosened. Each piece should be marked so that it can be replaced in its original position. After the metal and mica V-rings are lifted out the bars which are to be replaced should be tapped until loose and then removed. New individual bars must be carefully filed to the exact shape of the bars they replace or the repaired commutator will be worthless. Dirt and moisture must be kept out of the commutator while repairing. After the new parts are inserted the metal and mica V-rings may be reinserted and the nut or bolts brought up fairly tight. The commutator should be heated to approximately 120 deg. in an oven and then be given a final tightening while hot.

Outside Storage Increases Maintenance

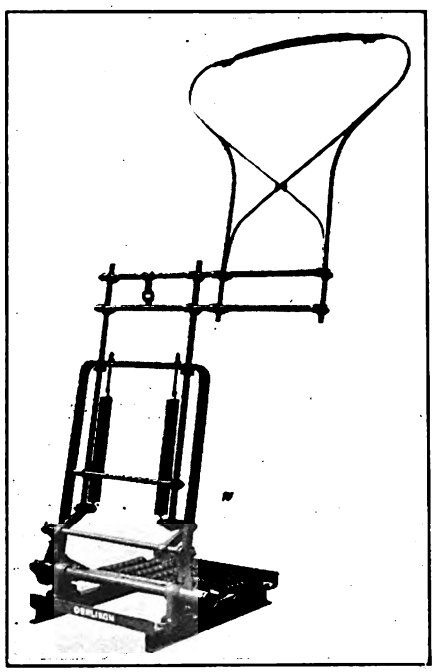
THE master mechanic of a company, which uses both outside and inside storage declares that there is a very marked difference in the amount of maintenance required by cars in outside storage as compared with those stored inside. Cars in outside storage have to be painted at least three times as often as those with inside storage. Moreover, the side of the car exposed to the sun, in outside storage, changes in color as compared with the side not exposed to the sun. There is also a tendency of the side posts of the car on the sunny side to get dry rot.

The advantages of inside storage have recently become particularly noticeable with twelve trailers acquired at the same time, six being kept in outside storage and six in inside storage. Within six months there was a great difference in the appearance of these cars, those stored inside being in much better condition.

New Equipment Available

Different Trolley Voltages Over the Same Track

IT IS NOT often that trolley wires carrying different voltages are used over the same track. This condition arose, however, recently in connection with suburban service



Offset Bow Collector for a Second Set of Trolley Wires

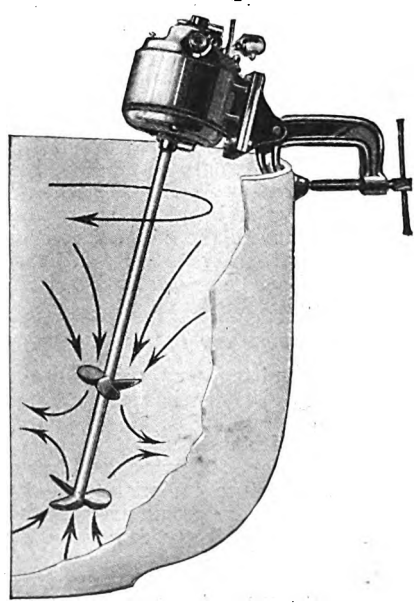
which was operated on some main line track near Uetliberg, Switzerland.

The track on which it was desired to operate this local service is equipped with a 15,000-volt, 16⅔-cycle, single-phase trolley to serve the trunk line electric locomotives which operate over this line. As 1,200 volts d.c. was considered more desirable for suburban service, a second trolley was installed 1.3 m. (51 in.) off center but at the same height, and current is collected from it by an Oerlikon side contact bow trolley. This construction has been in operation for about a year with satisfactory results. A view of the collector is shown.

The motor car used in this suburban service is double ended so that the offset of the trolley pole does not interfere with operation in the reverse direction, provided the motor car is not reversed at the end of the line.

New Portable Paint Mixer

A PORTABLE mixing machine which can be clamped to a tank or tub in which the liquid is to be mixed has recently been brought out by the Alsop Engineering Company, New York, N. Y. With the mixer in position a shaft on which is mounted two propellers extends down into the liquid. The bottom one pulls up the ingredients from the bottom of the tank so as to bring them into solution with the liquid, which is forced down by the top propeller. In this way the intermixing is accomplished beneath the surface of the liquid. All moving parts with the exception of the shaft are outside of the liquid.



Portable Mixing Machine Mounted on Tank

The mixer is made in four sizes and with varying lengths of shafts to meet the dimensions of the tank. The motor sizes range from ⅛ to ½ hp.

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The News of the Industry

Detroit Case Closed

Decision of Court Expected Soon in Suit Seeking to Compel City to Deal with Union

Arguments in the suit brought by the union officials to compel the Detroit Street Railway Commission to deal with them as representatives of the men have been brought to a close. Judge Theodore J. Richter, who heard the union's petition for a writ of mandamus to force the city to arbitrate the men's demands for increased wage scale and improved working hours, has advised the attorneys he would file his written opinion within a week. He set June 10 as the final date for the attorneys to file their briefs.

Attempt at Compromise Fails

A last attempt to effect a compromise in the suit failed after Judge Richter adjourned the hearing and instructed the attorneys on both sides to confer with their principals and consider arbitration. The street railway operating officials declined to deal with the union, but indicated a willingness to arbitrate with representatives of the men themselves.

Letters were sent to the twenty-three members of the platform men's committee by Ross Schram, assistant general manager of the municipal railway, inviting them to meet the Street Railway Commission on June 10 to discuss preliminary organization plans in an effort to settle the wage controversy. It was announced that arbitration would not be discussed at the meeting, in order not to interfere with the case pending in the Circuit Court.

Four of the twenty-seven members of the employees committee selected on May 29 have resigned. They were not invited to attend the conference and no union officials are members of the committee. Each member will represent a certain city line.

Many Important Points Discussed

The committee was selected at an election in the carhouses under the supervision of the D. S. R. management, and although only 470 votes out of a possible 3,900 were cast, it was announced by the commission that the committee chosen would be recognized by the street railway commission and executive heads of the railway as representing the men. The commission expressed willingness to hear any matters the committee may bring up, including demands for increased wages and improved working conditions. It is estimated that, failing an agreement between the commission and the executive committee, the city will be willing to arbitrate the differences through appointees of the committee.

Many interesting facts were brought out during the hearing before Judge Richter. One point established was that the national union was financing the suit for the men. The commission contended that if it is forced to deal with the union officials in matters concerning D. S. R. employees, it would be tantamount to being compelled to deal with the employees of the Detroit United Railway, a private corporation, which has no connection with the municipal government. The union has claimed the right of spokesman for the rank and file of D. S. R. workers because of its membership, alleged to be in excess of 90 per cent of the number of conductors and motormen. It was brought out during the hearing that the Detroit United Railway had objected to the same agent that handled the D. S. R. cases being permitted to handle D. U. R. grievance cases and that last February the union employed another business agent to handle D. U. R. matters. Of the 4,300 members of local No. 26 there are about 600 D. U. R. employees.

It was admitted by the secretary of the local union that three international union officers and two of the local union were present when the petition for a mandamus was drafted, and that he signed the petition before the expiration of the time limit given the commission by the union to comply with the union's demands to deal with it.

Ross Schram, assistant general manager, when asked concerning the Street Railway Commission's attitude toward recognition of the wage demands of the car men and of arbitration, reiterated his previous statements to the effect that the commission did not see any reason for it.

Strike at Cleveland Postponed

Men Put Off Walk-Out on Account of Republican Convention—Action Threatened for June 16—Efforts Continue to Avert Cessation

THE local union in Cleveland, by a vote of 1,587 to 53, decided at a mass meeting on the night of June 6 to call a strike effective at midnight Tuesday, June 10. This would have meant a tie-up of Cleveland's transportation system in the very midst of the Republican national convention.

At the request of City Manager W. R. Hopkins and on instructions from W. B. Fitzgerald, international vice-president of the union, and Edward MacMorrow, member of the international executive committee of the union, the strike was postponed until after the G.O.P. convention adjourned Thursday night, June 12.

Efforts to avert a strike were still under way on June 12, but the union and the Cleveland Railway considered a cessation of service so imminent that both were keeping up their preparations for a walkout.

The strike vote was taken when John J. Stanley, president of the Cleveland Railway, informed the men that he would never grant the award increasing wages 12 cents an hour made by the majority members of the board of arbitration, from which the two company members had withdrawn on the ground that the fifth and "neutral" member of the board was biased and prejudiced in favor of the men.

Mr. Stanley has made all preparations in Cleveland for a strike. Cars have been armored with wire netting, cook stoves and cots have been installed in the carhouses, and approximately 500 men are already on hand, ready to replace a similar number of the 2,500 platform men of the company in the event of a walkout.

Efforts of the car men's union to have the City Council intercede in behalf of the men resulted in the passage of a resolution by the Council on June 9 calling on the company to stop armoring its cars. Mr. Stanley announced immediately after this that he would continue his efforts to protect the company's property if the men walked out. The City Council also adopted a resolution authorizing its railway committee and the city manager to subpoena Mr. Stanley to meet with it and union officials in an effort to mediate the differences. Mr. Stanley is opposed to any interference on the part of the Mayor, City Manager or City Council. He is willing to have a new arbitration or to attempt to settle the wage dispute in direct negotiations with the union, but insists that he must refuse to accept an award which he considers has been made by a prejudiced board.

After the strike had been postponed out of a desire not to embarrass the city during the Republican convention, the City Council also had a resolution before it stating that "it is the opinion of the Council that the railway should accept the decree of the board of arbitration and grant the men the 12-cent-an-hour increase." This, however, was referred to the street railway committee of the Council, as was another resolution aimed to call a vote for the purchase of the Cleveland Railway by the city.

Another mass meeting of the union was held Wednesday night, June 11,

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at which the men were informed of the reasons for postponing the strike which they had voted. Sentiment at this meeting is said to have favored a move by the executive officers to put the strike into effect on June 14, but union officials say they are still trying to avert a walkout if it is at all possible.

Wage Increase in Massachusetts Cities

Trainmen in Springfield and Worcester Are Awarded Ten-Cent Advance Retroactive to Jan. 1

Wage increases of 10 cents an hour to uniformed and miscellaneous employees, with back pay on all payroll hours since Jan. 1, are granted the 2,000 employees of the Worcester Consolidated and Springfield Street Railway Companies in the arbitration award announced June 11. With it go an eight-hour day for uniformed employees, a spread of eleven hours for regular men and fourteen hours for spare men, and time and one-half for extra work. Louis C. Parker, chairman and neutral member of the arbitration board, personally appeared before the carmen in Springfield and explained the findings. Maximum pay is increased from 58 to 68 cents an hour.

The contract under this award will be dated Jan. 1 and will continue until June 1, 1925, although the new agreement and award will not be placed in operation until June 28. Back pay is at the rate of 10 cents for each hour worked in six months, to be computed on the basis of payroll hours of each employee and such payments to be made on or before Aug. 11.

Many of the so-called bonuses are reduced or entirely eliminated by the board, which expressed the opinion that "work required shall be paid for and that time paid for shall be worked and that there shall never be two payments to one man for the same work."

Employees had asked a maximum wage for uniformed men on two-man cars from $5.22 to $6.40 a day and were awarded a maximum rate of $5.44. They asked an increase from 8 to 15 cents an hour differential for one-man car operators, but were refused.

The uniformed men asked that where work on any run exceeded eight hours, compensation be thirty minutes for actual time up to fifteen minutes and one hour for the actual time between fifteen minutes and thirty minutes. The request was refused, and only actual time worked shall be paid for, with the proviso that not more than 30 per cent of the runs shall exceed eight hours. Eight hours pay is guaranteed spare men instead of seven hours as in the past.

Requests for ten minutes' pay for getting out cars and five minutes' for putting cars away were refused. One-man car operators were refused a request for five minutes to make changes at the end of the lines. Regular men will have only one unpaid relief each day, but spare men will have two reliefs, provided the reliefs are within eleven hours and that any relief of thirty minutes or less shall be paid platform time. Trackmen requested traveling time where work is more than 1 mile from the carhouse, but the request was refused. Traveling time is allowed where work is more than 2 miles, but this shall not be included as part of the day's work.

A separate department for the operation of buses, with seniority separate from that in the transportation service, is to be made, and vacancies are to be filled from the transportation department in the order of seniority if the men are qualified.

Attorney Bentley W. Warren, counsel for the company, presented a minority dissenting opinion. He said:

> The extravagant hourly rate fixed by my associates for motormen and conductors in Springfield and Worcester is unjustified and exhibits a reckless disregard of the rights of the public. The award is not justified on the basis of the cost of living.

The decision also affects the Milford, Attleboro and Woonsocket, Interstate Consolidated and Attleboro Branch Street Railway Companies. In relation to the different companies the report says:

> Evidence of the financial condition of the roads affected by this award was carefully considered. While, of course, wages must affect the finances of any company, yet the board does not think that its award of a fair and just wage in these cases will beyond reasonable doubt cause serious financial embarrassment to the companies, except in the case of the Milford, Attleboro & Woonsocket Street Railway. In considering that case a conference was held and by agreement between the men and the company an award was made of a wage rate, less than this board would otherwise think fair and just.

This award was not made public.

Chicago Parleys Halt

So Far as Surface Lines Are Concerned Purchase Negotiations Appear to Be at an End

The parleys between the Chicago Surface Lines and the officials of the city of Chicago have halted. On both sides it is now admitted that the municipalization of the lines seems no nearer than when the conferences started.

At the meeting previous to the ones that for a time at least terminated the negotiations, it appeared that a "working agreement" as to price had been reached. With the bankers insisting that they could not permit the repudiation of any part of the outstanding securities of the lines, because it would destroy all chance of marketing the Schwartz certificates, the various conferees apparently believed the Mayor had finally become convinced that he could not purchase the properties for less than $162,000,000.

Publication of the "working agreement," however, appears to have altered the Mayor's views, and at the last conference, he definitely declared that no agreement had been reached as to the price to be paid.

The Mayor was visibly disappointed. He would make no comment upon what the city proposed to do further in its effort to obtain the lines. Moreover, he announced that the bankers who have attended the conferences as representing the interests of the stockholders, admitted they had no legal authorization to speak for the security holders. The bankers, however, were of the opinion that this had been clear to the Mayor from the beginning. They gave it as their opinion that any recommendations they made to the security holders would be acceptable, and for this reason, they had felt justified in attending the conferences.

Meanwhile, similar negotiations with the Chicago Rapid Transit Company officials are proceeding with the purchase object in view. For more than an hour at the last conference Mayor Dever conferred with Samuel Insull, head of the company, and former Attorney-General Patrick J. Lucey, counsel for the system.

For rate-making purposes the elevated lines were valued by the Public Utilities Commission in 1921 at $86,250,000. Capital expenditure since then make the value as of Dec. 31, 1923, $90,499,756.

I. C. C. Authority Involved

Cases Before U. S. Supreme Court Involve Authority of Commission Over Certain Electric Lines

Arguments have been presented before the United States Supreme Court in consolidated cases involving the authority of the Interstate Commerce Commission to fix passenger fares on interurbans crossing state lines whose principal traffic is passenger rather than freight.

The cases are the appeals of the Interstate Commerce Commission and the Pennsylvania-Ohio Power & Light Company against the village of Hubbard, Ohio, and the Interstate Commerce Commission and the Steubenville, East Liverpool & Beaver Valley Traction Company against the city of Wellsville, Ohio. The issues are the same in each case and in both cases the district courts issued injunctions against the I. C. C. and the corporations against increasing intrastate passenger fares.

The Pennsylvania-Ohio company operates an interurban line between Youngstown, Ohio, and Sharon, Pa., about 14 miles, of which only about 1 mile is in Pennsylvania. Hubbard is half way between the terminals. The company sought to increase the fare from Hubbard to Youngstown in conformity with the fare from Hubbard to Sharon. The Interstate Commerce Commission granted it such authority, together with various other increases. The village of Hubbard resisted and won in the district court on the ground that the company did not operate as part of a general steam railroad and was not engaged in the general transportation of freight, thus being without the terms of the transportation act and outside the authority of the I. C. C. It was proved that the company operates a daily freight service and receives freight cars from steam railroads.

Similar issues are involved in the other case. The Steubenville, East Liverpool & Beaver Valley Company operates between Steubenville, Ohio, and Vanport, Pa., with various branch lines, the main line being 40.2 miles long, 11.4 miles in Pennsylvania and 28.8 miles in Ohio. In this case the city of Wellsville resisted the higher rates.

These cases form a test of that part of the transportation act giving the I. C. C. authority over interstate electric railways.

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Fifty Persons Injured in Double Accident in San Francisco

More than fifty persons were injured, many of them seriously, and four automobiles were badly damaged on June 2, when a crowded K line car of the Municipal Railway at San Francisco got beyond control in the Twin Peaks Tunnel. After a wild flight of eight blocks it crashed into an L line car at Dolores and Market Streets and caused the car with which it had collided to dash eight blocks down Market Street until it struck an automobile and stopped. The L car was discharging passengers at the time of the crash.

Witnesses said the K car was traveling 60 miles an hour when the crash occurred.

The accident was a most remarkable and unusual one in that a loaded car plunged at a speed variously estimated from 60 to 75 miles an hour down a grade as great as 5.4 per cent and that the car with which it collided in turn ran away for a distance of 2.9 miles. Still more remarkable, a considerable time elapsed after the rear-end collision before the brakes released on the second car and it in turn started on its wild trip of 0.6 mile down Market Street.

Fred Boeken, superintendent of the Municipal Railway, said shortly after the accident occurred:

There are four devices by which our cars can be stopped and we do not understand why Cronin was unable to bring his car to a stop by any of these methods.

First, there is the air brake. That evidently was faulty or completely out of order. Then there is the hand brake. A third way we have of stopping the car is by using the reverse lever. A fourth is a mechanical tripping device.

In case both the hand brake and the air brake do not work a motorman can stop his car with the reverse lever. If the trolley is off the wire and he has no power with which to stop, there is the mechanical tripping device, which works independently of the other contrivances.

Cronin has not explained to us satisfactorily why these four devices did not work. He says he used all four of them, but none would work. This would be so unusual as to be almost unbelievable. It is nothing unusual for trolleys to "run away," but they are always brought under control quickly and without the passengers knowing it by one or more of these four devices.

Action Taken in New York Against Parking

Copies of the new police rules which prohibit automobile parking for more than twenty minutes on Broadway, Fifth Avenue and other main arteries of traffic in New York City, beginning June 10, were made public on June 6 by Police Commissioner Enright, following a conference with Dr. John A. Harriss, Deputy Police Commissioner, in charge of traffic, and Dominick Henry, deputy chief inspector, in charge of traffic regulation in all five boroughs.

The five streets on which parking will be prohibited are at the approaches of Williamsburg and Manhattan Bridges, respectively. At busy intervals those streets are clogged with traffic due largely to the parking of automobiles, and traffic policemen stationed at street intersections are powerless to keep them clear when parking is permitted.

Traffic policemen have been instructed to concentrate on a movement to keep the business streets clear of unnecessary congestion. Inspector Henry said that trucks backed up against the delivery entrances of houses in the wholesale district practically blocked the street, or at best left only enough roadway for a truck to pass through.

Hearings on Maryland Company's Petition

The Maryland Public Service Commission has opened hearings on an application filed by the Washington, Baltimore & Annapolis Electric Railroad asking permission to increase its round trip and single fare rates 20 per cent and its commutation rates 10 per cent. The increase is designed to give the company additional revenue of $347,800, which is required, officials testified. The application for increase is being fought by many of the residents of the territory served by the company. E. J. D. Cross, assistant city solicitor, asked the commission to refuse to grant an increase until after a valuation of the company's property is made. Officials of the company declare the increase is necessary to enable the road to make certain additions and extensions.

Committees Report Favorably on Acquisition of Chelsea Division

The Massachusetts Legislature has a favorable report from its street railway and Metropolitan affairs committees on a bill providing for the acquisition by the state and the leasing to the Boston Elevated Railway of the Chelsea division of the Eastern Massachusetts Street Railway.

Under the terms of the measure the Eastern Massachusetts will be paid $3,000,000 for the property, which is located in Boston, Revere, Chelsea, Malden and Everett. Of this amount $2,000,000 will eventually be paid by the Elevated and $1,000,000 by the cities benefited by the act through a sinking fund arrangement.

The proportion of the $1,000,000 to be borne by each city would be fixed at a conference of its representatives. The measure as drafted, which means increased and improved service along with a 10-cent fare, has the approval of the city of Boston and the railways.

Fare Increase Granted in Suburban New York

Ten-cent fares on the lines of the Westchester Street Railroad, White Plains, N. Y., serving their territories were approved on June 5 by the Scarsdale and Harrison authorities, leaving the railway system of the county virtually intact. It was indicated later at the Court House that Supreme Court Justice Joseph Morschauser would vacate his peremptory order directing that service on these two lines be discontinued. With the exception of Mamaroneck, every municipality served by the road has heeded the court's order that it must allow an increase in fare to 10 cents in each zone and take the best service the company is able to offer, or lose all service. The fare has heretofore been 6 cents in each zone. The branch from the White Plains line to Mamaroneck will be shut off and the road sold at auction.

Eight Cents Allowed

Kingston Consolidated Permitted to Charge Increased Rate for One Year—Transfer Terms Unchanged

An order was issued on June 4 by the Public Service Commission permitting the Kingston Consolidated Railroad, Kingston, N. Y., to increase its cash or ticket fare to 8 cents. The order permits the change to be made on three days' notice, effective for one year and until further order of the commission. No change is made in the present regulation as to transfers, school or other reduced rate tickets.

The company claimed that its present rate of 7 cents cash, with sixteen tickets for $1, was insufficient to yield a reasonable return. It was contended that a 10-cent cash fare and 8-cent ticket fare should be permitted.

At a hearing of the interested parties held in Kingston on Jan. 23 two propositions were considered. The first was that the operation of the old Washington Avenue portion of the Colonial division be discontinued and that the system north of the power house be operated only during the five summer months. This would tend, it was claimed, to reduce the cost of service on the system.

The second proposition was to continue present service on the city division for the entire year, but to operate the Colonial division only during the five summer months. This plan, it was also claimed, would tend to reduce the cost of the entire service.

The city opposed any curtailment of service as well as any increase in fare.

The company has never paid a dividend on its common stock. Some 24 per cent in dividends remains unpaid on the preferred.

A valuation of $710,523 was claimed by the company. The commission, in its decision allows a valuation of $637,205.

The commission says the cost of service on the Colonial division is undoubtedly the cause of the unsatisfactory operating results.

Commissioner Van Namee says:

The operating results of comparable companies of the state indicate that the operating expenses here are rather below the average. There was evidence that operating expenses will be increased approximately $2,000 in 1924 because of wage increases made in July, 1923. Taxes have increased approximately 28 per cent since 1920.

The increases in fare during the period have not produced enough revenue, to counteract the constant annual loss in revenue passengers. Such average decrease in revenue passengers has been about 200,000 a year. For the year 1924 it is reasonable to suppose that the number of revenue passengers will not be greater than 2,925,000.

The evidence showed that the railroad carried 3,127,573 revenue passengers in 1923; 3,229,133 in 1922; 3,456,423 in 1921, and 3,705,896 in 1920.

The memorandum continues:

The rates demanded by the company—10 cents cash and 8 cents ticket—are plainly excessive. A flat cash fare of 8 cents will pay an estimated return of 7.8 per cent and such slight increase will not be likely further to diminish the number of revenue-paying passengers to any appreciable extent. This company must, however, practice the utmost economy, and should investigate the practicability of one-man safety car operation on its Kingston city division as a means of additional future retrenchment.

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Block Signal Systems Favored by Indiana Body

Failure of a train crew to obey a rule and the lack of a block signal system between Fort Wayne and Huntington, Ind., are blamed for the wreck on the line of the Indiana Service Corporation at Roanoke on May 19 by Samuel Artman, member of the Public Service Commission, who conducted a probe at Huntington. Five persons were killed and twenty injured when two passenger cars crashed head-on.

Mr. Artman held that the evidence showed a rule requiring extra trains to clear the main track five minutes before a regular train was due at a siding was violated by the crew of the eastbound extra passenger train. "The evidence is to the effect that this rule has been violated with more or less frequency and with some degree of consistency before the date of the wreck," Mr. Artman reported.

He said that, notwithstanding such violations, the management had taken no steps to secure strict compliance with the rule "beyond an occasional reprimand. The extent to which this failure to enforce the rule was responsible for the wreck is problematical, but that it was an indirect cause is a reasonable conclusion."

There is no block signal system between Huntington and Fort Wayne, the report says, and "the evidence is to the effect that if an automatic block signal system had been in operation upon the section on which the collision occurred the accident would almost certainly have been prevented."

Mr. Artman said he found the train records of the company "wholly unreliable," because instead of the dispatcher receiving actual reports upon the exact time a train passed a station, the dispatcher's assumption that the train passed on schedule time was recorded. On the day of the wreck numerous special trains were being operated and this may have been confusing to the dispatcher, the report says.

Mr. Artman makes five recommendations:

1. That the company immediately compel strict compliance with all rules.
2. That train records be based on actual information.
3. That additional stations be established where conductors get in direct communication with the dispatchers.
4. That the practice of operating so many extra trains be curtailed, but if they are necessary that such trains be operated as sections of regular trains.
5. That the commission "is thoroughly convinced" by the experience of the Roanoke wreck and the Alfont wreck on the line of the Union Traction Company on Feb. 2 that block signal systems are necessary, that the commission demands that the company ascertain the cost of a block signal system between Huntington and Fort Wayne and report to the commission within sixty days.

Original Five-Cent Fare for District of Columbia Defeated

An effort on the part of Senator McKellar of Tennessee to compel the railways of the District of Columbia to return to their original charge for fares of 5 cents cash, with six tickets for 25 cents, was defeated in the Senate by a vote of forty-four to twenty-one. The Senator sought to attach his fare bill as an amendment to the District of Columbia appropriations bill.

The hearings on the bill before a Senate sub-committee covered the greater part of five months, but little interest was shown in the proposal by Senators, newspapers or the public.

During the hearings testimony was presented by George E. Hamilton, president, and John H. Hanna, vice-president and general manager of the Capital Traction Company, and W. F. Ham, president of the Washington Railway & Electric Company. These officials testified that a return to the old 5-cent fare, with six tickets for 25 cents, would mean ruin for the corporations. The present fare in the District of Columbia is 8 cents cash, with six tickets for 40 cents.

Councilmanic Logic

MOTOR OMNIBUSES as an adjunct to municipal lines are the last word in efficient transit practice. The P. R. T. stands ready to make a widespread extension of this service by establishing four bus routes that will be of inestimable convenience to the people, relieve the pressure on the existing rail lines and afford a type of pleasure riding now available only to the wealthy. But it has been obstructed by the persistent demand for payment for the "privilege" of occupying the streets with the buses, from Councilmen and others who have not yet learned that state regulation of transit has radically altered conditions and that any charge piled upon the operator, over and above the ordinary taxes, is merely an addition to the burden which must be borne by the rider. The more onerous the franchise conditions the higher the fare.—Philadelphia *Public Ledger*.

Council of Phoenix Acts to Carry Out Its Threat

Complaint has been filed with the clerk of the Superior Court at Phoenix, Ariz., seeking confirmation by decree of the court of action by the City Council in repealing Ordinance No. 123 and revoking the rights and privileges of the Phoenix Railway.

The complaint of the city sets forth that Ordinance No. 123 and all amendatory ordinances granting J. O. Dunbar, his successors and assigns a franchise to construct and operate an electric railway and a system of electric lighting adopted by the Common Council of Phoenix on July 28, 1892, have been repealed in an ordinance passed by the City Commission with an emergency clause.

The complaint prays for judgment to the effect that all the rights vested or purporting to be vested in the defendant be terminated by decree of the court by reason of the lack of authority of the Common Council to vest Dunbar or his successors and assigns with any right or rights more than a revocable license to use the streets.

The matter has been referred to previously in the ELECTRIC RAILWAY JOURNAL. The Phoenix Railway has never been a paying institution. In recent years under changed economic conditions the burden of paying for paving has become intolerable. The company has placed its side of the case squarely before the public.

Detroit United Applies for Trucking Privilege

The Detroit United Railway Trucking Company has applied to the Michigan Public Utilities Commission for permission to establish a trucking line out of Imlay City. The trucking company is an adjunct of the Detroit United Railway system. The communities to be served are Brown City, Marlette, Elmer, Sandusky, Argyle, Ubly, Bad Axe and Harbor Beach. It is expected that through this application closer business relations with Detroit will be established for several of the Michigan Thumb district communities.

It is proposed to establish a daily freight and express service. The trucking company will not only carry freight originating in or destined to Detroit but will also handle shipments wholly between the trucking points.

Talk of Rocky Mountain Electrification Revived

E. W. Beatty, president of the Canadian Pacific Railway, announced in Vancouver that serious thought was being given to electrification of the mountain division of that road. Experts are making a careful examination of the possibilities of such a change in the Rockies, and when their report is complete it will remain with the heads of the road to consider whether or not the cost would justify the change. He believes that electrification might greatly reduce the cost of haulage through the mountains and he made it clear that his road fully appreciated the steadily increasing westward flow of grain from Alberta to Vancouver and also the fact that the Canadian National in its more northerly pass through the mountains has very much easier gradients than the Canadian Pacific.

Indiana Company Buys Buses

To augment its transportation service, the Interstate Public Service Company has placed an order with the White Company of Cleveland for eleven buses to be operated as an adjunct to the main line between Indianapolis and Louisville. The bus service, under present plans, however, will extend only as far south as Franklin, but later may be extended to Columbus according to a statement of Harry Reid, president.

The new buses, painted orange so as to harmonize with the color of Interstate passenger cars, will be of two designs. One will carry twenty-five passengers and the other twenty-six. They will be ready for delivery in about sixty days.

Mr. Reid said the purchase constituted the first active step of the Interstate company to meet bus line competition from Indianapolis. "If the people want to ride on rubber, we will provide that facility," he said. "The Interstate is in the transportation business."

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News Notes

Fare Reduced Five Cents. — The Yonkers Railroad has been authorized to charge 5 cents for a single-trip fare between Kimball Avenue, in the city of Yonkers, and Scotts Bridge over the New York, New Haven & Hartford Railroad track in the city of Mount Vernon. This rate is a reduction of 5 cents.

Reduction in Wages Rejected.—Employees of the Michigan Electric Railway, Jackson, Mich., have voted to reject a reduction of 2½ cents an hour in wages proposed by the company. The men are said to have instructed the advisory board, consisting of representatives of union locals in six principal cities, to consider the future course of action if negotiations now under way fail.

Bus Service Wanted.—Petitions requesting the Tampa Electric Company, Tampa, Fla., to establish bus service in the Seminole Heights, Idlewild and other sections are being circulated in these territories.

Fare Cut to Meet Competition.—In an effort to meet competition of the Trackless Transportation Company, which operates passenger buses along the Mississippi coast, the Gulfport & Mississippi Coast Traction Company, Gulfport, Miss., which operates between Biloxi and Pass Christian, for both passenger and freight traffic, has reduced passenger fares from 7 to 5 cents from zone to zone. This makes the trip between Biloxi and Gulfport 25 cents instead of 35 cents.

New Rates Sanctioned.—The Public Service Commission has approved a new tariff filed by the New York & Long Island Traction Company which establishes a new system of fare zones. For a continuous ride from one business center to another between the following named villages the fare will be 5 cents: Mineola and Hempstead, Hempstead and Roosevelt, Roosevelt and Freeport, Freeport and Baldwin, Baldwin and Rockville Center, Rockville Center and Lynbrook, Lynbrook and Valley Stream, Valley Stream and Rosedale. This change was referred to in the ELECTRIC RAILWAY JOURNAL, issue of May 31.

Wants to Operate Buses.—The Rock Island Southern Railway has filed application with the Illinois Commerce Commission for permission to operate a bus system from Silvis to Galesburg through East Moline, Moline, Rock Island, Taylor Ridge, Reynolds, Matherville, Gilchrist, Aledo, Monmouth and Cameron.

Paving Provision Rescinded in New Grant.—The Council of St. Mary's, Ohio, has granted a twenty-year extension of the Western Ohio Railroad franchise for the operation of cars there. Freedom from street-paving assessments is a provision of the new franchise, which differs from the one now in effect. The relief granted has little value at present, as 2 miles of street traversed by the railroad through town is already paved except one block. Western Ohio bondholders are said to be trying to refinance the road on condition that street paving obligations be eliminated. Ordinances identical with that adopted at St. Mary's are being placed before Councils in other towns served by the Western Ohio Railroad.

Fares Advanced.—City fares on the line of the Stark Electric Railroad in Alliance, Ohio, were increased to 6 cents on June 8. This 1-cent advance was projected to meet a deficit of nearly $1,000 a month in the city accounts. This action was also taken to retain service over part of the city line for which the company had filed an application to abandon. The abandonment plan was sidetracked for the present.

Wages to Be the Same.—Trainmen of the Pennsylvania-Ohio Power & Light Company, including the Youngstown Municipal Railway, will receive the same wages during the next year as this year. This was announced on June 4, after the men had voted favorably on a proposal submitted by the company. The wage scale is as follows, according to the term of service of the employee: First three months, 48 cents an hour; second nine months, 51 cents, and after one year service, 57 cents, with 5 cents an hour additional on one-man cars.

Bus Route Pamphlet Ready.—A folder showing the routes of the bus lines operated by the Los Angeles Railway and by the Los Angeles Motorbus Company, Los Angeles, Cal., has been compiled and will be mailed on request.

Long Distance Bus Line Proposed.—A long distance bus line is contemplated by the Eastern Massachusetts Street Railway. It is to run between Boston and Lowell, through Cambridge, Arlington, Winchester, Woburn, Burlington and Billerica, with a fare of $1. If the experiment is successful the service will be extended to other parts of the system. Three buses of the Fageol type, each having a capacity of twenty-two passengers, will be used. Communities through which the buses will pass are believed to be favorably disposed toward the plan, though the precise route that the buses should take through some of the towns is a matter of controversy. The State Department of Public Utilities will pass on the question of public necessity and convenience of the proposed service.

Half Cent Increase on July 1.—The Cincinnati Traction Company, Cincinnati, Ohio, has announced that the rate of fare on all its lines will be increased one-half cent on July 1. The cash fare will be 10 cents, with a reduction of one-half cent if tickets are purchased. At the present time the cash fare is 9 cents. This will be the highest rate of fare that so far has been charged under the existing law, which became operative in October, 1918. The increase is based upon the report of receipts and expenditures of the traction company for April and May, which indicate that the gross returns from fares and other sources did not offset the cost of operation. For a time, it was believed the negotiations for the proposed new franchise under which the Cincinnati Street Railway is to resume operation of the system would be concluded in sufficient time to make the increase unnecessary, but it was announced that even if the ordinance were passed it would be subject to a thirty-day referendum period and consequently it could not prevent the proposed increase on July 1.

Amended Subway Proposal Rejected.—Acting on the recommendation of Arthur S. Tuttle, chief engineer of the Board of Estimate of New York City, that body on June 9 disapproved the State Transit Commission's latest amended plans for the section of the Brooklyn-Eastern District subway east of Montrose Avenue and sent them back to the commission for revision. This further delay is not expected to interfere with the contemplated opening on July 15 next of that part of the Fourteenth Street-Eastern line virtually completed, extending through Fourteenth Street, Manhattan, and into Brooklyn as far as Montrose Avenue.

Hearing on Injunction Application Scheduled.—Hearing on an application for a permanent injunction to restrain the United Railways & Electric Company, Baltimore, from charging 8 cents cash fare and 7½ cents when tokens are purchased, which rate was recently authorized by the commission, will be opened before Judge Charles F. Stein, in the Circuit Court on June 17. The application for the injunction was filed by Mayor Howard W. Jackson, acting as a taxpayer of the city, and also by the Mayor and the City Council. The United Railways and the Maryland Public Service Commission are named as defendants.

Bus Franchise Granted. — The City Council of Philadelphia on June 5 passed an ordinance granting to the Philadelphia Rural Transit Company a franchise for five bus lines. There were seventeen votes for the bill. On the day previous the Council's committee on public safety approved a bill providing for a $50 license fee for buses after a provision requiring taxicabs to pay a $5 fee had been stricken from the bill. This measure will probably be passed by Council the latter part of this month. Under the provisions of the bill the Philadelphia Rural Transit Company would pay an annual fee of $50 on each of the 200 or more buses operated on the five new bus routes.

New Company will Operate Interurban.—The Winona Service Company, Winona, Ind., has been incorporated with 10,000 shares of stock, no par value, to operate the line formerly known as the Winona Interurban Railway. This property was recently bought at a receiver's sale for $309,369 by James P. Goodrich, formerly Governor of Indiana. The sale was referred to in the ELECTRIC RAILWAY JOURNAL, issue of June 7. Authority to issue $600,000 of 6 per cent serial bonds is asked in a petition filed with the Indiana Public Service Commission by the Winona Service Company. The proceeds of the bond issue would be used to finance service improvements. Another petition asks authority to sell the company's electric generating equipment to the Interstate Public Service Company and to buy current from the Interstate.

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Foreign News

From the Journal's Own Correspondents

Extensions to Paris Metropolitan Lines Progressing

The work of construction and extension of the underground lines of the Paris Transports en Commun, begun in 1920, has been carried out actively through 1923. There have been added to the length of line operated another 7½ km., which brings the total up to 92 km. out of a proposed total of 122 km.

Consent is now being obtained for an additional line to follow the grand boulevards through the heart of Paris. The city of Paris itself will undertake the construction and to this end will seek a public loan. A project has been investigated for extending the lines out into the suburbs at surface level or on an elevated structure with a further project of running certain urban trains out into the country over the tracks of the steam railroads, thus avoiding changes and congestion of railway station traffic at rush hours.

In 1923 passengers carried increased to 468,845,000 from 451,781,000 in 1922, receipts increasing from 154,507,000 francs to 160,786,000 francs respectively. It is anticipated that the receipts for 1924 will be appreciably greater by reason of the 20 per cent increase in fares which has been in effect since the middle of January of the present year.

Trackless Trolley Versus Tramway at Darlington

The tramway tracks in Darlington (England) belonging to the municipality are badly in need of renewal, and in view of the cost involved the question has been discussed locally whether it would not be more economical to abandon the tramways and to substitute the trackless trolley system. The tramways are not very extensive, measuring in all about 9 miles, reckoned as single track, and they have not been very successful financially.

The Town Council of Darlington recently obtained a report from Alfred Baker, general manager Birmingham Corporation Tramways, on the subject of replacing the Darlington trolley lines with trackless trolleys. Mr. Baker, who has had the experience of converting one of the Birmingham tramway routes to the trackless car system, estimates the cost of reconstructing the 9 miles of Darlington tramways, including the doubling of some of the single track, at £94,000, and the cost of installing the trackless system instead, including £27,000 for eighteen trolley buses at £34,000. Among advantages of trackless trolley lines pointed out by the report, as compared with gas buses, are comfort for the passengers, electric motive power, the silence of the vehicle, and good acceleration and retardation. The receipts on the trolley buses are estimated at 14.5d. per mile run, or on an annual mileage of 450,000, £27,187, while the working expenses are put at 11d. per mile run, or £20,625 per annum. From the gross surplus of £6,562 would have to be deducted £4,166 for interest and sinking fund on the capital expenditure and for depreciation and renewals, leaving a net profit of £2,396.

New Cars for London Tube Railways

The London underground railway companies have placed contracts for the construction of 127 additional cars for service on the Edgware & City & South London lines as follows: Metropolitan Carriage, Wagon & Finance Company, fifty-two motor cars; Birmingham Railway Carriage & Wagon Company, fifty trail cars; Cammell, Laird & Company, twenty-five control trail cars. This new rolling stock will be of the same type as now running in daily service from Moorgate and Hendon and Highgate. It will bring the total number of cars of this design to 318.

Improvements on Madrid Tramways

During the past year various improvements have been carried out in the street car system of Madrid, the Spanish capital. One narrow-gage line has been brought up to standard gage, 5 ft. 8¼ in. The length of line under operation is now 93 km. and several extensions are under construction or projected. All the old rolling stock is about to be rebuilt so that the cars can be operated either open or closed according to the seasons, which are very variable indeed. The company also purchased fifty new cars last year.

During the past year, operation was attended with some difficulty as all current was purchased. A new central station has now been constructed and will in future serve the street car system exclusively.

Receipts for the six months ending Dec. 31 last were 10,863,422 pesetas (normal par 19.3 cents), which was an increase of 741,019 pesetas over the same period in 1922.

Bradford to Retain Tramways.—A proposal that the trackless trolley system should supersede the tramways in Bradford on twenty-four routes when the tracks are worn out has been rejected by the City Council, but it agreed to a scheme to make use of railless trolley buses for an extension of an existing tramway route. The council has had several years' experience of the working of trackless cars. Some time ago R. H. Wilkinson, the general manager, estimated that by the adoption of railless cars on the whole tramway system there would be a saving of about £41,000 a year as compared with the cost of renewal and operation of the tramways. F. O. Whiteley, the city treasurer, contended that the saving would be much less, and pointed out that the maintenance of railless cars would cost more than that of tramway cars, and the latter could carry more passengers. He also showed that though permanent way renewals would be eliminated, road tax would have to be paid.

Railway Competition in Glasgow.—The steam railway companies, with both elevated and underground lines in Glasgow, are now endeavoring to compete for local traffic with the municipal electric tramways. This effort takes the form of cheap fare facilities, particularly weekly zone tickets.

Power Plant for East Tokio.—The department of railways of Tokio announces the building of an electric generating plant on the Shinana River to cost $23,000,000. This plant is to furnish power for distribution over all the east-central portion of Japan feeding the electrical service of Tokio and also supplying power for the Tokio Railway.

Another Pass in England.—The tramways committee of the Hull Corporation Tramways, Hull, England, has announced the adoption of the weekly pass in connection with its zone fares. The charge for the pass for a given 1½d. (3-cent) zone will be 2 shillings (48 cents normal exchange) and for a 2d. (4-cent) double-zone, 2/6 (60 cents normal exchange), thus making the weekly prices equivalent to 16 and 15 standard fares respectively. Hull, with a population of 300,000, is practically the same size as Bradford, the pioneer British user of the unlimited-ride weekly pass.

A New Ticket Machine.—The London underground railway companies are experimenting with a new type of ticket-issuing machine. This is on the principle of the "Rolltic" machine and is designed to hold a roll of 5,000 tickets, 347 yards long. The present machines hold only 500-750 tickets. During rush traffic it is imperative that there should be no pause in the issue of tickets and with a roll of tickets capable of supplying 5,000 passengers the machine will run for a number of hours before the ticket supply needs replenishing. Further improvements are to be made by the provision of electrical devices which will enable the passenger to obtain his ticket by inserting the correct fare in the slot, thus relieving him of the necessity of having to push buttons or pull levers.

Developing a London Underground Station.—There will shortly be ready a new station of the City & South London Railway, constructed under the roadway at Moorgate in the City of London. The new booking hall will measure 3,575 sq.ft., compared with 1,175 sq.ft. in the old station, constructed twenty-four years ago. The passenger lifts are being taken out and two escalators substituted. The journey from booking hall to station platforms will occupy seventy-five seconds. The escalators will have a capacity of 10,000 passengers an hour.

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Financial and Corporate

New Yorkers Ride at Less Than Cost

B.-M. T. Chairman Says Earnings on Company's Investment Average 3.83 per Cent Over Ten-Year Period

Gerhard M. Dahl, chairman of the executive committee of the Brooklyn-Manhattan Transit Corporation, says riders in New York have failed to pay the cost of carrying them for the last ten years to the extent of $84,968,800. The taxpayer and investor have paid the deficit. He says the subway problem in New York will never be solved until the public faces the cold, hard facts, which are financial and not political. As for his company, Mr. Dahl says that it can work out the situation on a 5-cent fare so far as its own selfish interests are concerned, but that it cannot possibly expand and develop and give the kind of service to which the community is entitled unless the taxpayer is willing to pay the difference between 5 cents and the actual cost to carry the car rider.

In support of the statement that car riders in the past ten years have been getting for 5 cents a ride that costs 7.31 cents, data are adduced showing annual return yielded by actual earnings on the average investment of the past ten years by the company and by the company and city combined. Actual expenditures of the company under contract No. 4 with the city to June 30, 1923, totaled $86,000,000, while expenditures of the city were $149,700,000. The investor's ten years' experience with rapid transit as set down by Mr. Dahl follows:

The average investment of company and city combined, together with return yielded by actual earnings, and the required fare per passenger to cover interest on city's investment and 6 per cent return on company's investment is stated by Mr. Dahl as follows:

Year	Average Investment	Required Earnings for Actual Interest on City Investment and 6 per Cent Return on Company Investment	Actual Earnings	Equivalent to per Cent per Annum	Required Fare per Passenger for Required Earnings
1914	$111,311,681.87	$5,530,070.63	$2,975,759	2.67	$0.065
1915	136,254,719.41	7,393,639.87	3,265,275	2.40	.075
1916	164,334,880.91	8,465,743.54	3,924,467	2.39	.073
1917	191,311,355.26	9,661,106.64	4,358,451	2.28	.074
1918	219,385,684.23	11,150,387.45	4,760,451	2.17	.075
1919	239,580,315.07	12,084,990.88	4,331,680	1.80	.075
1920	256,815,616.52	13,048,756.41	3,542,008	1.38	.075
1921	270,990,290.24	14,044,938.89	1,414,177	.52	.081
1922	282,299,595.16	14,681,821.73	6,640,557	2.36	.068
*1923	289,751,631.06	16,278,991.88	7,264,324	2.50	.069
Average for 10-year period	$216,203,576.97	$11,234,044.79	$4,247,715	1.96	.0731

*1923 partly estimated.

As just indicated the average return for the 10-year period was 1.96 per cent. The average cost of carrying passengers was 7.31 cents, indicating 2.31 cents has been paid by the taxpayer and the investor.

Mr. Dahl has reiterated these facts on several public occasions recently. They are all contained in a pamphlet "The Car Rider, the Taxpayer and the Investor," published recently.

Year	Average Investment	Required Earnings for 6 per Cent Return	Actual Earnings	Equivalent to Per Cent per Annum	Required Fare per Passenger for Required Earnings
1914	$64,104,364	$3,846,261.86	$2,975,759	4.64	$0.055
1915	81,978,103	4,918,686.19	3,265,275	3.98	.060
1916	94,439,363	5,666,361.79	3,924,467	4.15	.059
1917	102,969,130	6,178,147.80	4,358,451	4.25	.058
1918	112,331,758	6,739,905.47	4,760,451	4.23	.058
1919	117,848,569	7,070,914.12	4,331,680	3.67	.059
1920	123,304,531	7,398,271.84	3,542,008	2.87	.060
1921	130,148,642	7,808,918.55	1,414,177	1.08	.066
1922	136,982,390	8,218,943.41	6,640,557	4.84	.054
*1923	142,270,833	8,536,250.00	7,264,324	5.10	.053
Average for ten-year period	$110,637,768	$6,638,266.10	$4,247,715	3.83	.0579

*1923 partly estimated.

The company's investment as just indicated includes existing rapid transit lines at time dual contracts were made; in the contracts they were considered to have an earning capacity of $3,500,000 a year, and this amount has been capitalized at 6 per cent. Results of operation show, instead of 6 per cent earned on its investment, varying percentages constituting an average of 3.83 per cent. The average required earnings to produce a 6 per cent return would have been $6,638,266, whereas average actual earnings for ten years were $4,247,715.

Toledo and Indiana Railway Purchased and Reorganized

The Toledo & Indiana Railway, which operates between Toledo and Bryan, has been purchased by Cincinnati and Toledo, Ohio, interests. Those interested in the transaction are: L. G. Van Ness, president of the Cincinnati, Lawrenceburg & Aurora Electric Street Railroad and the Cincinnati, Georgetown & Portsmouth Street Railway; Charles Dehore, railway specialist of the General Electric Company, L. E. Eastman, Toledo attorney, and M. M. Miller, president of the Home Bank & Trust Company, Toledo. The railway property includes 52 miles of right-of way between Toledo and Bryan.

The Toledo & Indiana Railway was organized in 1905 to operate an interurban line between Toledo and Fort Wayne, Ind. Because of financial difficulties the company extended only from Toledo to Bryan. At the outbreak of the world war the company had under consideration plans and financial support to extend the line to Fort Wayne, but construction of this line was abandoned.

The purchase transaction involves about $1,000,000. The Toledo & Indiana Railway was incorporated with a capital of $1,040,000. In acquiring control of the company the Cincinnati and Toledo interests purchased the stock. The Central Light & Power Company and the Wauseon Light & Power Company, subsidiaries of the Toledo & Indiana Railway, also have been taken over by Mr. Van Ness and his associates.

The Toledo & Indiana Railway has been reorganized with Mr. Van Ness as president; Mr. Dehore, vice-president; Mr. Eastman, secretary, and Mr. Miller, treasurer.

Under the new arrangement the Central Light & Power Company and the Wauseon Light & Power Company will be consolidated under the name of the Lake Shore Light & Power Company and a separate company will be made of the Toledo & Indiana Railway, although the officers will be the same as those of the interurban company. The current will be generated by the railway company and distributed by the Lake Shore Light & Power Company to a dozen small municipalities which are located in the northwestern part of the state.

Willoughby Property Has Deficit in 1923

The Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio, reports gross earnings for 1923 amounting to $631,346. For 1922 the gross earnings were $663,344. Total expenses showed an increase from $443,477 in 1922 to $455,816 in 1923. Net earnings decreased $41,858. After the consideration of various income charges, including interest on bonds and other miscellaneous charges, the net income for the year ended 1923 showed a deficit of $28,074 against a surplus, in 1922, of $3,541.

The statement of gross earnings, by years, beginning with 1902 and ending with 1923 showed a decided growth in the company business during that time. In 1902 the gross earnings totaled $189,187, showing a steady increase up to 1921 when the earnings were $701,-

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026. In 1922 they went down to $663,344 and last year $631,346. During the year ended Dec. 31, 1923 $10,328 was expended on additions and improvements chargeable to capital account.

Chicago "L" Stock Offered Direct

Sale of New Issue to Public Started June 7—Employees Oversubscribed Their Allotment of $1,000,000

In accordance with previously announced plans, the new prior preferred stock of the Chicago Rapid Transit Company, which was sold to the employees on favorable terms up to the opening of the public sale, was offered to the public at par, beginning on June 7. On that date two-column advertisements were inserted in all the local newspapers, similar to the one reproduced in the accompanying engraving. At the same time, Samuel Insull, chairman of the board of directors of the company, issued a statement in which he said:

The plan of offering stock to customers is the same that has been followed locally by the Commonwealth Edison Company, the Peoples Gas Light & Coke Company and the Public Service Company of Northern Illinois. It provides an opportunity for safe investment, gives the community a real financial interest in the success of the company and affords an additional incentive for still greater service. Out of the proceeds of the $5,000,000 series "A" prior preferred stock, about $3,000,000 will be used for important improvements necessary to keep pace with Chicago's growing demand for transportation. The rest will be used for refunding indebtedness. Additional cars that can be used for subway as well as elevated lines will be purchased, and main line platforms will be lengthened so as to permit six and eight car train operation. This latter is expected to give 15 to 20 per cent more capacity through the loop.

The company considers the prior preferred stock an excellent investment. The shares are exempt from personal property tax in Illinois and exempt from the normal federal income tax and are preferred as to dividends over interest on the adjustment debenture bonds, as well as preferred both as to dividends and assets over the preferred and common stock. The company will not entertain any propositions for the sale of the properties to the city of Chicago which does not fully protect this issue.

The properties of the Rapid Transit Company were valued in 1921 by the Public Utilities Commission at $86,250,000, which with additions and betterments to Dec. 31, 1923, of $2,266,359 and other corporate properties of $1,983,397 valued on the same basis as the commission valuation make a total appraisal of $90,499,756. To this figure should be added the improvements to be made through the sale of preferred stock. The Chicago Rapid Transit Company lines in 1923 carried 203,954,574 passengers, an increase over 1922 of 12½ per cent. All employees have been delegated to take subscriptions to the prior preferred stock investment.

On the basis of the incomplete returns on June 6 it was announced that the employees of the company had largely oversubscribed the amount of new prior preferred stock of the company which was set aside for them.

As announced in the ELECTRIC RAILWAY JOURNAL for May 31, page 871, the new issue of 7.8 per cent prior preferred stock issued by the "L" lines consists of a total of $5,000,000, of which $1,000,000 was set aside for employees. It was assumed that this amount would be ample to fill the demands of employees for the new stock. However, in a campaign lasting only two weeks, very close to 11,500 shares were purchased. This represents a total value exceeding by $150,000 the amount set aside for employee subscriptions. Of a total of 5,860 employees more than 75 per cent subscribed for the new stock.

Many interesting phases of the sale have developed as a result of comparisons of statistics available. In a number of cases individual trainmen purchased from twenty-five to thirty shares of the stock and paid for it in cash. Although there was a deferred payment option in connection with the purchase of the stock, approximately 2,650 shares of the total of 11,500 shares sold were paid in cash. This amounts to approximately 23 per cent of the total number of subscriptions. The total of 11,500 shares was taken by approximately 4,500 subscribers, making an average of a little more than 2½ shares per subscription.

"L" dividends for Patrons

CHICAGO Rapid Transit Company, operating all branches of Chicago's Elevated Railroad System, invites you to share in the earnings of the Elevated trains.

This community partnership plan, sponsored by Mr. Samuel Insull and associates, managers of the Elevated properties, is the plan that has proved so strikingly successful in the case of the Commonwealth Edison Company and other public service institutions under their management.

Elevated train patrons have an unusual opportunity for safe profitable investment in the

7.8% Prior Preferred Shares

Chicago Rapid Transit Company

This investment is protected by the steady earnings of the "L" [a rapid transit system serving a population of 3,000,000 and carrying more than a half-million passengers daily] by valuable franchises and by income-earning properties worth more than 4½ times the full amount of this stock issue.

Your money invested here will be used for service extensions and betterments, to keep pace with Chicago's pressing transportation needs. Not only will these improvements help the city to grow, increase property values, and shorten travel time, but they afford an easy way for "L" patrons to share in "L" earnings.

Dividends Payable Monthly

Shares, $100 each, will entitle you to receive 12 dividend checks each year, at the rate of $7.80 yearly per share. Shares are exempt from personal property tax in Illinois. Dividends are exempt from normal Federal income tax. This stock issue has been approved by the Illinois Commerce Commission; application will be made to list it on the Chicago Stock Exchange.

$10 *Down*—$10 *Monthly per Share*

You can purchase for cash or through our easy saving plan of $10 down and $10 monthly per share; 7% interest allowed on payments. For full particulars speak to any Elevated employee or send the Coupon for our new 12-page illustrated booklet. It tells surprising "L" facts every Chicagoan should know.

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New York Railways Reports Falling Off in Traffic

The New York Railways, operating 72 miles of line in New York City, which is expected to lift its receivership by July 1, the end of the company's fiscal year, recently submitted its report on operation for the nine months ended March 31. The figures include those of the leased lines of the company. The year ended March 31, 1924, showed a net improvement of $29,459, although there was a falling off in Manhattan in surface car traffic when compared with the traffic for the nine-month period ended March 31, 1923. The company reports total operating revenue of $6,733,977, compared with $6,971,610 for the same period in 1923.

Gross revenues from passengers were $6,129,283 for the nine months, compared with $6,311,150 in the corresponding period a year ago. Total operating expenses were $5,989,655, against $6,173,405. Taxes were $608,515, against $656,772. Net income from railway operations prior to fixed charges on securities outstanding and rentals, and prior to income from any bank balances and investments, was $135,806, compared to $141,433, a decrease for the period of $5,627.

Non-operating income was $449,269, against $469,184. Total fixed charges, including interest, rents and other deductions amounted to $2,080,186, as shown in the corporation's and receiver's reports, against $2,135,187 in the same period of last year, leaving the net corporate deficit in the combined reports at $1,495,110, against $1,524,570.

Considerable interest attaches to the progress of the New York Railways System, with the end of the receivership imminent which was instituted in 1919. Under the guidance of Job E. Hedges, the receiver, the various groups of bondholders have come to terms on a policy of readjustment.

The decrease in traffic on the lines of the system is shown by the fact that in the nine months ended March 31 total revenue passengers numbered 118,871,216, as compared with 122,074,837 in the previous similar period; paid 2-cent transfers collected totaled 8,357,499, against 9,529,662; free transfers collected totaled 2,260,687, against

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2,886,618, and revenue car-miles operated totaled 8,831,992, against 8,994,558.

Under the plan which was submitted to the bondholders' committee last February, the capitalization of the new company will be in the neighborhood of $40,000,000.

The company's funded debt is $58,173,027. The accumulated deficit for the estate, resulting from interest accruals, amounts to $15,708,318, and the accumulated deficit for the receiver since he took over the properties, $1,213,701.

Seeks Partial Abandonment in Palo Alto

Importance of serving the public interest was emphasized by Commissioner Martin at a hearing in Palo Alto, May 13, on the application of the Peninsular Railway to abandon franchises and tracks and all local service in that portion of the city of Palo Alto, Calif., to the north of the Southern Pacific tracks. With this major object in view Commissioner Martin continued the application of the railway company until June 10, largely for the purpose of giving the railway and city officials an opportunity for further negotiation, and if possible, agreement, which will enable the railway to continue to operate car service. He suggested the propriety of either the city or the company arranging for motor bus service.

It was brought out by the applicant at the hearing that due to passage of an ordinance by the city trustees of Palo Alto, requiring certain street improvements, the company desired to abandon all local service, but proposes to continue to operate the service between the Southern Pacific station and the campus of Stanford University. The company claims that the operations in the city of Palo Alto are carried on at a substantial loss, but that there is some profit in the operations between Palo Alto and Stanford University.

Dividend Declared on Manhattan "L" Issue

The board of directors of the Interborough Rapid Transit Company, New York, on June 10 directed the payment on July 1, 1924, of the rental of the Manhattan Elevated Railway for the quarter ended June 30 next at the rate of 4 per cent per annum upon the stock of the Manhattan company. This payment is based on the earnings of the previous quarter in accordance with the requirements of the readjustment agreement of 1922.

On July 1, 1923, the rental was not paid in full at the 3 per cent rate agreed upon for last year because estimates made at the time indicated that it would not be earned to the extent of 15 cents a share of stock. The exact earnings now having been ascertained to have been at the 3 per cent rate, the board of directors directed payment on July 1 next of this amount in addition to the regular quarterly rental previously mentioned, thus making a total of $1.15 a share of Manhattan stock.

On Jan. 1, 1924, the rental for the quarter then just ended was deferred because the earnings for the quarter ended Sept. 30, 1923, showed a deficit and an estimate for the remainder of the year did not seem to warrant the belief that the year would show earnings at the rate of 4 per cent. The directors decided in view of the increase in taxes and contingent liabilities, it is more prudent to await the ascertainment of the exact facts as to the earnings for the year ending June 30 next than to base any action upon estimates at this time.

Definite action on the matter will be taken, however, in ample time to permit the payment on Oct. 1, next, of the deferred quarter's rental or such part as may be found to have been actually earned in case the earnings for the year shall not equal 4 per cent upon the Manhattan stock.

The earnings of the subway and elevated combined for the month of April showed a balance of $461,163, but the earnings for the ten months ended April 30 last showed a deficit of $370,917, with the Manhattan rental accrued for that period at the rate of 4 per cent. The figures for May are not yet available.

$6,500,000 of Chicago Rapid Transit Bonds Offered

The Chicago Rapid Transit Company offered through the National City Company and Halsey Stuart & Company, New York, on June 11, $6,500,000 of 6½ per cent first and refunding mortgage gold bonds of the series due in 1944. The offering price was 94½ and interest to yield more than 7 per cent. The first and refunding mortgage bonds will be secured by a first mortgage on the property of the so-called South Side Division. The bankers say that the earning power of this division has been notably consistent. The earnings and expenses of the properties comprising the South Side Division covering a period of six years follows:

	Average for 5 Years Ended Dec. 31, 1918-22	Year Ended Dec. 31, 1923
Gross earnings	$4,366,383	$4,952,168
Operating expenses, current maintenance, taxes, rental and equipment charges, and pro rata share of charges for Loop Terminal operation	3,217,415	3,723,249
Balance applicable to interest charges and reserves	$1,148,968	$1,228,919
Annual interest on first and refunding mortgage bonds, including this issue, requires	.....	$518,500

The bankers say that the combined properties of the Chicago Rapid Transit Company for the twelve months ended March 31, 1924, produced gross earnings of $18,554,781 and net earnings of $3,874,235. Annual interest on divisional mortgage bonds and equipment obligations outstanding with the public and first and refunding mortgage bonds, including this issue, requires $2,344,000, indicating a balance available for replacements, junior securities, etc., of $1,530,235.

Losses Increase

The Jamestown Street Railway, Jamestown, N. Y., shows an increase in its net corporate loss for the first quarter of 1924 against a similar period a year ago. The loss from January-March, 1923, was $16 and in 1924 it was $13,628. The Chautauqua Traction Company also showed an increase in the net loss, being $28,790 in 1923 and $34,918 for the period from January-March, 1924. The net corporate loss of the Jamestown, Westfield & Northwestern was $6,805 for the first quarter in 1923 against $13,072 for a similar period in the current year. The three companies operate in Chautauqua County, New York, and are controlled by the same interests.

Mayor Has Municipal Railway Appropriation Measure.—A resolution asking the Board of Estimate of New York City to authorize the issuance of $50,000 in special revenue bonds to replenish the revolving fund for the operation by the city of the Staten Island Midland Railway was passed by the Board of Aldermen on May 27. It is now in the hands of the Mayor pending his approval or veto. The resolution was passed on the recommendation of Commissioner Grover A. Whalen of the Department of Plant and Structures. Mr. Whalen's suggestions with respect to the needs of the Staten Island line were reviewed at length in the ELECTRIC RAILWAY JOURNAL for May 24, page 830.

Bonds Approved.—The State Railroad and Public Utilities Commission recently issued an order approving the application of the Tennessee Electric Power Company for the issuance of $1,000,000, fifteen-year 6½ per cent debenture bonds, due 1939. The bonds are to be sold at not less than 92 cents on the dollar plus interest. The proceeds are to be used for certain improvements made in the power plants and in the Nashville Railway & Light Company's property.

Take Over "L" Line.—An agreement has been entered into between the Boston Elevated Railway and the Middlesex & Boston Street Railway under which the Elevated turns over its tracks in Trepelo road in Belmont to the Middlesex & Boston, which is to perform all the service there in the future. The line which the Middlesex & Boston takes over runs from the railroad crossing at the Waverly station of the Boston & Maine Railroad to the Belmont-Waltham line. The agreement has just received the approval of the State Department of Public Utilities.

Another Move Made in Montreal Suit.—As a sequel to the recent suit wherein the Montreal Tramways & Power Company, Montreal, Que., seeks $4,000,000 as loss of profit and damages from certain of its former directors, and the Imperial Trust Company, Ltd., another action has been taken by C. H. Cahan, for the Tramway & Power Company, asking the court to declare void a note for $824,603 signed by E. A. Robert in favor of the Imperial Trust Company. The note in question was signed by Mr. Robert before he ceased to be president of the Montreal Tram-

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ways & Power Company, and when he was still head of the Imperial Trust Company, Ltd. By it, the Tramway & Power Concern was bound in a sum of $824,603 and this transaction is numbered among those which the present directorate attacks in its suit to recover $4,000,000 from Mr. Robert and other former directors of the plaintiff company, and from the Imperial Trust Company, Ltd.

Accumulated Deficit $1,682,874.—The Visalia Electric Railroad, operating in Visalia, Exeter-Strathmore and vicinity, reports to the California Railroad Commission for the year 1923 that its operating revenue was $206,573 and operating expenses $133,051, giving a net operating revenue of $73,521. The net corporate loss for the year was $114,680. The deficit at the beginning of the year was $1,568,501. Miscellaneous additions to surplus for 1923 amounted to $307, leaving an accumulated deficit at the end of the year of $1,682,874.

Notes Issued. — A bonded indebtedness of $2,500,000 has been created by the Key System Securities Company, a holding company for the Key System Transit Company, Oakland, Cal. The indebtedness takes the form of 6 per cent notes, dated July 1, 1925, and maturing in ten years. They are secured by a collateral trust agreement on property held by the company.

Long-Term Bond Issue Offered. — Offering of an issue of Wheeling Public Service Company consolidated first mortgage 6 per cent gold bonds due Oct. 1, 1952, is being made by H. M. Jacoby & Company and Glidden, Morris & Company, New York, at 77, to yield 8.10 per cent. The company operates 25.7 miles of electric railway at Wheeling, formerly comprising the properties of the Wheeling & Elm Grove division of the West Virginia Traction & Electric Company. It is explained that the company's water property has been sold to the city of Wheeling and a contract signed to take it over on Sept. 1, 1924, which will bring $225,000 to the company's treasury. Negotiations are also under way to sell Wheeling Park and other real estate, conservatively estimated in value at $300,000.

Dividend Payment Cut by Twin City Company.—The Twin City Rapid Transit Company, Minneapolis, Minn., has declared a semi-annual dividend of 2 per cent on its outstanding common stock. From 1910 until April 1, 1918, the company paid 1½ per cent quarterly. On April 1, 1918, the quarterly dividend was reduced to 1 per cent. The dividend was passed in July, 1918. A dividend of 1 per cent was paid in January, 1919, and 2½ per cent on Feb. 20, 1920, 3 per cent was paid on Jan. 3, 1921, 2 per cent Feb. 10, July 1, and Dec. 30, 1922, and 3 per cent July 2, 1923, and 3 per cent Dec. 21, 1923.

Line Discontinued. — The Selectmen of Pembroke, Kingston and Hanson, Mass., have been notified of the discontinuance of about 8 miles of track operated by the Brockton & Plymouth Street Railway between Mayflower and Kingston carhouse. The entire road is 26 miles long. The discontinued trackage is in the middle of the system. The two ends will be operated as separate units.

Preferred Stock Offered.—W. C. Langley & Company, New York, are offering 5,000 shares of the 7 per cent cumulative preferred stock of the Knoxville Power & Light Company, Knoxville, Tenn., at $98 a share and accrued dividend, yielding about 7.14 per cent. The company conducts the electric power and light and street railway business in Knoxville, and surrounding territory. It operates under the supervision of the Electric Bond & Share Company.

Seeks to Abandon.—The Connecticut Company, New Haven, Conn., has petitioned the Public Utilities Commission for permission to discontinue operation over the tracks of the New York, New Haven & Hartford Railroad between East Hartford and Rockville. The company will claim that the service is not paying and that it is a duplication.

$1,581,000 Issue Sought by Boston Elevated.—The Boston Elevated Railway has petitioned the Massachusetts Department of Public Utilities for permission to issue $1,581,000 of thirty-year 6 per cent bonds to refund a similar amount of West End Street Railway bonds on Aug. 1.

Stock Offering Successful.—The Tennessee Electric Power Company, Chattanooga, Tenn., operating among other properties 70 miles of electric railway, announces that more than $700,000 of its first preferred stock has been sold to its customers and employees in less than six months. The company had two reasons for offering the stock, the first being to obtain money for capital expenditures and the second for the furtherance of the customer-ownership idea.

Gold Bonds Offered.—Harris Forbes & Company, New York, N. Y., are offering at 96¾ and interest yielding about 5.75 per cent $20,000,000 of the Puget Sound Power & Light Company's first and refunding mortgage 5½ per cent gold bonds, Series "A". The bonds are dated June 2, 1924, and are due June 1, 1949. The company does the greater part of the commercial light and power business in western Washington and substantially all the electric street and interurban railway business in this district except in Seattle.

Line Abandoned. — The Wyoming Public Service Commission has granted the Sheridan Electric Railway permission to abandon its line between Sheridan and the Veteran's Hospital No. 6, formerly known as Fort McKenzie.

Line Bought.—The 4-mile trolley between Phoenixville, Pa., and Spring City, known as the Chester & Montgomery Street Railway, has been bought by Thomas O'Connell of Phoenixville from the American Gas Company, for $10,000, with twenty years to pay.

Book Reviews

Portland Cement Prices

Their basis, character and present position. By Henry Parker Willis, Professor of Banking, Columbia University, and John R. B. Byers, Instructor in Economics, College of the City of New York. The Ronald Press, New York, 1924. $1.25.

That uniformity of prices is a quality indicating competition rather than combination in trade is the principal theme of this book, written by two well-known economists. This investigation was undertaken at the request of some of the leading producers of portland cement in the eastern part of the United States, because the manufacturers felt that the actual facts with regard to the economic conditions of manufacture should be made public. The authors, however, assume sole responsibility for the statements in the book.

An interesting story is told of the method by which the price of portland cement is determined and the factors which affect it in any given market. The way in which competition tends to fix a uniform price is convincingly brought out. Figures are presented to show that at the present time the average return to the producer of cement after making a fair allowance for depreciation is in the neighborhood of 7 per cent.

Among the reasons mentioned for the general uniformity in prices of portland cement are the fact that it is a uniform standardized product conforming to recognized tests of quality; that it is produced under substantially uniform conditions of manufacture, without trade secrets or patent processes which might be relied upon to furnish an advantage to one concern; that it is subject to very sharp competition on the part of buyers, who are, for the most part, professionally informed as to changes in cost and who are influenced by the price of cement as a constituent element in commodities or services which they are undertaking to deliver, and that it is in a high degree subject to the so-called law of substitution, by which is meant that for many purposes a substitute of some sort can be found in other materials.

No technical description is given of the composition and qualities of various kinds of cement, but the reasons why prices tend to be uniform in any one market are set forth. This book is therefore likely to be of interest and value to any one concerned with the purchase of large quantities of portland cement.

Car Lighting by Electricity

By Charles W. T. Stuart, Foreman of Car Lighting, Philadelphia Terminal, Pennsylvania Railroad. Published by Simmons-Boardman Publishing Company, New York, 1923.

This book is a practical treatise on the construction, operation, inspection and maintenance of the car lighting systems in use on American railway cars. The various systems in use are described in some detail, and methods of installation are included.

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Personal Items

N. H. Brown Leaves the Railway Field

N. H. Brown, general manager of the Stark Electric Railroad, Alliance, Ohio, has resigned to become associated with A. L. Chambers & Company, investment bankers, Buffalo, N. Y. This firm has been desirous of having Mr. Brown associated with it for some time, but on account of several important problems of the Stark Electric, he wished to remain until these were in process of completion. Mr. Brown retires from the street railway field after more than thirty years of service. He started as a conductor and worked through the various departments. He has been identified with the New York State Railways, Syracuse, N. Y.; Worcester Consolidated Street Railway, Worcester, Mass.; Albany Southern Railroad, Albany, N. Y.; International Railway, Buffalo, N. Y.; New Orleans Railway & Light Company, New Orleans, La.; Buffalo & Lackawanna Traction Company and the Depew & Lancaster Railway Corporation, both of Buffalo, N. Y., and the Stark Electric Railroad of Alliance, Ohio.

Charles Dehore will assume active management of the reorganized Toledo & Indiana Railway, Toledo, Ohio. Mr. Dehore is a railway specialist of the General Electric Company and is also secretary of the Cincinnati, Georgetown & Portsmouth Street Railway.

Howard W. Palmer, for many years a member of the editorial staff of the Watertown, N. Y., *Daily Times*, commenced duty as assistant secretary to the New York Public Service Commission June 2. Mr. Palmer will assist the secretary in the preparation of news reports of hearings and decisions of the commission.

W. S. Lee has been appointed general carhouse foreman for the Charleston Consolidated Railway & Lighting Company, Charleston, S. C. In this capacity he succeeds Ernest Barker, master mechanic, resigned. Mr. Lee has been in the employ of the company since January, 1911, when he entered the service as a trainman. Later in that year he was transferred to the car shop and on Dec. 1, 1921, became carhouse foreman, which position he held until his recent promotion to general carhouse foreman.

Glenn S. Reeves has been appointed assistant master mechanic of the Omaha & Council Bluffs Street Railway, Omaha, Neb., to take the place made vacant by the death of O. A. Norene. The electric railway industry is not entirely a new line of endeavor for Mr. Reeves, as he was employed in the shops of the Omaha & Council Bluffs Street Railway for several summers while still carrying on his studies at the University of Nebraska. As assistant master mechanic of the property he will report directly to T. E. Wood, master mechanic.

Charles E. Bostwick, Jr., for six years superintendent of the Jacksonville Traction Company, Jacksonville, Fla., has become manager of the White Star Stage Line at Tampa, organized recently to take over bus properties reported to have been purchased by Stone & Webster. The stage company operates from Tampa to Orlando, St. Petersburg and other important points in that section of Florida. Mr. Bostwick was graduated from Georgia Tech.

George R. Brown has been appointed purchasing agent of the Des Moines City Railway, Des Moines, Iowa.

Obituary

Henry Sellers McKee

Henry Sellers McKee, a pioneer Pittsburgh and New York capitalist, died on June 10 following an operation. He was eighty-four years old. Mr. McKee was prominent for more than half a century in glass making and was nationally active in the electrification of street railways. From 1890 to 1902 Mr. McKee was interested in a syndicate which accounted for the electrifying of traction systems in Pittsburgh, Buffalo, Indianapolis, Rochester, Newark and Paterson. The McKee group won a signal victory before the United States Supreme Court when local capital in Indianapolis attempted to take over the street railway franchise there. Philander C. Knox and ex-President Benjamin Harrison represented the McKee interests. In his early work in the electric railway field Mr. McKee was associated with Murry A. Verner in acquiring the Pittsburgh & Birmingham Traction Company and other properties. Among his other contemporaries in the traction field in Pittsburgh in the early days of electric traction were George W. Elkins, P. A. B. Widener and C. L. Magee.

Davis J. Cable, president of the Lima Street Railway and of the Lima-Toledo Railroad, Lima, Ohio, died on May 18, following an illness of six months. One of Lima's foremost lawyers and financiers, Mr. Cable was in close touch with the public and actively interested in the various public utilities in the city and vicinity. He was attorney and one of the promoters of the Fort Wayne, Van Wert & Lima Traction Company, Fort Wayne, Ind. He was also attorney for the Lima Street Railway prior to the organization of the Ohio Electric Railway and was attorney for the northern district of the Lima-Toledo Railroad for many years, becoming president in 1922, when the organization of the Lima Street Railway and Lima-Toledo Railroad took place. His son, Congressman John L. Cable, who had been associated with him, will continue as counsel for the public utilities with which they have been associated for years.

Joseph O. Gauthier, superintendent of rolling stock and shops of the Middlesex & Boston Street Railway, Waltham, Mass., died recently at the Newton Hospital, at the age of fifty-six, after an illness of some six weeks. Mr. Gauthier entered the railway business in 1891 as a night inspector with the Middlesex & Boston Street Railway. He worked his way up to the position of superintendent of equipment. Mr. Gauthier was held in high esteem both by the management and his employees and was known quite well throughout New England. At the time of his twenty-fifth anniversary in the employ of the company he was presented with a Waltham watch and $25 in gold from the directors of the company at a reception held in his honor.

O. A. Norene formerly assistant master mechanic of the Omaha & Council Bluffs Street Railway, Omaha, Neb., died recently.

Frank Lewis Buxton, for thirty-four years with the Boston Elevated Railway and for much of that time at the Park Street station, died recently while en route to Boston from Amherst, Mass., where he had a summer home. He had the distinction of being the first man to drive an electric car in the Newtons. He was born in Haverhill, Mass., in 1860.

J. Walter Tracy, vice-president and general manager of the North East Electric Company, Rochester, N. Y., was drowned in Lake Ontario on May 30 while attempting the rescue of members of a cruising party swept overboard in very rough water. Mr. Tracy entered the automotive field in October, 1912, with the North East Electric Company, makers of starting, lighting and ignition systems, horns and speedometers for buses and other automotive equipment. A pioneer in automotive electrical service, he developed and built up a service organization for North East equipment along original lines, and when the North East service organization was incorporated as a separate concern in 1921 he was made the active head.

William Crawford Smith, for many years superintendent of the New Castle division of the Pennsylvania-Ohio Electric Company, Youngstown, Ohio, is dead. Mr. Smith was seventy-seven years old. He had retired from the railway business early in 1922 following a career of forty-two years. From 1880 to 1883 he conveyed passengers for the Citizens' Passenger Railway of Pittsburgh and in 1883 became stable chief and superintendent of the East End Division. In 1889 he was appointed assistant superintendent of the Citizens' Traction Company. His experience also included the direction of cable cars. When the Pittsburgh companies were consolidated Mr. Smith was made superintendent of transportation. From 1901 to 1904 he acted as assistant manager and later general manager of the Mahoning Valley Street Railway in Youngstown, but returned for three years to Pittsburgh. From 1907 and up to the time of his resignation he was with the Mahoning & Shenango Railway & Light Company in Youngstown as superintendent with headquarters at Newcastle.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Use of Wood Preservative Is Increasing

Between 6,000,000 and 8,000,000 wood cross-ties are said to be used annually by the electric railways of the country. Of the number installed in 1922, according to statistics compiled by the United States Forest Service, only 600,000 were treated with wood preservative before being placed in the ground. Separate figures are not available for 1923 to show how many treated ties were installed by the electric railways and how many by steam railroads. The total number of treated ties used in that year, however, was considerably greater than during the preceding year, and it may reasonably be inferred that the electric railways used a proportionately larger number.

There seems to exist in some quarters a misapprehension concerning the life of untreated wood ties in paved streets, which may partly account for the comparatively small use of treated ties by the electric railways. While it may be said in general that ties last longer in paved streets, where they are protected from the weather, than they do in open track construction, according to the American Wood Preservers' Association, drainage is really the controlling factor. In some cases ties on unpaved streets have lasted several years longer than those in paved streets in the vicinity.

There can be no question but that with steadily rising timber prices electric railways must devote more attention to the use of wood preservatives not only for ties but also for other purposes. The committee on wood preservation of the American Railway Engineering Association has stated that the use of treated ties of one kind or another is not only an economic necessity but an economic duty for all railways. In other words, none but treated ties should be used, irrespective of climate or other condition, except where there may be still available naturally long-lived woods. If the steam railroads can save from 10 cents to 20 cents per tie per year by the use of a preservative treatment there can be no question but that the electric railways would secure equally good results.

Japan Orders Railway Equipment

A contract calling for $1,500,000 of railway electrification equipment was received on June 12 by the Westinghouse Electric International Company from Takata & Company, acting as agents for the Imperial Government Railways of Japan. The contract covers equipment for the extension of electrical service in the vicinity of Tokio.

Included in the order are eight large locomotives for high-speed express service which will eventually extend from Tokio to Kobe, ten 2,000-kw., 1,500-volt rotary converters, two 2,000-kw. motor-generator sets, with automatic switching equipment, and a large amount of substation equipment.

In a statement made just after the order was received I. F. Baker, manager of the Westinghouse Electric International Company in Japan, who is now in New York on a commercial visit, said: "This order is the result of several years study with the Imperial Government Railways, during which a careful comparison was made between Westinghouse equipment and that of important European competing companies and is an indication of the excellence of American-designed electrical apparatus."

Infringement of Fageol Patents

A letter has been sent by Fageol Motors Company, Oakland, Cal., to all bus body manufacturers in the United States drawing attention to the subject of infringing patents. The company declares that it feels sure none of the other manufacturers would knowingly commit any infringement of the Fageol patents. Several, however, have inquired what features are covered by these patents so that they might be guided thereby in designing their own bus bodies. With a view to answering those questions, therefore, the company has distributed the letter and a folder describing certain features of the Fageol construction.

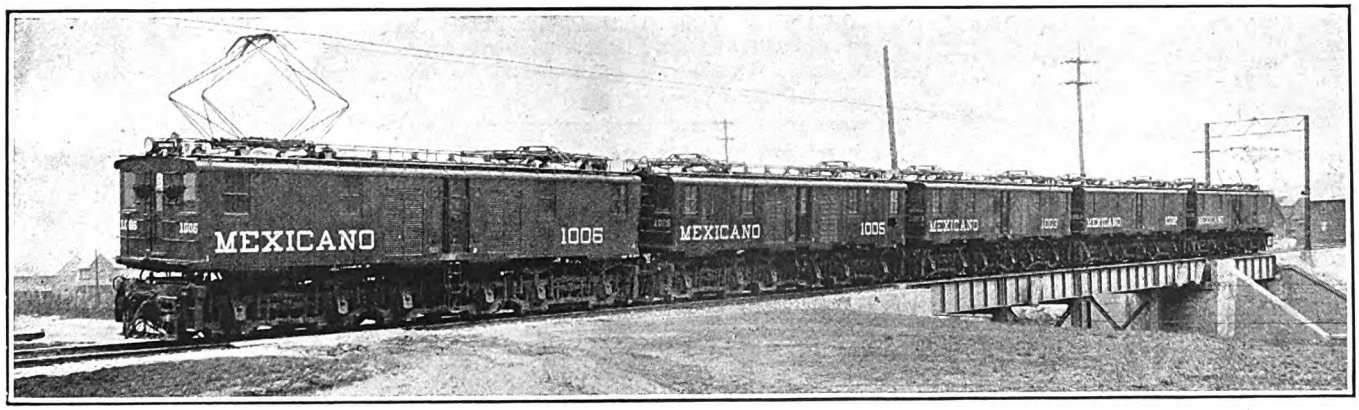
New Sales Organization for Central and Northwestern States

James C. Jameson and Harry E. Ross have organized the Jameson-Ross Company with offices in the Straus Building, 310 South Michigan Avenue, Chicago, Ill. This company will act as sales agents in the Central and Northwestern States for manufacturers of railway supplies and equipment. Among others it will represent the Dayton Mechanical Tie Company, Dayton, Ohio; Indianapolis Switch & Frog Company, Springfield, Ohio; Railway Track Work Company, Philadelphia, Pa.; Atlas Railway Supply Company, Chicago; Liteweld Company, Cleveland, Ohio; Electric Tamper & Equipment Company, Chicago; Plymouth Bus Body Works, Plymouth, Ind., and the Universal Lubricating Company, Cleveland, Ohio.

Mr. Jameson has been identified with the electric railway industry for more than fifteen years. He is vice-president and secretary of the Indianapolis Switch & Frog Company and is also vice-president of the Dayton Mechanical Tie Company. Mr. Ross recently resigned as Western manager for ELECTRIC RAILWAY JOURNAL and *Bus Transportation* to take up this new work. He was formerly secretary of the Kenfield-Davis Publishing Company and business manager for *Electric Traction*.

Metal, Coal and Material Prices

Metals—New York	June 10, 1924
Copper, electrolytic, cents per lb.	12.687
Copper wire base, cents per lb.	15.25
Lead, cents per lb.	7.05
Zinc, cents per lb.	6.17
Tin, Straits, cents per lb.	42.00
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.425
Somerset mine run, Boston, net tons	2.175
Pittsburgh mine run, Pittsburgh, net tons.	1.875
Franklin, Ill., screenings, Chicago, net tons	2.00
Central, Ill., screenings, Chicago, net tons.	1.625
Kansas screenings, Kansas City, net tons..	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.35
Weatherproof wire base, N.Y., cents per lb.	17.25
Cement, Chicago net prices, without bags.	$2.20
Linseed oil (5-bbl. lots) N. Y., per gal.	$0.97
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	12.25
Turpentine, (bbl. lots), N. Y., per gal.	$0.85



Five of the Ten Locomotives Recently Built by the General Electric Company for Heavy Duty in Mexico. They Are Here Shown on the Test Tracks at the Erie Plant of the General Electric Company

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Rolling Stock

Pacific Electric Railway, Los Angeles, Cal., has announced specifications on the 1,350 freight cars referred to in the ELECTRIC RAILWAY JOURNAL, issue of April 5, 1924. The order included 600 drop bottom gondolas, 150 steel flat and 600 wood box cars. The detailed specifications follow:

Number of cars ordered.....600
Date order was placed.....Dec. 26, 1923
Date of delivery.....March 26, 1924
Builder of car body.Standard Steel Car Co.
Type of car.....50-ton single sheath box
Total weight .....43,200 lb.
Bolster centers, length.....30 ft. 8 in.
Length over all .....45 ft. 1¼ in.
Truck wheelbase .....5 ft. 6 in.
Width over all .....10 ft. 6 in.
Height, rail to trolley base.....14 ft. ⅛ in.
Body .....Wood
Roof:
300 Murphy radial all-steel.
300 Hutchings car roofing.
Air brakes .....N. Y. Air Brake
Axles ..Pollak steel, A.R.A., 5½ in. x 10 in.
Bearings .....E. S. Woods, side bearings
Couplers,
A.R.A. type D National Malleable Castings Company
Hand brakes,
National Malleable Castings Company
Journal bearings,
Friction 5½ in. x 10 in. A.R.A. Mangus Company
Journal boxes .....Bettendorf
Springs....Railway Steel Spring Company
Trucks .....Bettendorf
Wheels.....33-in. C.I., 750-lb., A.R.A.

Number of cars ordered.....150
Date order was placed.....Dec. 26, 1923
Date of delivery.....March 15, 1924
Builder of car body,
Ralston Steel Car Company
Type of car.....50-ton steel, flat
Total weight .....33,688 lb.
Bolster centers, length.....30 ft. 8 in.
Length over all.....41 ft. 9½ in.
Truck wheelbase .....5 ft. 6 in.
Width over all.....9 ft. 9½ in.
Body .....Steel
Air brakes.....Westinghouse KC-812
Axles,
Pollak steel, A.R.A. standard, 5½ in. x 10 in.
Center and side bearings.....E. S. Woods
Couplers,
A.R.A. type D, National Malleable Castings Company
Hand brakes,
National Malleable Castings Company
Journal bearings,
Friction, 5½ in. x 10 in., Mangus Company
Journal boxes,
American Steel Foundry, integral
Springs....Railway Steel Spring Company
Trucks..American Steel Foundry, integral
Wheels.....33-in. C.I., 750-lb., A.R.A.

Number of cars ordered 600
Date order was placed.....Dec. 26, 1923
Date of delivery.....March 26, 1924
Builder of car body,
General American Car Company
Type of car...50-ton drop bottom, gondola
Total weight .....46,775 lb.
Bolster centers, length.....31 ft. 10⅛ in.
Length over all .....46 ft. 1½ in.
Truck wheelbase .....5 ft. 6 in.
Width over all .....10 ft. 5¼ in.
Height .....9 ft. 7⅞ in.
Body .....All-steel
Air brakes .....Westinghouse KC-812
Axles,
5½ in. x 10 in., A.R.A., Pollak Steel Company
Bearings .....E. S. Woods, side bearings
Couplers,
A.R.A. type D, National Malleable Castings Company
Hand brakes,
National Malleable Castings Company
Journal bearings,
5½ in. x 10 in. friction A.R.A.
Journal boxes .....Integral type
Springs.....Railway Steel Spring Company
Trucks,
American Steel Foundry, integral type
Wheels.....33-in. C.I., 750-lb., A.R.A.

Indianapolis Street Railway, Indianapolis, Ind., expects to receive and place in service ten new cars during the course of the next few weeks. These are double-truck, closed passenger cars of the Peter Witt type, 50 ft. in length over bumpers. They will be equipped with Taylor trucks, 24-in. steel wheels, four G. E. No. 258 motors per car, one G. E. 12 H controller, G. E. air compressor and Peter Smith heater. It is expected that more cars of the same type will be ordered in the near future.

Twin City Rapid Transit Company Minneapolis, Minn., upon the determination of a permanent rate of fare in the Twin Cities, plans a five-year program providing for the expenditure of $3,000,000 for new "noiseless" type cars to be installed at the rate of fifty a year.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y., to be succeeded under reorganization by the Interurban Company, will, it is reported, purchase twenty-five new cars for use in interurban service modeled after the design of the one-man interurban cars in use on the lines of the Kentucky Traction & Terminal Company, Lexington, Ky.

Interstate Public Service Company, Indianapolis, Ind., has placed an order with the White Company of Cleveland for eleven buses. The buses will be of two designs. One will carry twenty-five passengers and the other twenty-six. They will be ready for delivery in about sixty days.

Track and Line

San Francisco Municipal Railways, San Francisco, Cal., will probably build an extension into the Eureka Valley district following a recommendation adopted by the public utilities committee of the Board of Supervisors.

Tri-City Railway, Rock Island, Ill., through Manager T. C. Roderick, announced that the relaying of tracks on the Third Avenue line along Seventh Street, Rock Island, would cost $13,000.

Pittsburgh Railways, Pittsburgh, Pa., following a paving agreement with the city of McKeesport, will carry out some improvement plans. The work includes the placing of girder rails in Fifth Avenue between the bridge and B. & O. tracks and necessary paving, at a cost of $33,180. One track is to be renewed in Fifth Avenue between Sinclair and Huey Streets and new track is to be laid in Fifth Avenue between Huey and Evans Streets and paving done, at a cost of $46,522. If the company has sufficient funds Atlantic Avenue is to be improved, probably not later than 1926.

Seattle Municipal Railway, Seattle, Wash., is being urged by the residents of the University District to extend the Cowen Park line on Fifteenth Avenue Northeast across the park north to Bothell Way.

Power Houses, Shops and Buildings

Columbus Railway, Light & Power Company, Columbus, Ohio, plans a one and three story, 52 x 125-ft. reinforced-concrete addition to its power house on Gay Street. The contract for erection has been awarded to E. Spencer, 910 Huntington Bank Building, for $125,000.

Toledo, Fostoria & Findlay Railway, Fostoria, Ohio, has completed an automatic substation, replacing the steam plant which had been in service more than twenty years. The main plant handles power for cars between Findlay and Pemberville.

Pacific Electric Railway, Los Angeles, Cal., plans to build a concrete substation near Twenty-fifth Street and Long Beach Avenue at a cost of more than $60,000.

Steubenville, East Liverpool & Beaver Valley Traction Company, East Liverpool, Ohio, plans new substations at Steubenville, Costonia, Yellow Creek, Kountz Corner, East Liverpool, Industry and near the Pennsylvania-Ohio state line for conversion of 22,000-volt a.c. to 635-volt d.c. at a cost of $175,000.

Trade Notes

General Electric Company, Schenectady, N. Y., has recently opened a service shop in Kansas City, provided with machine equipment of new and up-to-date design. In addition to the service shop at Kansas City, service shops have been established within a year in Los Angeles, Seattle and Dallas.

King's Concrete Crosstie Corporation, New York City, N. Y., has been incorporated to manufacture patented and unpatented railroad crossties and tie plates. The capital is $1,000.

Pharo Engineering Company, Pittsburgh, Pa., has been appointed sales representative of the Nichols-Lintern Company, Cleveland, Ohio. It will handle the entire line of Nichols-Lintern specialties for electric railways and industrial plants.

Okonite Company, Passaic, N. J., announces that George N. Brown has been appointed manager of the Atlanta office, succeeding J. L. Phillips, who has been appointed manager of the San Francisco office.

New Advertising Literature

Jewell Electrical Instrument Company, Chicago, Ill., has started the publication of a house organ called the "Jewell Magnet." The paper will be issued because the company feels that electrical measuring instruments are the "keystone of the electrical industry." The company invites suggestions and constructive criticism from every one in regard to articles for scientific or strictly electrical engineering data.

Electric Machinery Manufacturing Company, Minneapolis, Minn., has issued Bulletin No. 833, on "E-M Junior Synchronous Motors for Direct Connection to Small Compressors."

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued "Westinghouse Mica Insulation," dealing with all the forms of sheet, hot molding and cold molding mica insulation manufactured by that company. The booklet, a 16-page publication known as folder 4531-A, describes the various grades of mica insulation and gives their different applications.

Crouse-Hinds Company, Syracuse, N. Y., has issued folder No. 11, entitled "100 per Cent Fireproof Interlocking Safety Switch and Plugs."

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New York, June 21, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 63
Number 25

Making Office Furniture Pay Big Dividends

ELSEWHERE in this issue, Robert M. O'Brien, superintendent of rolling stock and shops New Orleans Public Service, Inc., tells how that company in 3½ years has increased the average car mileage per pull-in from 1,380 to 217,728. An interesting statement in this account is that with an idea of building up the morale of the mechanical department, master mechanics at the various carhouses were provided with suitable offices and office equipment. Of course, it is not claimed that this was the reason that the number of pull-ins and the maintenance cost were reduced. But it indicated a line of thought on the part of the management that probably goes a long way toward explaining the remarkable record which the mechanical department has made.

A good man always works better when an appeal is made to his self-respect. Giving the master mechanics better offices and better office furniture did not make them any more capable in a technical sense, but it undoubtedly did give them a new sense of their own importance in the railway organization and stimulated them to do better work than they had ever done before. Many a man has it in him to do good work if properly encouraged. In this case the encouragement took the form of increasing the dignity of the position, and certainly if the results achieved at New Orleans are a fair criterion, this method is worth trying elsewhere.

Using a Technical Man for Technical Work

ANOTHER progressive step that the New Orleans company has taken to improve the quality of railway maintenance work is the employment of young graduate engineers to inspect and test electrical apparatus. The superintendent of rolling stock and shops believes that a man who has made a comprehensive study under competent instructors of the theoretical side of electricity, is better able to make accurate scientific tests, than is the average practical railway man.

For this reason it is planned to have the electrical equipment of the cars thoroughly overhauled after 40,000 miles of operation, and carefully tested by an electrical engineer before it is returned to service. Should the engineer in his work of testing find only one serious defect in equipment that would have caused an accident should it have passed a less rigid inspection, his salary would be earned several times over. Even without this contingency, the reliability of the equipment should eliminate delays and interruptions to service that in themselves cost a great deal of money.

This is in line with the best modern thought on the subject of technical education, which acknowledges that the college graduate, after having a certain amount of practical experience is usually far more valuable in any organization than is the man without technical training. It is, however, a point of view which has been slow to be accepted by electric railway men in general, and the adoption of this plan by New Orleans Public Service, Inc., is the more encouraging on that account.

He Bought Them Because They Were Cheap

A MAN we know has a pile of old hats on the shelf of the hall closet in his home. There are straw hats, felt hats, and derbys; some broken, others out of shape and all rather dilapidated. None of them is much good to him now although in every case he thought himself rather smart when he bought the hat. He bought them because they were cheap.

Afterward, he discovered that while the cheap hat looked well enough at first, it did not last very long. So he got another cheap hat to replace the first cheap hat, and in the end spent a good deal more money than if he had bought a high-grade product in the first place.

A few railways follow a similar policy in buying rolling stock. They purchase second-hand cars and equipment because they are cheap. Later they find out, as did the man with the hats, that cheapness alone is not a sufficient recommendation. Their odd cars differ in appearance and mechanism from the other cars on the property. They give to the property an appearance that we like only to associate with the junk yard. The variation in equipment requires extra investments to provide replacement parts and thereby adds to the overhead expense. Maintenance costs run high and increase rapidly as time goes on. The number of pull-ins and service interruptions are disgraceful. And soon the cars have to be scrapped—much sooner than new cars would have had to be scrapped.

A company which follows this policy, soon accumulates a miscellaneous assortment of rolling stock which clutters up the storage yards and is the only thing it has to show for money spent, for such cars would doubtless earn deficits. Like the old hats of the man already referred to, these cars are of little value. Bought because they were cheap, they gave a poor quality of service and had only a brief useful life. A first-class car bought new would have given more and better service and in the long run would have been a decided economy as well as an attraction to riders.

There are occasions when the purchase of a few second-hand cars will successfully solve a pressing problem. As a regular policy, however, it is almost certain to be a failure. Yet it is nice for the managements who are living in 1924 and not 1904 to have this other type of management in existence, because this provides a means of disposing of the "has beens" in cars.

This is the issue in June that is devoted essentially to maintenance subjects

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A New Way of Increasing Rail Life

WITH improvements in track joints the wear of the rail head is becoming more and more a dominant factor in the life of track. Wear depends primarily on the hardness of the rail, and the high carbon steels now used extensively have a longer life in track than the early wrought iron or soft steels. They do have a tendency toward brittleness, and occasionally failures occur due to breaks in the rail.

The ideal rail should have a section of tough metal with a hard wearing surface. While such rails have never been produced commercially, at least in this country, the so-called *in situ* process has been developed for surface hardening. This is now being experimented on by the Toronto Transportation Commission under the direction of A. T. Spencer, assistant to the general manager, as described in this paper for June 14, page 922.

That the process does harden the rail surface is an established fact. It is to be hoped that the results obtained will be in every respect all that are claimed. There are many miles of rail in service that while partially worn, still have sufficient metal in the head to last for several years if the wear can be arrested.

The tests being made by Mr. Spencer indicate that the life of rails can be prolonged perhaps five years by the application of this process. It is quite inexpensive and does not require the track to be disturbed in any way. In fact, the work can be done at night without interruption to car traffic the next day.

With such possibilities before it, the tests of the process being made in Toronto will be watched with great interest by way engineers.

It Pays to Do a Good Job in the First Place

THERE may be some question as to the desirability of building cars to have long life, because merchandising value as well as cost of maintenance must be taken into consideration, but there is no such question about building track to have the longest possible life. It is more expensive to tear up the old track and replace it every few years than it would be to do a real job of construction in the first place. Moreover, tearing up the pavement and relaying the rail involve interruptions to service and inconvenience to the general public. This element, although difficult to evaluate in dollars and cents, should not be overlooked.

Probably the most interesting point developed by the track joint survey which appears elsewhere in this issue is the opinion expressed by a number of way engineers that poor original construction is to blame for the majority of joint failures. Convincing evidence in this direction is furnished by the experience in Atlanta, where it was found that all of the joints made on one rail by a particular construction gang developed defects, while those made at the same time on a parallel rail by a second gang remained in good condition. This incident seems clearly to indicate that the quality of the original workmanship is a vital factor in the life of the joints.

In line with this theory is the idea that repairs should be made by installing the best type of modern joint rather than by replacing the defective joint with another of the same kind as that used in the first place. Most railway companies appear to favor the practice of installing the best joint.

Perhaps the most convincing way of expressing the soundness of a policy of excellence in track construction was outlined recently by a prominent way engineer who remarked, "When I get through with this job I want people to remember how long the track lasts, not how little it cost to build it."

Horse Power— or Brain Power

ALL THE track laborers on one good-sized Eastern railroad, numbering perhaps thousands, develop a working effort of only some 300 hp., according to its president. That is the way he would rate them as machines, figured from the actual work their muscles perform. On this basis man-power is the most expensive kind of power in the world.

Then why continue to employ man-power to do the work of a machine? If the man does the work no better and the cost is more, there is not much argument in favor of the man. The value of man-power comes in direction of effort, so that instead of supplying a large quantity of brute force, a much smaller amount can be applied intelligently to produce the desired result faster. Going a step further, the man need not apply the power at all, but only supply the directive force to control a machine.

But unless the man can think and perform a duty that cannot be done equally well by a machine, he is not fulfilling a real place in the present scheme of things. Even today too many men, not only in the ranks but in more important positions, are supplying little more than horsepower; they let some one else do the thinking for them and merely carry out the designs of others, often not as well as a good machine can do.

Opportunities for doing things better and for rendering real service are missed repeatedly, and as a result not only the men themselves but the properties of which they form a part fail to progress as they should.

Let each of us stop and consider—am I supplying brain-power or only horsepower? Is my work so mechanical that I can be replaced by a machine which can do it better and at less cost?

Maybe It's Not So Bad to Have a Fickle Public

SOME electric railway executives lament the fickleness of the public. Today the majority of people may appear to sympathize with the aims and objects of the railway and be willing to help in their accomplishment, while tomorrow the tide of public opinion may be running strongly against the traction company. We have all seen instances of that kind. Often it has been some vote-seeking politician with more oratory than facts at his command who has inspired sudden change in attitude. Without doubt it is a hardship on a railway to have the support which it needs suddenly withdrawn. But perhaps it is not so bad as it seems. Knowledge of the fickleness of the public should serve to keep the railway management alert and energetic in providing service that is above criticism. In other words, the company must keep its patrons sold on the idea that it is doing its job well. That is the unvarying basis of good public relations.

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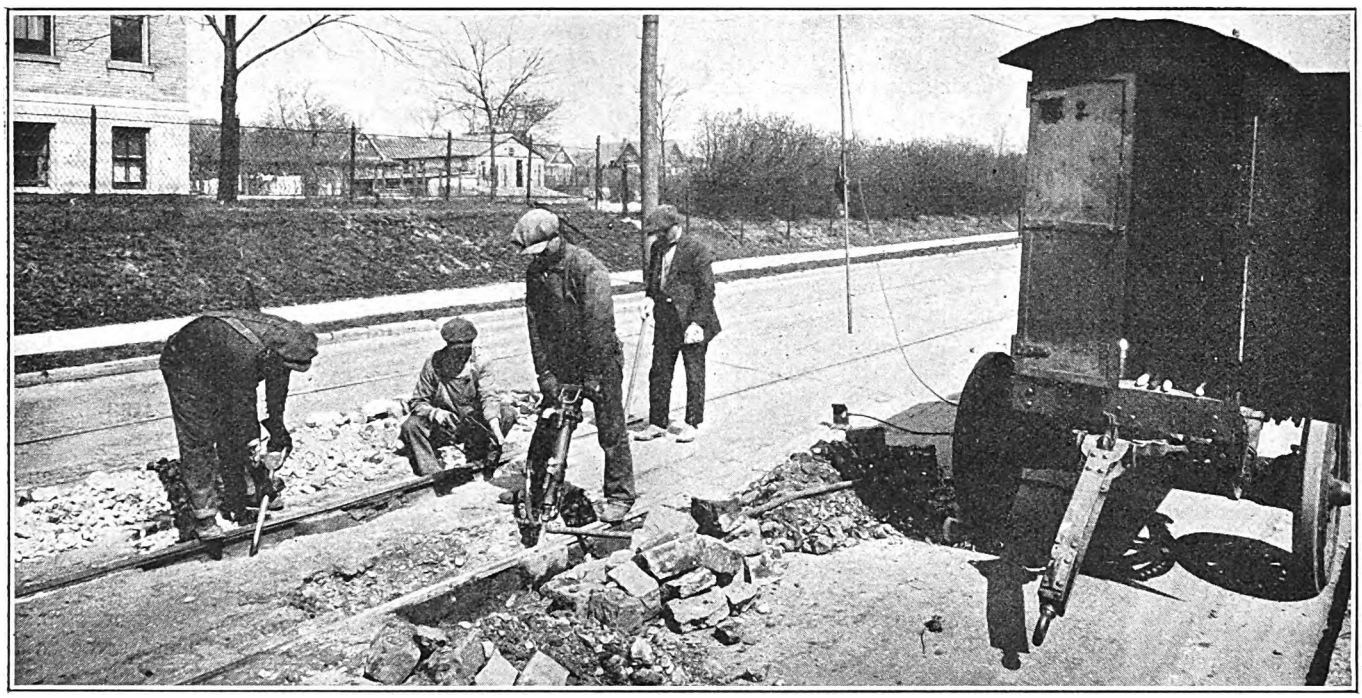
Track Joint Failures—Cause and Repair

A Survey by the "Journal" Shows that a Number of Way Engineers Blame Failure on Poor Original Construction—Maintenance Methods of 14 Railways Are Described—How Battered Joints Are Built Up by Welding—Granite Block Paving Is Favored



When Making Joint Repairs in Milwaukee the Practice Is to Remove the Paving with Air Tools for a Width of About 12 In. on Each Side of the Rail and for a Length of About 3 Ft. on Each Side of the Joint

THE consensus of opinion among way engineers developed by a survey made by ELECTRIC RAILWAY JOURNAL is that failure of track joints can usually be attributed to poor original construction. A variety of methods are used to determine whether or not a joint should be opened up for repairs. In making repairs most railways appear to favor the use of the best type modern joint rather than the installation of a joint of the same kind as the original. For paving along the rail granite blocks are thought by a majority of these engineers to be the most satisfactory material.

Concerning the causes of joint failure in Baltimore, W. W. Wysor, chief engineer United Railways & Electric Company, says: "In bolted joints the most frequent cause of failure is improper fit of the joint and failure to keep it tight. Failure may also be due to improper design of the joint plate, but assuming that plates have sufficient strength and are designed with proper bearing area, both top and bottom, the failure is then probably due to improper fit or improper tightening of the joint in the first place or failure to hold it tight.

"When it comes to welded joints, it would be very difficult to say what is the most frequent cause of failure. That would, of course, depend upon the type of welded joint used and the particular methods employed in making the welds. But one thing in my opinion which is essential to the success of all joints in paved streets, whether they be bolted or welded, is the elimination so far as possible of any space between the ends of the rails and that the head of the rail throughout the joint should be continuous, of uniform section and uniform metal. If some form of welding is employed where the heads of the rails are actually melted together, care should be taken not to change the chemical or metallurgical properties of the steel, and the proper contour of the rail, if disturbed, should be restored. Where the rail heads are not melted together, but merely abutted, precautions should be taken to make joints just as tight as possible. The heads of the rails should be milled to a smooth true surface and the rails should be drawn together in the field by the use of drift bolts or by some form of compression machine."

Carelessness in making the joint, in the opinion of C. A. Smith, superintendent of roadway Georgia Railway & Power Company, Atlanta, Ga., is responsible for most failures. Instances have occurred in Atlanta where both the left-hand rails of a double-track line have broken down at the joints, while both the right-hand rails remained in good condition. Investigation showed that the same construction gang had made the joints on both of the good rails and a different gang had made the joints that had failed.

The most frequent cause of joint failure, according to B. H. Eaton, engineer maintenance of way Los Angeles Railway, is loosening of the plates, causing the receiving rail to cup. As this cup grows deeper it entirely destroys the joint either by breaking the plate or the rail. Another frequent cause of joint failure is loose track, allowing too severe bending moments to occur under wheel loads.

The Los Angeles Railway has found that joint failures are far more frequent in the so-called rigid type of construction than in more resilient types. This is thought to result from crystallization of the rail,

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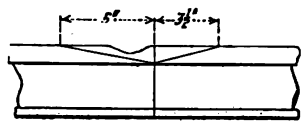
caused by the pounding of the car wheel, rather than from loose track or cupping. Very serious trouble has been experienced on all the rigid tracks of this company.

The Chicago & Joliet Electric Railway has found the most frequent cause of joint failure to be poor original workmanship. It has been the experience of this company that a joint which is not properly supported will fail under a very small amount of traffic.

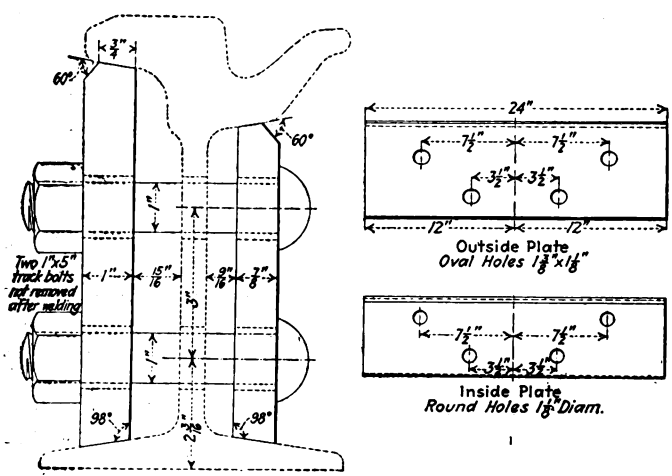


The Union Street Railway, New Bedford, Mass., Cuts Back on Both the Damaged and the Good Rail Before Building Up a Battered Joint.

A similar opinion is expressed by A. T. Spencer, assistant to the general manager, and formerly way engineer, Toronto Transportation Commission. Mr. Spencer says: "On mechanical joints under continuous service there occurs in many places cupping of the receiving rail. Should the joint be poorly supported there will develop a rail movement at the joint. This causes wear on the fishing surfaces of the plates and rail, which in turn causes the joint to deteriorate more rapidly. Defects in welded joints in our experience have almost invariably been traced to poor quality of welding workmanship or possibly a break in the rail outside of the joint plate."

From experience in Milwaukee, it is believed by R. H. Pinkley, engineer way and structures the Milwaukee Electric Railway & Light Company, that joint failures in general are due to imperfections in the joint itself. It is pointed out, however, that there are cases where other causes contribute to such failure. The most common of these are failures of the foundation due to poor subsoil or undermining of the track.

Improper fitting of the rail ends or joint connection or bad bonding are blamed by S. Clay Baker, engineer



Seam-Welded Joints Used by the Chicago Surface Lines. Bolts Are Left in Place and Spot Welded

maintenance of way East St. Louis & Suburban Railway, for joint failure. In the case of bolted joints, loose bolts are sometimes responsible for failures.

Most of the track built in Chicago since 1907 under the specifications of the Board of Supervising Engineers has been 9-in. 129-lb. girder rail on concrete or crushed stone foundation, using Lorain electric welded joints. Concrete has been used extensively for paving foundations in various types of construction.

Electric welded joints are specified as standard construction except at special work and the process has proved satisfactory and economical under existing conditions wherever traffic can be rerouted, handled on temporary tracks or the construction carried out on one track at a time with traffic using the other. Most of this work has been performed on a contract basis under the terms of which the life of the joint was guaranteed and the railway paid a fixed price per joint.

During the general construction program subsequent to 1907 a complete record of all track joints was made, identifying them by house numbers along the streets. As repairs have become necessary these records have been maintained, so that an almost complete history of all the joints on the system is now available. This furnishes a good basis for analysis of the merits of various types of construction and repair methods.

Such an analysis made for a group of 176,000 joints put in by the Lorain welding process during the original construction period showed a failure of slightly less than 1 per cent per year for the first 10 years of the life of the new track. This analysis was made for track under heavy traffic. On light traffic streets the percentage of joint failures over a period of 15 years showed even better results.

Determination of Need for Repairs

Personal observation by an experienced track man is the method most widely followed to determine when a joint should be opened up for repairs. Among the railways using this procedure are the Boston Elevated Railway, Twin City Rapid Transit Company, Memphis Street Railway and the United Railways & Electric Company of Baltimore. In Baltimore, however, repairs are often made following the complaint of some individual or organization or at the request of the municipal authorities before the repairs are really necessary in the judgment of the railway.

In the case of an old-time structure which will require reconditioning within a year or two, the Los Angeles Railway does not pay as much attention to poor joints as is paid in the case of comparatively new structures where it is expected to get 10 or 12 years more life. In an old structure this company considers that a joint should be repaired when it is entirely broken and will cause damage to the rolling stock or be dangerous to operation. In a comparatively new structure any joint showing signs of cupping or becoming loose is opened up for repairs. Not only the actual joint which has failed is opened up but also the joint opposite. Track joints are placed opposite in Los Angeles instead of being staggered. Ties are tamped up. New plates are then installed and seam welded.

In Atlanta also the character of the pavement is an important consideration in determining the time to open up a joint for repairs. With an expensive pavement this is done as soon as cupping of the rail is noticed. In Memphis if the rail is so badly cupped that it cannot be ground smooth the joint is opened up. The Chicago & Joliet Electric Railway, on account of limited funds available for maintenance work, opens up joints for repair only after they have commenced to pound or have given other indications that something is loose or broken. Mechanical joints are occasionally opened up and repaired when they become defective electrically.

The practice in Milwaukee is to keep joints in such condition as to avoid complaints due to rough riding or pounding. Whenever joints are in a condition to cause damage to the surrounding track or paving structure they are repaired. In the opinion of Mr. Pinkley the chief factor which affects the degree to which such

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maintenance can be extended is the ratio of earnings to operating expense.

In Toronto a cupped receiving rail is given early attention. Otherwise the rapidly increasing depression might require the installation of offset joint plates and the joint would have to be opened up anyhow to accomplish this. It is felt therefore that it is not worth while to postpone needed repairs. Sometimes wave motion of the rail at the joint necessitates the opening up. Movement of the rail ends is used also by the East St. Louis & Suburban Railway as an indication of the need for joint repairs.

On the Chicago Surface Lines both the division maintenance forces and the track switch cleaning and maintenance men make observations of the condition of rail joints in their divisions. Any defects which require immediate attention are reported by telephone as soon as possible and emergency repairs are made to relieve the condition until a permanent repair job can be done. In the spring all the track on the system is inspected by trackwalkers sent out by headquarters and tabulations are prepared by sheets showing the condition of joints on each line. These records are used in planning the spring and summer repair program.

There is considerable diversity in the sizes of the areas of paving removed in making repairs. In the case of repairing a single joint in Baltimore paving is removed by pick or crowbar for a distance of 10 in. to 15 in. each side of the rail and for whatever length may be necessary. In other words, no more paving than is absolutely necessary is removed. Sometimes it may be necessary to do some surfacing beyond the joint, and for this reason a slightly larger area of paving may have to be removed. In Minneapolis most of the paving in the track area is of granite block. Outside of the track it may be wood block, brick or asphalt. Granite block paving is removed by workmen with sledges and bars. Wood block or brick paving is removed with picks. The area opened up is approximately 18 in. wide on each side of the rail and extends a foot beyond the cut.

Concerning pavement removal in Toronto, Mr. Spencer says: "If the pavement is a unit one and only one or more joints need attention the blocks are removed by hand labor, using bars and picks. Should a series of joints in the same locality require attention, it may be economy to send an air compressor outfit with chisels and drills to do the job. In the case of an asphalt or other homogeneous pavement it may be economy to use air equipment for even a small number of joints. If a joint requires to be opened up for attention to the plates only, the area opened is about 4 ft. long and 12 in. wide inside and outside of the rail, or just room enough to remove the old and install the new plates. If the rail is loose for a distance either side of the joints a larger area would be opened."

Pneumatic tools are used by the Milwaukee Electric Railway & Light Company to remove paving for a width of 12 in. on each side of the rail and for about 3 ft. on each side of the joint. In Los Angeles paving is removed by hand on small jobs and by compressed air drills on larger ones. The area opened up is about 2½ ft. long and 2 ft. wide, 1 ft. on each side of the rail. All paving along the tracks of the Chicago & Joliet Electric Railway is brick and it is removed with picks and shovels. No more paving is removed than is absolutely necessary to make the repairs. In Memphis, also, paving removal is done by hand. It is interesting to note that in New Orleans the nuts on track bolts are inside the rail and can be reached without disturbing the outside pavement. A description of the track construction methods of this company was published in ELECTRIC RAILWAY JOURNAL, May 17, 1924.

At Left, a 4-Ft. Dutchman Is Ordinarily Used by the Milwaukee Electric Railway & Light Company. At Right, in Cutting Out a Section of Rail the Head Is Sawed with a Hacksaw and the Web and Base Are Cut with an Acetylene Torch

The Boston Elevated Railway uses pneumatic tools and a portable air compressor for paving removal whenever the construction is of concrete or granite block with grouted joints. An area about 4 ft. long and 18 in. wide on each side of the rail is opened up. In East St. Louis it is sometimes necessary to open up a sufficiently large area to raise the ties and retamp them. In other cases extra plates are used on top of the existing tie plates to bring the rail to the proper surface and a smaller opening suffices.

A majority of way engineers from whom information was obtained on the subject of joint repair appear to favor a policy of installing the best possible type of joint rather than installing again the same kind that was originally used. In this connection Mr. Wysor says: "All of our joints in paved streets are, or have been at some time, welded, excepting joints through special work, or where a joint failure has occurred in old track and we have not considered it worth while to reweld. At present all of our joint welding is either thermit or arc seam weld. If failure occurs in

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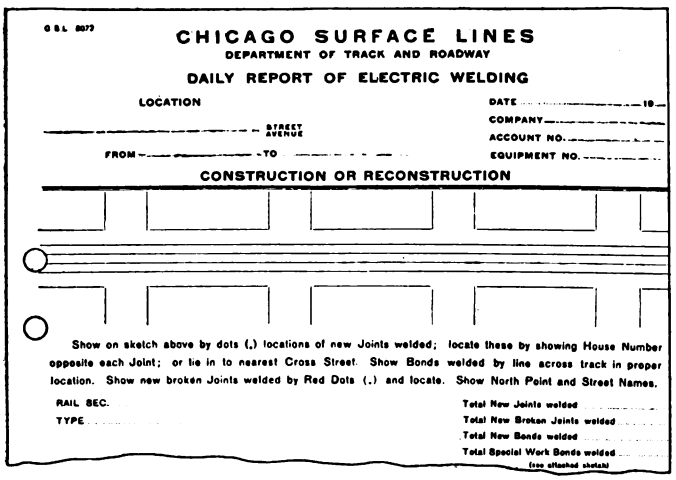


CHICAGO SURFACE LINES
DEPARTMENT OF TRACK AND ROADWAY
DAILY REPORT OF ELECTRIC WELDING

LOCATION — STREET AVENUE — FROM — TO
DATE ..... 19..
COMPANY
ACCOUNT NO.
EQUIPMENT NO.

CONSTRUCTION OR RECONSTRUCTION

Show on sketch above by dots (.) locations of new Joints welded; locate these by showing House Number opposite each Joint; or tie in to nearest Cross Street. Show Bonds welded by line across track in proper location. Show new broken Joints welded by Red Dots (.) and locate. Show North Point and Street Names.

RAIL SEC.
TYPE
Total New Joints welded
Total New Broken Joints welded
Total New Bonds welded
Total Special Work Bonds welded (see attached sketch)

New Joints Are Located by Sketch on the Daily Electric Welding Report of the Chicago Surface Lines

joints of this type they are repaired with the same kind of construction. But if failure occurs in one of the older forms of welding, such as cast welding or bar welding, the repair is made by putting in either one or the other of our present forms.

"When old track which is built of light rail sections and which has reached the point where it will be necessary entirely to reconstruct it within a short time we do not attempt to reweld the joints that have failed. It would be extremely difficult to make a satisfactory weld on old and badly corroded rail of light section and we do not believe the expense would be justifiable. We therefore cut out the broken or otherwise defective joint and insert a piece of rail of the same section and one that is worn to approximately the same extent and install a bolted joint which gives satisfactory service until such time as the track is reconstructed."

In Minneapolis the practice for the last five or six years has been to repair joints by cutting out a section of the original rail and adding a splice which is held in place by four bolts and a seam weld. On the Milwaukee Electric Railway & Light Company's lines the thermit process is generally used in making new joints, although some of the old joints are of different type. When making this kind of weld on short sections of rail it is the practice to make one weld at a time, allowing the rail to cool completely before the second weld is made. At Toronto it is customary, when the condition of the rest of the rail warrants it, to replace a mechanical joint with a welded joint. In cases which require only the tightening up of the bolts the joint is not welded.

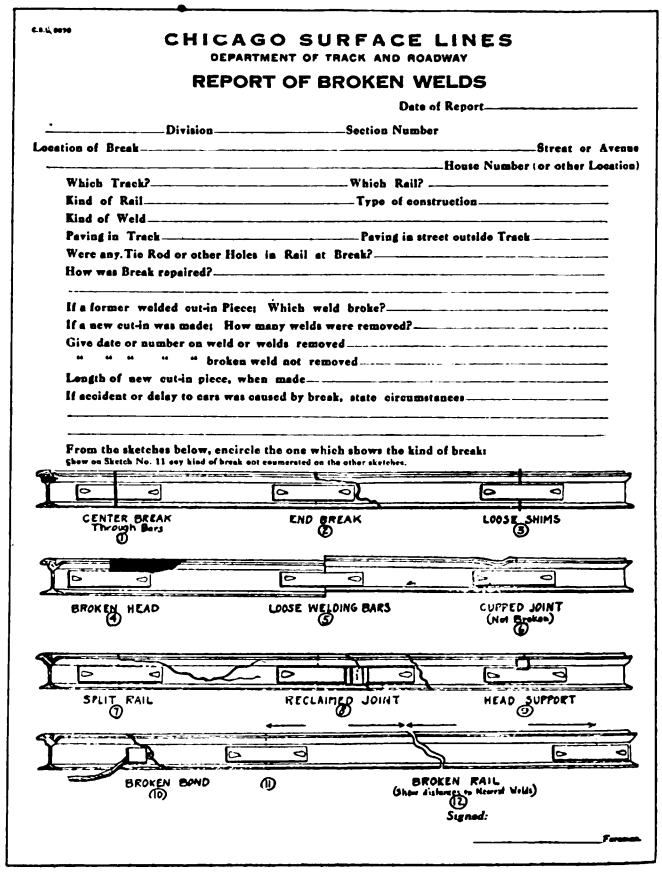
The Georgia Railway & Power Company now ordinarily installs welded joints irrespective of the original construction. Although joints were in the past replaced by new joints of the same type on the Chicago & Joliet Electric Railway, all joints are now made by welding. On the other hand the Boston Elevated Railway, the Memphis Street Railway and the East St. Louis & Suburban Railway replace joints with construction identical with the original. The Los Angeles Railway repairs joints with construction of the same type except in the case of cast welds or thermit welds, which are replaced by seam-welded joints.

On small reconstruction jobs, particularly in making repairs to broken standard joints, the Chicago Surface Lines uses seam-welding equipment on account of its low investment cost and flexibility in handling. For repair work where joints are scattered this equipment can be shifted readily from point to point along the right of way. Except in the congested districts a large part of this work can be done during the daytime without delay to car traffic. As the same equipment is used for making repairs to damaged rail ends it allows such work as cutting in new sections of rail and building up tops of the joints to be carried out with a minimum amount of shifting of equipment and delay in completion of the job.

In South Chicago much of the track construction has a concrete paving foundation on top of rock ballast. Joints in this track were originally of the cast weld type. Tee rail was used and when a bad joint was encountered it was the practice for a time to cut out the old cast weld and splice in a piece of rail approximately 18 in. long, welded on by the contact process. A 4-ft. bar on either side was held in place by four welds.

This type of repair has the advantage of giving a continuous single bar contact between the rail ends. It was, however, very expensive for this class of track and since the adoption of the seam-welding process the latter has been used with good results. Where the cast weld is intact but a piece of the head breaks out near the joint it has been found practicable as a temporary measure to weld in a new piece of rail head by the seam process, thus requiring only a minimum amount of paving to be removed and allowing the old cast weld to remain in place. In some cases worn sections of rail heads are built up with the welder to give additional life.

Most railways follow the practice of building up damaged rail ends by welding and then grinding the surface smooth. In Atlanta it is customary to build up by welding in case the rail is cupped to a depth greater than $\frac{1}{4}$ in. If the cup is less than $\frac{1}{4}$ in. deep



CHICAGO SURFACE LINES
DEPARTMENT OF TRACK AND ROADWAY
REPORT OF BROKEN WELDS

Date of Report
Division — Section Number
Location of Break — Street or Avenue
House Number (or other Location)
Which Track? — Which Rail?
Kind of Rail — Type of construction
Kind of Weld
Paving in Track — Paving in street outside Track
Were any Tie Rod or other Holes in Rail at Break?
How was Break repaired?
If a former welded cut-in Piece: Which weld broke?
If a new cut-in was made: How many welds were removed?
Give date or number on weld or welds removed
" " " " " broken weld not removed
Length of new cut-in piece, when made
If accident or delay to cars was caused by break, state circumstances

From the sketches below, encircle the one which shows the kind of break: (Show on Sketch No. 11 any kind of break not enumerated on the other sketches.)

CENTER BREAK Through Bars (1) — END BREAK (2) — LOOSE SHIMS (3)
BROKEN HEAD (4) — LOOSE WELDING BARS (5) — CUPPED JOINT (Not Broken) (6)
SPLIT RAIL (7) — RECLAIMED JOINT (8) — HEAD SUPPORT (9)
BROKEN BOND (10) — (11) — BROKEN RAIL (Show distances to Nearest Welds) (12)

Signed:
Foreman

An Additional Report Is Made of Each Broken Loraine Joint Repaired, Giving Full Information Regarding the Break and Showing by Sketches Its Exact Nature

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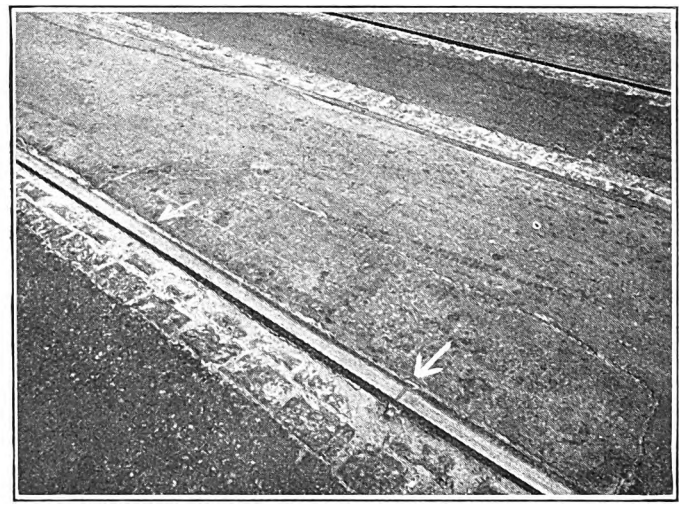
the joint simply is made smooth by grinding. The Memphis Street Railway and the East St. Louis & Suburban Railway build up battered joints by welding. This is done also in Baltimore if the joint is otherwise in good condition. Welding and grinding are done in Toronto, although in some cases it has been found possible to use offset plates and then grind down the rail without the introduction of any welding material. The Twin City Rapid Transit Company follows the practice of cutting off the ends of damaged rails. Welding and grinding are done only in the case of a slight cupping. The Boston Elevated Railway builds up by electric arc welding when the rail ends are only slightly battered.

If the rail is simply cupped and the fishing surfaces are in fair condition the Los Angeles Railway makes repairs to the ball of the rail by metallic arc welding process. If the rail is broken either in the ball or, as frequently occurs, in the web, a section of rail is replaced with a "dutchman." This procedure is practically identical with that followed by the Chicago & Joliet Electric Railway.

When Making Thermit Weld Joints on Short Sections of Rail It Is the Practice in Milwaukee to Make Only One Weld at a Time, Allowing the Rail to Cool Completely Before the Second Weld Is Made



Granite Blocks Along the Rail and Reinforced Paving Elsewhere Have Given Good Results in Milwaukee. The Completed Repair with These Materials Shows a Neat and Workmanlike Appearance

An interesting method of repairing damaged rail ends has been adopted by the Union Street Railway, New Bedford, Mass. A diagonal cut 5 in. long is made in the cupped rail with an acceptable torch, as illustrated on page 960. A similar diagonal cut 3½ in. long is made on the sound rail. The object of cutting back on the good rail is to give the new welding metal a bearing and eliminate any possible drop at the joint. After the cuts have been made the surfaces are thoroughly cleaned. Then the weld is started at the bottom of the gap and continued until the gap is half filled. The process is interrupted at that time because of the possibility of the new welding metal burning if too large an area is filled in at once. If that occurred the joint would be likely soon to fail. The weld is begun and ended at the gage line of the rail because there is more metal to expand and contract there. After the cuts have been filled in by welding the surface of the rail is ground smooth.

Almost all railways use "dutchmen" under certain circumstances, but there are wide variations in practice as to the length of the piece inserted and the circumstances under which it is done. Moreover, way engineers differ as to nomenclature. Some call such a piece "an insert" and say that they do not use "dutchmen" at all.

The practice of the Toronto Transportation Commission is to use "dutchmen" from 4 in. to 12 in. long. This is done, however, only when the rail is broken or parted from the web. Various methods of repairing the joint in this way have been tried. Perhaps the most satisfactory, in the opinion of Mr. Spencer, has been with the use of a special pair of welding plates 36 in. long with bolts passing through both sections of the old rail and the "dutchman" also. The railway, however, does not contend that this method of repairing a joint has been altogether successful.

According to H. M. Steward, superintendent of maintenance, the Boston Elevated Railway uses an insert when the cupping is too serious to be repaired by welding. When the gap between the rail ends is too wide to permit the use of inserts a "dutchman" 12 in. long is used. On the other hand the Milwaukee Electric Railway & Light Company never uses a "dutchman" of shorter length than 4 ft. The Georgia Railway & Power Company uses "dutchmen" varying in length from 10 in. to 20 in. Joint plates 52 in. long are used in this work. The minimum length of a "dutchman" used by the Los Angeles Railway is 5 ft.

The only place where the United Railways & Electric Company of Baltimore uses "dutchmen" is in closing up a piece of new work. Mr. Wysor says: "We attempt to avoid the use of 'dutchmen' just as much as possible, and in fact they are very seldom used. But occasionally after closing rails have been cut there is a drop in temperature which makes it necessary to install a 'dutchman,' or wait until the rails expand enough to close the opening, or to cut in new rails. We can generally overcome the trouble by waiting for a change in temperature to expand the rails, but sometimes this is not possible and we then resort to a 'dutchman,' which may be anywhere from ¼ to 1 in. in thickness. This is arc welded in place."

It is the practice of the Twin City Rapid Transit Company to install "dutchmen" where broken and battered sections of the rail at the joint are so short that cutting out 18 in. of rail will remove the defect. In such a case a piece of rail of the proper length is inserted and splice plates 34 in. long are bolted and seam welded in place. In Memphis "dutchmen" are

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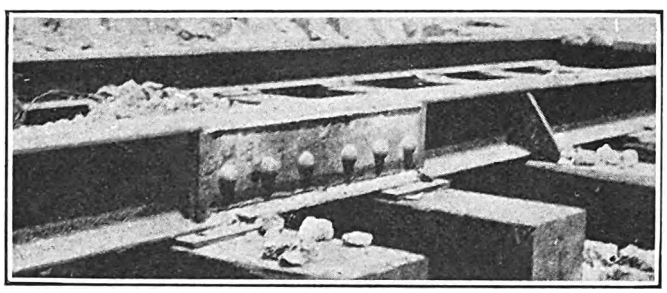
used in two ways. They may be either short pieces only 2 in. or 3 in. long or pieces longer than 6 ft. In the former case a single joint is made and in the latter case two separate joints. The East St. Louis & Suburban Railway uses "dutchmen" only in the case of temporary repairs. When it is necessary to cut in a piece of new rail the joints are placed approximately 15 ft. apart and the piece inserted and it therefore can hardly be classed as a "dutchman."

Where the paving is good along the rail and the track has the proper gage the Chicago & Joliet Electric Railway inserts a short "dutchman" and welds it in place. If the rail is in bad condition and it is planned to replace it in the near future, a "dutchman" about 9 in. long may be used with holes through the piece to be inserted and continuous joint plates. Ordinarily "dutchmen" 4 in. long are used by the Milwaukee Electric Railway & Light Company.

In Chicago in addition to the method of splicing in a piece of rail about 18 in. long, as already described, it is a practice where the weld is loose and the rail ends are damaged to insert a new section of rail 12 ft. in length and to seam weld each of the new joints. In many cases where the rail is badly worn it was formerly



In New Orleans Track Bolt Nuts Are on Inside of Rail, Where They Can Be Reached Without Disturbing the Outside Pavement

the practice to weld in short blocks above the joint bars, making a chock to support the head and lip of the rail. This practice has now been abandoned in favor of using 12-ft. sections of new rail. In the use of the seam welding bolts are left in place.

Often it is necessary to do more to improve the condition of a rail joint than simply to build it up by welding and then grind the surface smooth. In this connection the Chicago & Joliet Electric Railway says: "If the rail ends are bent down they are straightened up with a special device which we have for this purpose and a reinforcing plate is put under the base of the rail. The battered ends of the rail are then built up with an electric welder and ground off to a smooth surface. Generally if any other portions of the rail are out of surface they are raised by means of steel shims on the ties, or if more than 1 in. out of alignment they are raised and supported on wooden blocks." A device of this kind used by the Springfield Street Railway, Springfield, Mass., was described in ELECTRIC RAILWAY JOURNAL for March 29, 1924.

Steel or wood shims are used also by the Toronto Transportation Commission. The Twin City Rapid Transit Company, the Georgia Railway & Power Company and the United Railways & Electric Company of Baltimore all follow similar practices. It is the practice of the last-named railway if the rail is only slightly out of surface above only a few ties to bring it back to grade by inserting steel shims or tie plates between the rail and the tie. If, however, the track is very much out of surface and is in that condition for a long distance a larger area of paving is removed and the tracks reballasted. This is frequently necessary over openings made in the streets for sewers, water pipes or other purposes and where trenches were not properly back filled.

In Los Angeles if the rail joint is simply loose and the rail has not been damaged beyond slight cupping it is the practice to install new plates and seam welds. Any small gaps between the rail ends are plugged with a thin shim of the same section as the ball of the rail. If the surface of the rail at the joint is low a portion of the adjacent track is dug out, the ties are raised sufficiently to bring the track to grade and thoroughly tamped.

In Chicago very few cases have been found where the track is in a condition requiring the grade to be restored. This occurs only where adjacent building construction has caused a settling of the track foundation. Otherwise the foundation is usually found to be in good condition. In the few cases where the foundation has given way, a large scale reconstruction program usually has been necessary, and consequently joint repair work was not attempted. When the rail has become worn so that grade variations occur from this cause, steel shims cut and drilled to correspond with the tie plates are sometimes used. This practice is not strongly favored, however, and is used only when absolutely necessary. Where a break occurs in the rail head cars are kept running by means of temporary jumpers until permanent repairs can be made. These are cast-steel devices of special design and are so arranged that they simply drop in place over the joint plates.

GRANITE BLOCK PAVING IS POPULAR

Among the companies favoring granite block pavement along the rail are the United Railways & Electric Company of Baltimore, Georgia Railway & Power Company, Boston Elevated Railway, Toronto Transportation Commission, Twin City Rapid Transit Company, East St. Louis & Suburban Railway, Milwaukee Electric Railway & Light Company and Chicago Surface Lines.

This paving has been used for some time in Chicago both between the rails and also for the track zone outside the rails. It is considered the only practical type of paving where heavy vehicular traffic is encountered. In outlying districts where traffic is lighter brick paving has given satisfactory results. Some railways favor the use of grout between the blocks, while others prefer a bituminous filler. In the former category are the Toronto Transportation Commission, the Milwaukee Electric Railway & Light Company and the Boston Elevated. At the present time the East St. Louis & Suburban Railway is laying granite block pavement with a bitulithic filler. The idea in this is that it relieves the noise and vibration to some extent and also makes the paving structure more nearly waterproof. The Georgia Railway & Power Company and the New Orleans Public Service are other railways which favor a mastic filler between the granite blocks.

A few railways prefer an entirely different sort of pavement. The experience of the Memphis Street Railway with an asphalt pavement on a concrete foundation has been very satisfactory. The Chicago & Joliet Electric Railway has found brick paving to be satisfactory and economical. Mr. Eaton says: "We have adopted (in Los Angeles) as our standard paving a 6-in. cement concrete base with a 2-in. asphalt top, as we believe it to be the best for use in this locality. It permanently seals the structure and will not allow

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water to seep between the paving and the rail. We have a number of miles of this construction which was installed some 10 or 12 years and shows no signs of cracking along the rails, and when necessary to open up for installation of special work, etc., we have found the rails to be in as perfect condition as when it was originally installed, showing no signs of rusting or electrolysis. The cost of repairing this class of paving is probably somewhat greater than that of asphalt concrete paving because it is harder to remove."

The Los Angeles company is so well satisfied with paving of the character described in the preceding paragraph that all paving repairs along the tracks are made in this way regardless of the original construction. When joint repairs are made by the Milwaukee Electric Railway & Light Company the original granite blocks are put back along the rails and new concrete is put in to fill the holes. An accompanying illustration shows the finished appearance of a completed joint repair job. Reinforced concrete with granite blocks along the rail is now considered the most desirable form of paving for Milwaukee, both from the standpoint of cost and wear and also ease in making repairs.

The Chicago & Joliet Electric Railway has found that the original paving bricks are usually in fairly good condition and the unbroken ones can be turned over and reused. After repairs are made and the rail is tight the hole is filled in with a rich concrete mixture up to the paving subgrade and then brick paving is installed. It has been the experience of this company that about 60 per cent of the paving bricks can be salvaged and used the second time. The Twin City Rapid Transit Company and the Boston Elevated are other railways which reuse the original material so far as possible.

In Toronto, if the paving is a unit one, the old blocks are usually replaced. The paving base, of course, is not taken out, but new concrete is tamped under the base of the rail and brought to the former level. An asphalt surface on a concrete base is often used. In East St. Louis the original paving blocks are put back, but a bitulithic filler is used instead of cement grout, to allow traffic to pass over the repair more quickly.

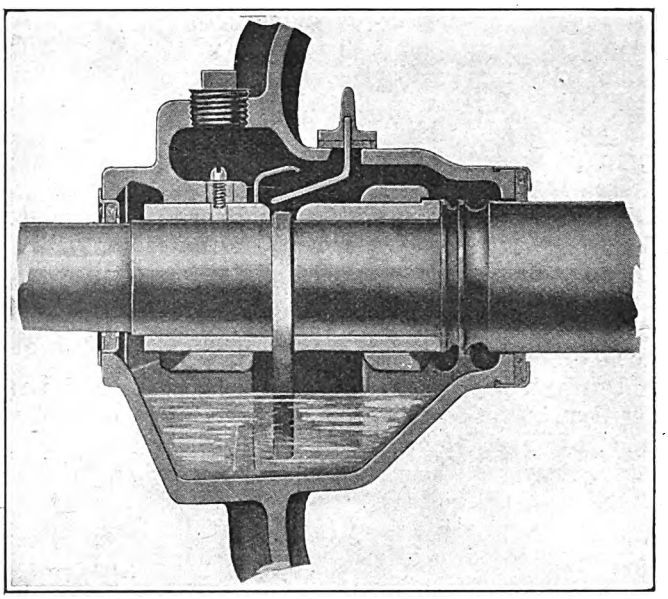
In Baltimore if the original paving consists of some kind of blocks such as brick, wood or granite and is in good condition the same blocks are put back. Generally speaking, however, wood block is so broken or split that it cannot be put back and new material must be substituted. If the old bricks are badly worn they are discarded and new ones substituted, the same being true of granite and other forms of blocks. Where asphalt is laid it is, of course, necessary to put in new material. Ordinarily, after the track repairs are completed, the concrete paving base is installed and the old block laid in place temporarily until the concrete base has had sufficient opportunity to harden. The wearing surface is then restored in a permanent manner similar to the original construction.

Granite block paving is used throughout almost the entire track area in Chicago, and the original blocks are replaced after joint repairs except when they are broken. The granite blocks are always laid with cement grout and on this account a certain number of them are sure to be broken during the removal. In Atlanta the same type paving is ordinarily put back after the railway has made a joint repair. However, asphalt is sometimes substituted for wood blocks, which have not always proved entirely satisfactory as paving along the tracks.

Leakproof Sleeve Bearing Developed

A NEW TYPE of sleeve bearing for electric motors, designed to prevent the leakage of oil into the windings or the entrance of dust and grit into the bearing, has been developed by the Westinghouse Electric & Manufacturing Company. This new bearing is directly applicable to motors for railway shops and, no doubt, will result in improvements in the bearings for motors of rolling stock.

A connecting passage in the upper part of the bearing housing secures a condition of balanced air pressure in the separate chambers into which the housing is divided by the bearing supports. The action of the blower at high speeds sets up a vacuum next to the inside end of the housing and, since it is impossible to seal the housing absolutely at that point because the shaft passes out there, the vacuum is communicated to the space within the housing itself. If the upper passage were not provided, an unbalanced air pressure would result whenever the oil level rose high enough to close the lower cored openings.



This Bearing Is Sealed Against the Entrance of Air or Dust and Prevents the Leakage of Oil or Oily Vapor Into the Motor

For inspection of the oil ring, a large air-tight threaded pipe plug is provided. An inclosed combination filling and overflow opening is placed in the side of the bearing and a rigid cast-iron cover is bolted over the oil-ring slot and made airtight by an oilproof packing.

Where the shaft passes through the bearing, an improved method of supporting the felt dust-proofing washer is used. For the purpose of lending resilience to the soft felt, the metal cap has a diameter at least ¼ in. larger than the shaft diameter. This prevents the felt from being compressed close to the shaft, which would cause it to become glazed and hardened and soon to burn and wear out.

The airtight construction of the bearing prevents the passage of air through the bearing and at the same time prevents oil from being drawn into the motor windings. The oil ring, carrying oil from the oil well to the motor shaft, stirs up and churns the oil into a fine spray, which, in the ordinary type of bearing, is sucked into the motor and covers the windings.

The bearing requires practically no attention, and oiling once or tice a year is all that is necessary.

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"Anything Is Possible When We Have to Do It"*

The Working of Economic Laws, the Superior Efficiency in Use of the Street, Intelligent Sales Effort and Good Use of Publicity Will Bring Electric Railways Back Into Their Own

By H. G. Taylor
President National Association of Public Utility Commissioners,
Member Nebraska State Railway Commission

IT IS NOT for me to point the way to prosperity for the street railway industry. Street railway transportation will respond ultimately to the unerring influence of economic law. Unfortunately, there have been too many theories about the operation of street railroads. They have been made laboratory specimens for every political tinkerer who could win his way into a place of authority. These transportation "specialists" have been in accord only on one thing—and the ill-fated Akron slogan well epitomizes it—"a nickel or nothing." Blissfully unconscious of changing conditions, increasing costs and the development of the motor vehicle, these human dodoes have maintained an unwavering faith in the power of municipal fiat. If the city ordinance is made to say that street cars can operate for 5 cents, that solves the problem.

During the past 10 years this country has had a rebaptism in the doctrine that government is omnipotent and that such things as wages, fuel, prices, maintenance, business management and other unpleasant facts are immaterial and irrelevant. Indeed, we are assured quite stridently that these things are mentioned only to postpone the dawn of a new day and delay the coming of the industrial millennium. Old King Canute had much the same idea. He marched down to the seashore one sunny morning, followed by the retinue of his court and a number of his subjects, to give a demonstration of his power as a monarch. When the stage was all set, he made a magnificent gesture of authority and commanded the waves to recede.

Economic Law Must Govern

It has been said that it is given unto every man once to make a consummate ass of himself. King Canute measured up to the full limits of his opportunity. The only excuse history has for remembering him is that he made such a fool of himself. At that, however, he displayed more wisdom than some of his modern imitators, for when he returned to the palace he sorrowfully admonished his subjects to take note of the spectacle he had made of himself and never thereafter attempted to interfere with the laws of nature. The Akron, Saginaw, Des Moines, Seattle, Detroit and numerous other street railway debacles furnish emphatic evidence that political demagogues are slower to learn than King Canute. And since thinking has gone out of fashion within the halls of Congress our national legislators have manifested the same brand of stupidity. If anything is wrong, pass a law. Pass a law whether anything is wrong or not. Let the statutes command the sun to stand still and the waves to recede and the rivers to run up hill. Compared with some of the proposals put forth by our uplifters and lawmakers Canute's command was a sage and sensible suggestion.

But I started out to say that the street railway problem will yield ultimately to the action of economic forces. There is a place for the street car. For the moment we do not know just where that place is or how large it is to be, but as the use of the automobile is rapidly reaching the point of saturation the relative importance of the street car is more easily measured.

Motor Vehicles Have Limitations

There are 15,000,000 motor vehicles in the United States. In the classic language of Grover Cleveland, that is a "condition and not a theory." Some one has figured out that if all these motor vehicles were placed in a column 15 abreast the line would extend from New York to San Francisco. Assuming an average value of $750 for each vehicle, the total aggregates the staggering sum of $11,250,000,000. The development of the automobile is one of the amazing phenomena of American life. The automobile is here to stay. It has become a permanent factor in the commercial and social life of the country. It is a recognized unit in the transportation situation. The problem, therefore, for the older established forms of transportation like the railroad and the street railway is to study the problem as it is changed by the new competition.

Already it is becoming apparent that the rosy prophecies of the motor vehicle manufacturers will not all be realized. The prediction that old Dobbin would have to go is now being qualified. A use for the horse still exists. For short-haul deliveries in congested areas he can be utilized to better advantage than the auto truck. And the tractor is not to supplant him on the farm. General utility at lower cost justified his continued use in that capacity. Buses for long-haul transportation have not as yet justified themselves, although there are hundreds of hardy and hopeful souls who are willing to continue the experiments. They are not succeeding notwithstanding public concessions as to free use of highways, exemption from taxation and freedom from regulation of rates and service. Once the novelty has worn off and the public settles down to accept them as ordinary common carriers their problem will be all the more difficult. If they cannot succeed under present very favorable conditions they cannot hope to do so once they are subjected to the economic test that comes sooner or later to all enterprises.

Manifestly, therefore, the whole transportation problem is in an experimental stage, awaiting the final

*Abstract of address delivered before first annual meeting, Mid-West Electric Railway Association, Omaha, Neb., June 12, 1924.

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adjustments made necessary by the advent of the motor vehicle. The future from the street railway standpoint, however, is not without its promising aspects. While there are 15,000,000 automobiles in the country today, it is comforting to remember that during the period of this remarkable development there has been an increase in population of about 25,000,000. And more comforting still to your industry, this increase in population has been very largely in the cities. While the street car traffic has not kept pace with this growth, due to the use of the automobile as a substitute, present conditions indicate that we may be on the eve of another step in the readjustment, forced by the infirmities of the automobile itself.

Observations Show Inefficiency of the Automobile as a Transportation Means

A 10-hour observation of auto traffic along O Street, Lincoln, Neb., reveals that on an average five automobiles carry a total of seven persons. The daily traffic report of the street railway company shows that approximately 18,000 passengers are carried each day by street cars. The cars make 1,017 round trips—or 2,034 one-way trips per day. This means that an average of nine passengers are carried on each car per one-way trip.

The average seating capacity of street cars in Lincoln is about 36 passengers. Accordingly, 75 per cent of the service rendered during the entire day is wasted because it is not patronized.

An observation taken on Fifteenth and O Streets between 4 p.m. and 6 p.m. on May 19 showed that 53 street cars going east carried 1,481 passengers while 757 automobiles going in the same direction carried 1,079 passengers. For each street car carrying 28 passengers there were 14 automobiles carrying 21 persons.

The automobiles that passed during that time, if placed in a single line, would cover a distance of 1⅓ miles. The line of street cars would be three-tenths of a mile long.

On an average of one and one-half persons per automobile, it would have taken 18 autos to have carried the 28 people who rode a street car, or 987 to have carried all the street car passengers—nearly one and one-third times more autos than did pass during the two hours. The automobiles necessary would have formed a line nearly 4 miles long.

Nature brooks no violations of her laws. Punishment is swift and certain. Traffic congestion in our cities will ultimately be relieved because society will reach the conclusion that it cannot pay the appalling cost. Automobile manufacturers have already anticipated this development and are leading in the movement for safety regulation. The day of the unlicensed, unrestricted, unregulated use of the motor vehicle is approaching its sun-down. Human life is more precious than personal liberty. Sheer necessity will compel a more restrained use of the automobile. When it does the street car will return to a measure of its former popularity. For the movement of large numbers of people into, out of and through congested areas at low cost it has no equal. Like old Dobbin, however, it has lost prestige. In addition to having been made the prey of designing politicians, it has lost countenance with the general public through no fault of its own, but because its flashy and luxurious competitor has made a more romantic appeal to the public mind.

It is at this point that the recovery of the street railway industry begins. Old methods will necessarily have to be discarded with old conditions. Exemptions from special taxes and paving assessments must be secured. Further relief through rate increases is not to be expected until you can convince your patrons it is worth as much to ride in a street car as in a bus or taxicab. So far as that remedy is concerned, it is a job of salesmanship—the task of giving the public a new and more wholesome viewpoint. In the slang phrase of the street, the street railway industry has "got to go and get a reputation." Expressed in another way, a time-tried and valuable commodity must be put in a new and attractive package. When the inevitable reaction from the misuse of the automobile arrives the street railways must be ready to take advantage of it.

More efficient methods of operation must be developed, one-man cars should be further perfected and utilized, greater efficiency in equipment should be devised. You say that is not possible. I say anything is possible when we have to do it. And your industry has reached the crisis in its career when the *"must"* of the situation has become the dominant note. The public, whether it realizes it or not, must have street car service. It must be educated to that fact. You who are in the business must find ways and means of giving that service.

When the Germans had reached Verdun and threatened the very gates of Paris, the indomitable will of France found glorious expression and victorious fulfillment in the cry "They shall not pass!" That genius for overcoming obstacles that has been the characteristic of American progress will find a way in your industry. Last, but not least, the human element in your business must yield the full measure of its wonderful possibilities.

Publicity Is Necessary

The frank disclosure of information hitherto considered private and confidential has gone far to create a wholesome confidence in your good purposes. In this work your Committee on Public Utility Information has performed a conspicuous service. As one engaged for fourteen years in the newspaper business, I have a profound respect for the value of publicity. In these modern days, it is one of the essentials to the success of private business. To the public utility, operating as a monopoly, it is even more necessary and should be provided for with as much certainty as labor, fuel or capital. It must be intelligently prepared and placed, however, and skill and training of a high order are required. The bookkeeper or the plant superintendent cannot take an hour off once a week and prepare this material.

It is to the credit of the industry that it has taken its publicity work seriously and has perfected organizations in each state that have already developed a more healthy public opinion. Some one in this twentieth century has coined the very significant phrase—"the fanaticism of veracity." Perhaps it is a little too strong, but in a day of loose talking, mendacious assertions and wholesale appeals to prejudice, we need to get down to first principles, and I would recommend that the phrase be printed and framed, and hung in the office of every publicity representative as a constant reminder of the great need of eternally emphasizing facts. Not that these men have not been disseminating

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the truth, but that in the face of wholesale misrepresentation their unremitting vigilance is imperative.

A straight line is the shortest distance between two points. This is as true of life as it is of geometry. It applies to the relations of men with each other. This is so despite the complexities of the twentieth century. The homespun days have gone, never to return. The simplicity of life is passing away. We live on the main highway and every passing caravan leaves a new contact. In the language of David Starr Jordan, "We must cultivate the social tact, the gentleness, the adroitness, the firmness necessary to carry out our own designs without thwarting those of others."

CO-OPERATION IS THE LAW OF THE HOUR

Whether we like it or not, we must co-operate. It is the law of the hour. It is another phase of human progress. Being compelled to work together we must cultivate anew the knack of getting along with each other. And in that respect the fundamental rules of conduct are still in force. The hearty handshake, the cheery greeting, the cordial exchange of ideas are as potent as ever.

And this brings us to the thought that there is no inherent conflict of interest between the utility and its patron. When I go to a merchant to buy a pair of shoes, I get something I need and I give him something he needs. It is a mutually beneficial transaction—a fair exchange. When the Ampere Electric Company sells 275 kw. of current to Citizen John Condenser it gets cost and a little profit. John Condenser gets some energy which he uses for his comfort or profit. There is nothing in the exchange itself to excite hostility. And yet, strange to say, there has been permitted to grow up a traditional resentment in the mind of Mr. Condenser for the company. What ought to be a happy relationship has developed into a strained neutrality, unfortunate for both. Intelligent co-operation is the one and only remedy.

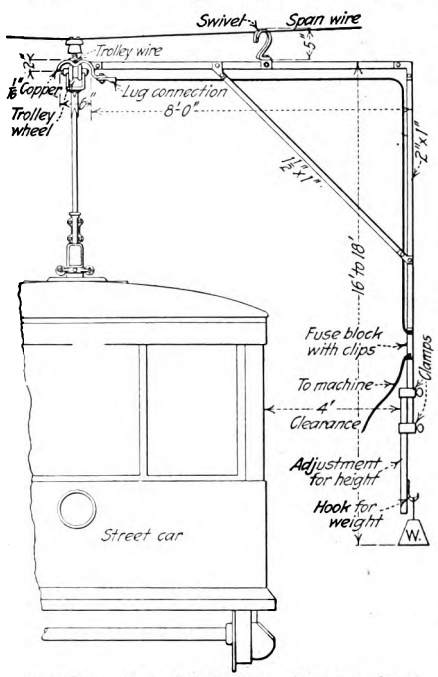
The railroads have made the approach to a better understanding through the formation of shippers' conference boards. These boards have been a common meeting ground for the exchange of complaints and ideas. The results have been amazing. Ancient grudges have disappeared. Misunderstandings have been cleared away. Suspicion and prejudice have dissolved under a frank disclosure of all the facts. Feelings of good will and friendliness have been kindled and controversies that had grown into "problems" have vanished like mist before the sun. And this happy condition of affairs has been as surprising to railroad men as to shippers. The procedure is simple, and it is sufficient only to bring the parties together in orderly fashion. Human contact does the rest. The experiment has demonstrated that when men with common interest and common purpose meet about a council table in an effort to reach a common understanding success is assured from the start. Under our very eyes the great and perplexing problem of transportation is being composed through the very simple process of the two parties at interest—the public and the railroads—sitting down to talk it over.

Another conspicuously successful adventure in co-operation has been undertaken by the federal and state commissions. For years they quarreled over jurisdiction. Overlapping authority produced friction and ill-feeling. Dealings were at arm's length. The situation was almost intolerable, and then one day some one thought of trying the plan of getting together to talk it over. The conference was so successful that a permanent plan for co-operation was devised, remarkable for its simplicity. Within two years mutual distrust has disappeared, confidence and good will have been substituted. Controversies that formerly culminated in lawsuits and rigid orders have yielded to joint action, and the powers of local and federal authority have been co-ordinated to the great advantage of all concerned.

Co-operation is practical. It works. It is not sentimental, but the finest sentiment grows out of it. Its possibilities are unlimited. The only wonder is that we have been so long discovering it.

Overhead Contact Permits Passage of Cars

A DEVICE for obtaining power from the overhead trolley wire for track tools, which allows the passage of cars without removing the contact from the wire, is used by the surface track division of the Brooklyn-Manhattan Transit Corporation. The contact is a sheet copper pan with a groove formed in its upper surface which is placed under the trolley wire. It is of 1/8-in. hard drawn copper, 10 in. long and 4 in. wide, the groove fitting snugly around the wire and providing a smooth underrun for the trolley wheel. This same type of pan was described in the JOURNAL of Sept. 2, 1922, page 319, where the supporting pole was mounted on an Indianapolis welder. The use of the contact has now been extended to other track tools not affording a support close to the track. The copper pan, in its new application, is attached to the short end of an inverted L-shaped frame. The frame is suspended from a span wire by a swivel hook on the short arm, so placed that the arm will be suspended horizontally. Weights placed on the long or vertical arm of the frame tend to rotate the device about the point of support, causing the contact to be pressed against the wire.



Apparatus for Obtaining Power from Overhead Trolley Wire Which Allows Passage of Car and Trolley Wheel Without Removing Contact from the Wire

The frame is made up of 1-in. x 2-in. wood reinforced at the joints with steel plates. The short arm is 8 ft. long, while the long arm is 16 to 18 ft. long, being adjustable for various heights of span wires. A diagonal brace connects the two members of the frame.

Connection between the contactor and the lead-in wire is made through a lug bolted to a lip of the pan. A fuse block is mounted on the vertical member, near the lower end. The lead-in wire is connected to the top of this block, while the machine wire is connected to the bottom of the block.

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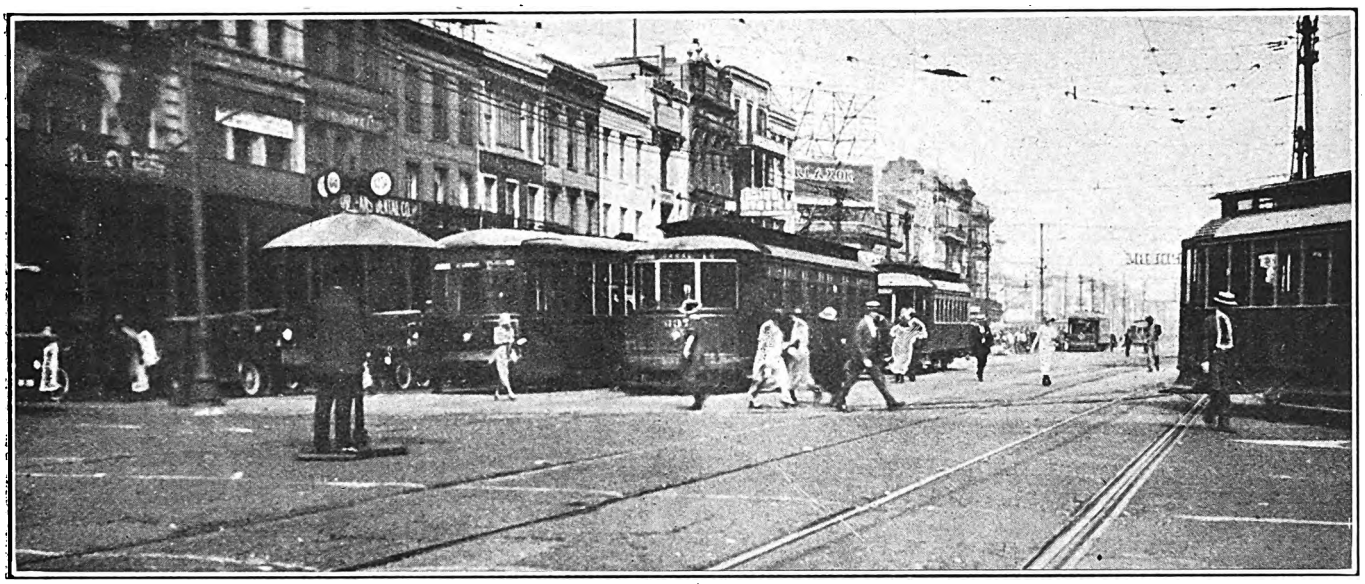

Types of Cars Operated in New Orleans on Which Good Pull-In Record Is Made. On the Left Is a Modern Light-Weight Steel Car, in the Center an Older Double-Truck Car, and on the Extreme Right a Single-Truck Car

217,728 Car-Miles per Pull-In

A Well-Organized System of Inspection and Repair Has Enabled the New Orleans Public Service, Inc., in 3½ Years to Eliminate 95 per Cent of the Pull-Ins and Cut Maintenance Costs to Half

By Robert M. O'Brien
Superintendent Rolling Stock and Shops, New Orleans Public Service, Inc.

IN MARCH, 1924, the New Orleans Public Service, Inc., operated an average of 217,728 car-miles for every car taken out of service on account of mechanical or electrical defects. This mileage should not be considered as an indication of what may regularly be expected in the future, however, but rather as a maximum figure resulting from a combination of particularly favorable circumstances during that month. Nevertheless the experience of this railway indicates that with proper organization and facilities it should be possible to maintain continuously an average of well over 100,000 car-miles per pull-in.

At the outset of a discussion of pull-ins it is well to explain the exact meaning of the term as used at New Orleans. Pull-ins are classified as "chargeable" or "not chargeable." A chargeable pull-in is any car which is removed from service because of the development of serious defects before the termination of its regular day's run as specified in the time-table. Cars which are removed from service because of accidents beyond the control of the mechanical department, such as automobile collisions, etc., are considered as not chargeable pull-ins.

Efforts are made to repair certain minor defects such as difficulties with the fare register, bell cords or gongs, by having a mechanic board the car as it passes the carhouse and travel with it for a short distance without taking such a car out of service. This is done more to promote the convenience of the passengers than to reduce the number of pull-ins, although, of course, it does have that effect also. Any car which is actually taken out of service before the termination of its daily run, however, is considered a pull-in, and is so listed in the records.

The secret of the elimination of the pull-ins lies in the development of an adequate system of inspection and repairs, the upbuilding of the morale of the mechanical department and placing the several carhouses on a competitive basis. Under the plan followed by this company the main office of the equipment department furnishes repair foremen with daily inspection reports showing the cars to be inspected, and separate cards detailing the parts to be examined. After the receipt of these cards at the stations, or carhouses, repair foremen notify the transportation department which cars are to be kept in the following day, and competent men are selected to make the inspection of the electrical and mechanical parts.

After making his examination of a car each inspector notes on a form specially prepared for that purpose the condition of the various apparatus. This report lists 34 different parts of the car equipment. Each part must be examined and if the inspector finds it in good condition he places his initials opposite that item on the card. The attention of the foreman is called to repair work that should be done by the absence of initials on the card. In such a case the foreman then calls a regular repair man to correct the defect and afterward O.K.'s the card. Cars are inspected on a 1,000-mile basis except some of the older rolling stock, which is inspected every 800 miles.

The number of miles run during the previous day by each car on the system is furnished to the equipment department by the auditing department at 1 o'clock every afternoon. The former department then tabulates the information on a large mileage sheet which shows for each car the daily mileage, the cumulative mileage since the last inspection and the total mileage

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NEW ORLEANS PUBLIC SERVICE INC.

INSPECTION REPORT

CAR No. _____

Date _____ 19__ Last Inspection _____ 19__

_____ STATION

I have inspected and now report the following parts in good condition.

	SIGNATURE
TROLLEYS	
Pole, Stand ard Wheel	
CAR BODY	
Doors	
Windows	
Seats and Screens	
Gates	
Grab Handles	
Draw Bars, etc.	
Fenders	
Registers and Pulleys	
MOTORS	
Armatures	
Brush Holders and Brushes	
Fields	
Leads	
Cables	
Suspensions, etc.	
Gears and Pinions	
Oiling	
TRUCKS	
Wheels	
Axles	
Journals	
Truck Parts	
Brakes	
CONTROL SYSTEM	
Over Head Switch	
Controllers	
Reverse	
Rheostat	
AIR BRAKES	
Brake Valves	
Air Compressor	
Governor	
Pipes, etc.	
MISCELLANEOUS	
Light-Circuit	
Lightning Arrestors	
Signal Bells	
Fuse Boxes	

Car O. K. for Service _____

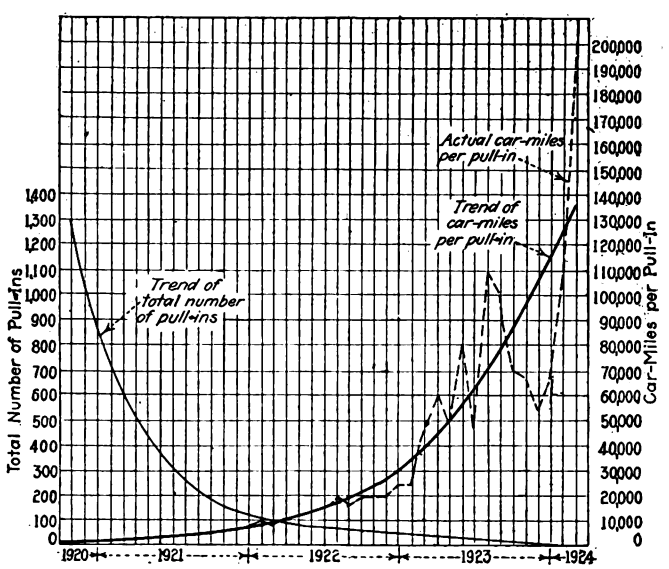
Car kept in for Repairs _____

Remarks: _____

_____ Repair Foreman.

The Inspector Must Sign for the Condition of Each Item on this Form

since the last general overhauling. Armature mileage for each motor is also tabulated on this sheet. Every Saturday the repair foremen are notified of any armatures which are approaching the mileage limit. Bearings are then immediately gaged for clearance between the armature and pole pieces. This is repeated weekly until the armature is removed for overhauling. At present all armature repairs, as well as repairs to trucks and wheels, are made at the various carhouses because the repair shops have not sufficient space in which to do the work. It is planned, however, to start an entirely new system of inspection on July 1. Under the new plan no armatures or fields will be removed at a carhouse, but the complete motors after having operated 40,000 miles will be sent to the assembly room at the Carrollton shop. There the motor will be knocked down and completely overhauled, tested and passed by an electrical engineer before being returned to service. Under this scheme it is thought that all electrical parts will be kept in nearly as good condition as when they were originally furnished by the manufacturer. It is planned to have extra trucks, motors, air compressors, controllers, line breakers, etc., so that all the vital parts of the car can be sent to the general shop, repaired and tested on this mileage basis.



A Steady Decrease in Pull-Ins Is Shown During the Last Four Years

The selection of 40,000 miles as a basis for the removal and overhauling of electrical equipment was made because experience showed that thorough examination and tests usually were needed after that length of operation. However, this figure was selected only tentatively and if it turns out that the expense of overhauling every 40,000 miles is exorbitant, the mileage will be increased. It is firmly believed, however, that a thorough overhauling and examination of equipment by a young graduate engineer will result in the discovery of many hidden defects and will prove to be a real economy.

Competition between the different stations is fostered by the publication of comparative records. A statement of cars taken out of service on account of defects is furnished monthly to the management and to all minor officials of the equipment department. It is placed also on the bulletin boards at all the carhouses. This is done so that each individual in the organization will know exactly what is being accomplished at the others.

The form is divided into the two major classifications already mentioned, pull-ins chargeable to the equipment department and those not so chargeable. Among the chargeable defects are such items as armatures rubbing poles, hot journals and charged cars. The classification of pull-ins not chargeable to the equipment department includes the items derailment, broken glass, accidents, split switches and troubles reported but not found. This tabulation shows at a glance the number of cars taken out of service at each of the five carhouses for these various reasons. Comparative figures for the previous month and the same month the preceding year are also given. At the bottom of the sheet the number of car-miles per pull-in is shown for each carhouse. Each repair foreman is therefore able to compare the work being done at his station with that being done at the other stations of the railway.

A statement of expenditure showing the amount of money spent on materials and labor in the various shops and carhouses is prepared monthly. While the primary effort has been to reduce the number of pull-ins, it has been the aim to accomplish this without running up large maintenance costs. The two accompanying charts show very clearly the success that has been attained by the company not only in increasing the car mileage operated between pull-ins, but also in reducing the maintenance cost per car-mile. In 3½ years the average miles per chargeable pull-in has been increased from 1,380 to the maximum of 217,728 mentioned above. At the same time the maintenance cost has been reduced from $0.057 to $0.021 per car-mile.

The reorganization which has accomplished these results was made on Nov. 1, 1920, under the new management which took over the operation of the company just prior to that date. The important part that should be played by the equipment department in giving good service to the public was immediately recognized. This department was acknowledged to be a vital cog in the railway mechanism, rather than being considered, as is so often the case, merely as a kind of necessary evil. The superintendent of equipment and the master mechanics at the various carhouses were provided with suitable offices and office equipment. If the master

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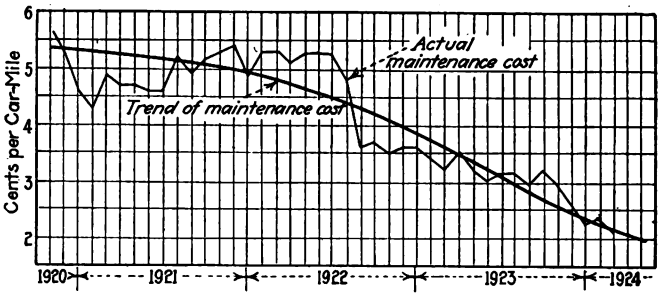
mechanic has an office in which to work and a desk at which to sit, he goes at his work in a different spirit from that of the man who has to use an old packing case shoved off in some dark corner of the repair shop.

A program of regular meetings of station foremen once a month was inaugurated. At these meetings the various problems of the mechanical department are discussed and methods to overcome them are proposed. Genuine attention is paid to the views of every individual, and no attempt at dictation is made by the superintendent. With the idea of teaching them what the other fellows were doing and broadening their viewpoints, master mechanics, inspectors of equipment and foremen were sent to various railway shops and manufacturing plants in other cities. These trips were of material benefit to the company and have resulted in the abandoning of many old methods in favor of newer ones.

Previous to the reorganization of the mechanical department the engineering for that branch of the railway was done at the general engineer office of the company. Now, however, an engineer is employed to work directly with the equipment department, and his services have been invaluable. It is planned to extend this idea still further. Additional engineers will be secured and it is expected that the equipment department will then be able to do all of its own design, inspection and testing work. The technical knowledge possessed by an engineer, especially in connection with the testing of electrical apparatus, is felt to be an absolute essential in the efficient operation of the equipment department.

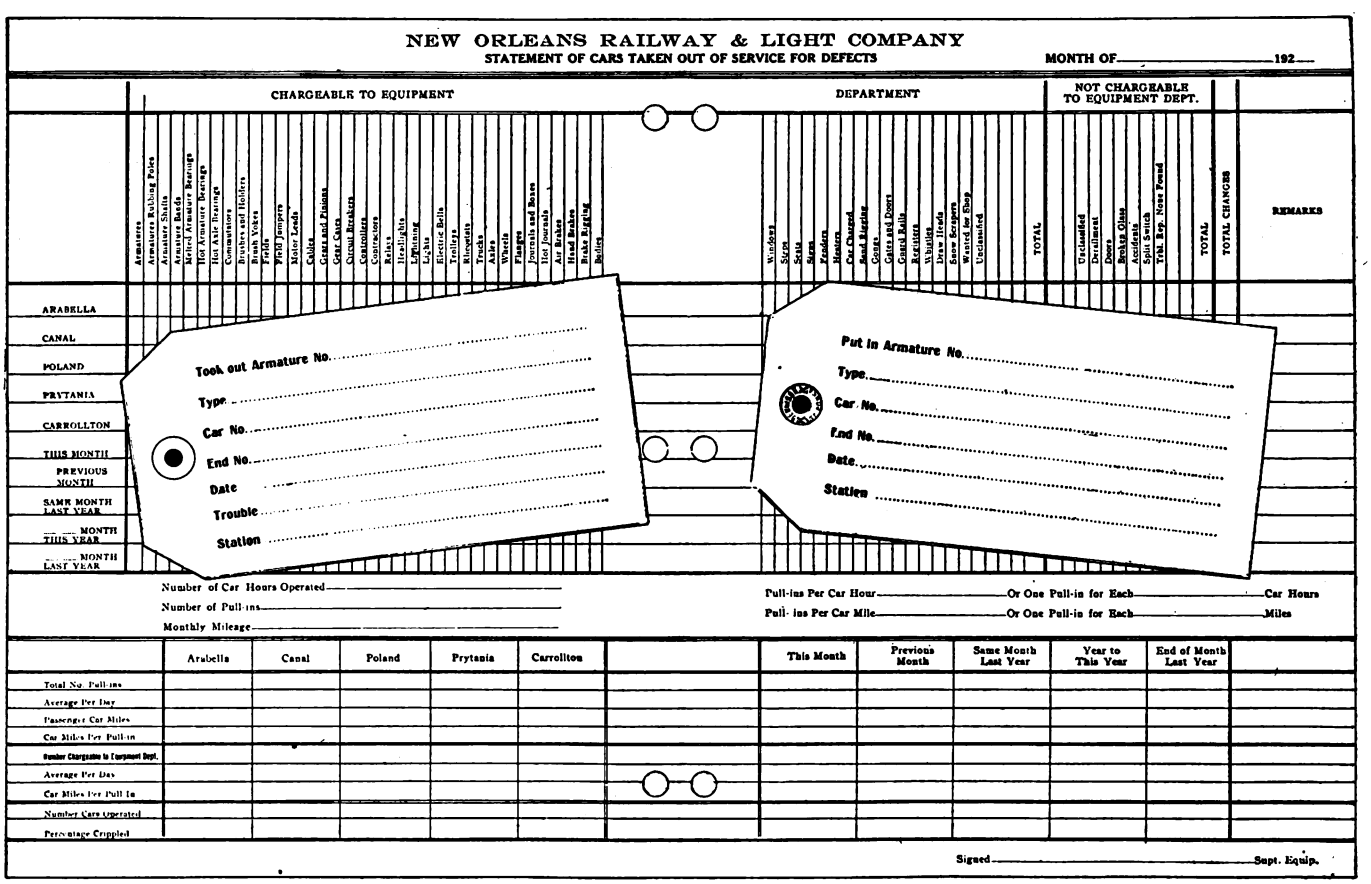
New cars and equipment have been purchased. Dipping tanks and baking ovens have been installed and have proved to be particularly valuable. Car hoists and cranes have been installed so that the men can do their work easier and better. By degrees the improved conditions were appreciated and a new spirit introduced with this department.



Along with the Reduction in Pull-Ins the Maintenance Costs Are Going Down

About 100 modern cars have been bought and are now in operation while 73 more are on order. The reduction in the number of pull-ins, however, cannot be attributed wholly to the operation of new rolling stock and the elimination of some of the older cars. More than 400 cars are in regular service in New Orleans, and the new ones, therefore, constitute only a fraction of the total. There are in operation a great many double-truck cars which are not new and about 200 old single-truck cars. Maintenance costs on cars of the latter type are high and constant care must be exercised to keep them in good condition and thus prevent pull-ins.

The recognition of the mechanical department by the executive heads of the company, the purchase of modern rolling stock and proper tools to enable the men to perform their work efficiently, and the development of a regular system of inspections and repair have created a spirit of enthusiasm and a desire to co-operate for the general welfare of the railway. The result of this has been better car service in New Orleans.



This Form Summarizes the Pull-Ins by Divisions and by Classification of Defects. The Insets Show the Armature Tags Employed

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Financing Purchase of Coal for Employees

Plan Adopted by the Connecticut Company Has Enabled Its Employees to Secure the Quantities Needed at a Minimum Price

THE experience during the past winter of two large railways which undertook to finance the purchase of household coal for their employees was so satisfactory that the continuation of the plan is assured. The Connecticut Company was the originator of the idea and it has been followed by the United Railways & Electric Company of Baltimore.

So much enthusiasm has been shown by the employees of the Connecticut Company who availed themselves of the company's plan to distribute coal that the participation of a much larger number in a similar scheme next year is expected. A brief description of this plan was given in ELECTRIC RAILWAY JOURNAL for April 28, 1923. During the past winter 987 employees ordered 4,691 tons of coal at a total cost of $63,000. All of this coal was delivered prior to March 1, 1924.

The great difficulty in obtaining an adequate supply of coal for household purposes, as well as the abnormally high prices prevailing for such coal as was available, induced the company in the spring of 1923 to propose a plan to assure its employees an adequate supply at a reasonable price. Such employees as wished to avail themselves of the offer had their full winter's requirements of coal delivered during the summer at a time convenient to the retail dealers. Payment to the dealers was guaranteed by the railway and deductions made from each individual's weekly pay during the period from May to November. In this way the employees obtained advantage of the lower price possible through buying in ton lots rather than in smaller quantities. Moreover the plan enabled the dealers to deliver coal during the spring and summer months when there was slight danger of interruption in rail shipments. In a small measure it has tended toward greater equalization in mining activity.

Early last summer the United Railways & Electric Company undertook a similar plan. Up to Feb. 1, 1924, 1,952 orders had been placed with the company for 5,250 tons of coal at a total cost of $84,022. All but a very small percentage of this coal had been delivered and paid for up to that time. A quarter of 1 per cent of the total represents the loss through coal delivered but not paid for.

On the basis of an average price of $15 per ton the railway arranged to collect from its employees at the rate of 75 cents per ton per week. This meant that the account would be paid off in twenty weeks. The company pays cash for coal and takes advantage of the cash discount of 25 cents a ton, and this saving is passed on to the employees.

The plan has been so successful that at the request of the Employees' Benefit Association it has been extended to become a permanent part of the company's activities. Employees may order coal at any time of the year and pay for it as described. The company believes that if such a scheme were put into effect by other large employers of labor it would materially improve the peak conditions in the coal mining industry and give the employees the benefit of purchases at the summer season price without the need to finance the purchases so far in advance of actual need for the coal.

The Readers' Forum

Believes Wheel Welding Can Be Done; Wants to Know Right Technique

INDIANA, COLUMBUS & EASTERN TRACTION COMPANY

SPRINGFIELD, OHIO, June 6, 1924.

To the Editors:

I am very much interested in the reconditioning of steel wheels by building up the worn flanges by electric welding. This is not a new subject, as flange welding has been practiced for some years by a few mechanical men with varying success. In our own shop we have built up the flanges on several wheels that have given upward of 40,000 miles of service on our heavy cars, which performance is entirely satisfactory. On the other hand, we have had wheels develop serious cracks which we feel certain were due to welding the flanges, making them unsafe for use. I understand this has been the experience of practically every one who has undertaken to weld flanges.

These experiences have led some to abandon and condemn the welding of flanges as impractical and unsafe. But the fact that even a few welded wheels have been an entire success, also the fact that wheels from certain makers crack more than others, leads me to believe that universal success is a possibility. The reason that uniform results have not been obtained is no doubt because conditions were not uniform. My feeling is that we are all groping around in the dark and when we secure a good result we do not really know why or how we did it, likewise with a bad result.

My contention is that the steel wheel makers should take up the problem in a thoroughly scientific and practical manner and be prepared to supply the railways with wheels that can be successfully welded. They should also be prepared to furnish the proper welding rod and specify what rod to use on their wheels, together with the current strength, voltage over arc, etc., so that the railway men can depend on being able to do this work without fear of cracked wheels.

Recently I wrote on this subject to one company which manufactures steel wheels and the reply was that it was very much interested in this matter, as it felt that if worn flanges could be successfully renewed on steel wheels there would be but few chilled wheels sold, but that its engineers had been working for two years on the problem and so far had not met with success. In practically every attempt incipient cracks were discovered which tended to be progressive.

In this connection I am reminded of the slogan: "The fellow who says it can't be done is interrupted by the chap who is doing it." The wheel company men referred to gave me a very pressing invitation to visit their laboratory and assured me they could convince me of the impossibility of flange welding. Still I am not convinced and furthermore refuse to be convinced that this thing cannot be done.

In order to see what savings can be made by flange welding it first must be noted that in about 90 per cent of the cases sharp wheel flanges occur on one wheel only. Therefore, if this one flange can be renewed by welding, it will in many cases not be necessary to turn the treads down in the lathe, and if this process can be kept up, that is by renewing the flanges as they

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wear down, it should increase the ultimate life (or mileage) of the pair of wheels by some three to five times that obtained when wheels have to be turned down to a smaller size every time a sharp (or thin) flange develops. As to the saving that can be effected, I have made the following rough comparisons based on our practice, which I consider conservative:

Cost of two new 37-in. steel wheels	$95.00
Cost of mounting wheels on axle	5.00
Cost of turning pair of wheels three times	4.50
Total cost of two wheels present method	$104.50
Probable total mileage	200,000
Cost per 1,000 miles	$0.52
Cost per 1,000 wheel-miles	$0.26
If flanges are welded they will probably have to be welded about eight times during the life of the wheels.	
Cost of welding flange on one wheel	$4.00
Cost of welding flange on one wheel eight times	$32.00
Total cost two wheels ($95 + 5 + 32)	$132.00
Probable total mileage	750,000
Cost per 1,000 miles	$0.176
Cost per 1,000 wheel-miles	$0.88
or about one-third the present cost	

The above figures certainly look attractive and I feel reasonably sure they can be attained and probably surpassed if the one point of dependability can be secured. My purpose in writing you is to enlist your support. What I am interested in is getting the thing "put across" by some means and I think the ELECTRIC RAILWAY JOURNAL is in a position to lend material aid in doing this. Possibly the manufacturers who are producing the welding outfits could also be interested in helping to put this over.

F. J. FOOTE,
Superintendent Motive Power and Equipment.

[Methods for neutralizing internal stresses from welding wheels were discussed in an article by W. J. Merten in the ELECTRIC RAILWAY JOURNAL for April 21, 1923. Several methods which have been used successfully were described in the Aug. 18, 1923, issue in connection with a survey of wheel, gear and axle practice.—EDS.]

Thinks Pneumatic Equipment Desirable

NEW YORK, June 4, 1924.

To the Editor:

In reading my ELECTRIC RAILWAY JOURNAL of May 24 I was quite interested in noting several statements in your article on the new car design adopted by the Springfield Street Railway, and would like to remark on type of door control mentioned, which is not at all in harmony with the present trend of electric railway car design. It is mentioned that manual operation of the folding door is preferred to pneumatic operation because of the danger of freezing of pneumatic door engines and the piping. It has been my privilege to inspect electric railway operation from Sydney, Nova Scotia, to Fort Worth, Tex., and I have specially observed pneumatic door operation from every standpoint. The only cases of freezing that I observed, which were very few, have been due to conditions peculiar to the individual installation, which could readily be corrected and were. At this moment I have a vivid recollection of the little one-man safety cars in Sydney plowing through a blinding snowstorm without a gap in schedule and with perfect door operation. These cars were equipped with the safety car equipment and the doors operated by a pneumatic door engine.

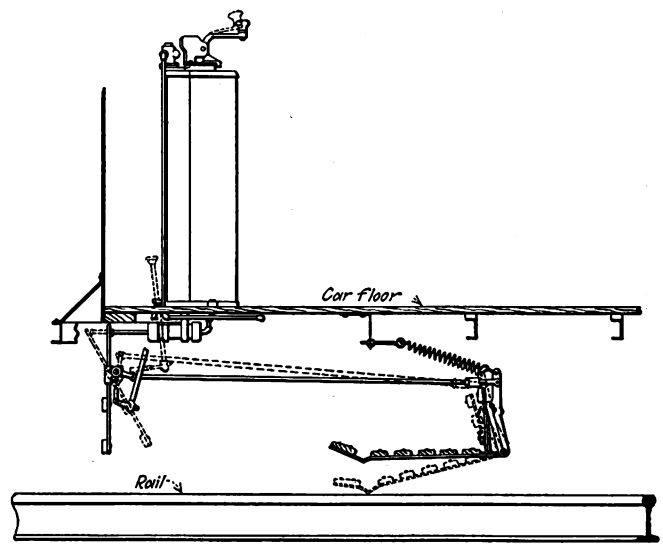
Another statement in your article criticises the sudden starting of cars where doors are interlocked with contactors or line switches, where the car is started by the closing of the doors. This is another case that can be controlled by proper installation. The Third Avenue Railway of New York City has used such operation for more than ten years through all the vagaries of New York traffic, and the resulting operation has been smoother than on the few cars which are not equipped with safety interlocking door control. The secret, if any, lies in using a sufficient amount of resistance on the first step of the controller with the proper grading of the resistance on the remaining steps. Furthermore, there are thousands of cars equipped with this type of safety interlocking door control throughout the country, all of which seem to be giving the very best results. This is progress, and it is impossible to stop progress of the right kind.

G. H. VANDER VEER,
Car Equipment Engineer National Pneumatic Company.

Life Guard Operated by Air

Connection for Safety Device Is Made to the Exhaust Pipe from the Controller Handle on Safety Cars

IN ORDER to make the operation of the life guard automatic the Savannah Electric & Power Company, Savannah, Ga., has equipped all of its safety cars so that the tray drops whenever the emergency devices function. An extension has been welded upward from the apron of the life guard and a cylinder similar to the circuit breaker knock-out cylinder is placed under



Showing How Exhaust Air from the Controller Handle Trips the Life Guard

the floor of the car. Connection to this cylinder is made from the exhaust air pipe from the controller handle. When the operator removes his hand from the controller this exhaust air operates a plunger which hits the welded extension to the apron and trips the tray.

When the car is moving at a speed of 20 m.p.h. it has been found that the life guard can be dropped in a distance of 3 ft. After tripping, the tray is returned to its normal position by means of a treadle. Air connections to perform this work are being considered, however. A cut-out valve is placed under the floor below the controller, to eliminate the automatic feature if it should be so desired at any time. All safety cars of the Savannah Electric & Power Company have been equipped in this way at a cost of approximately $10 per car.

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Equipment Maintenance Notes

Reclaiming Rail Bonds in Brooklyn

BY G. H. MCKELWAY
Engineer of Distribution
Brooklyn-Manhattan Transit Corporation

WHEN bonds of the compressed and expanded terminal type were to be removed from tracks in Brooklyn, an old method was to cut off the terminals with a cold chisel and save only the length of the stranded conductor between the terminals. The part removed was turned into the storeroom and later sold as scrap copper. However, many bonds reached the junk dealers in a more direct but unauthorized way.

In order to prevent this waste a method of salvaging the complete bonds was tried. Instead of cutting off the terminals, these were punched out of the rail and those which were unfit for reuse in the condition in which they were removed were filed to necessary dimensions. This work was expensive, and a first-class job was seldom obtained, as the terminals when finished were not round and were too small to fill the holes in the rails and provide a proper sized button on the end. As a result, in reusing these bonds they were installed only in sidings or points where it was expected to relay the track.

An improved method of finishing the terminals is now being used which makes them suitable for reinstallation in place of new bonds. A special milling tool is used in a drill press. This has knife blades on the inside and lower end. With this milling tool fitted over the terminals, the excess copper from expanding the terminal in the web hole is quickly cut away to the exact dimensions required, and where the terminals are distorted from being driven out these are trued up. Some of the copper is removed from the shoulder of the terminal so as to make the stud long enough for reinstallation. This method enables the reuse of the bonds in rails with the same or even greater web thickness than those from which they were removed and a satisfactory button is obtained.

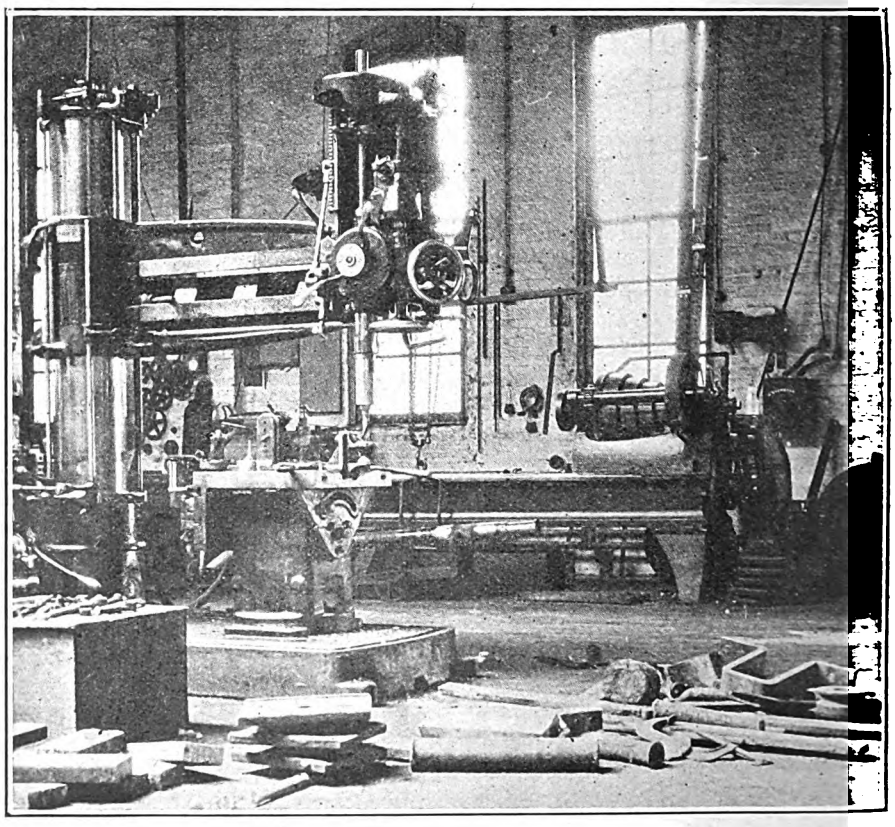
In some cases where a number of heavy bonds are installed in the same locality the studs of the bonds are cut from the terminals, leaving the sleeves in place around the end of the strands. The sleeves are then welded to the base of the rail. The sleeve around the end of the strands is of great advantage as it holds them tightly together until they can all be welded to the rail. It also prevents the burning of the strands, which might occur if heat were applied directly to the individual strands instead of to a number at the same time.

High-Speed Drill Proves Economical

A FOSDICK high-speed radial drill with Westinghouse control is used in the Fulton County plant of the Georgia Railway & Power Company, Atlanta, Ga., to drill material of all kinds—from brass to tool steel. For such articles as brake beams, levers, etc., which require several holes to be drilled, this machine is said to save from 50 to 75 per cent of the labor cost. For drilling single holes of small size, the new machine is not greatly superior to the old, but for large single holes, 2 in. or more in diameter, the saving by the use of this radial drill is from 75 to 80 per cent. This machine was installed in the fall of 1923, and has "kept the floor clear," as the shopmen say, ever since.

Oxyacetylene Welding Wagon

THE accompanying illustration shows a type of wagon used quite extensively in the Harmon shops of the New York Central Railroad for mounting oxygen and acetylene tanks and carrying the necessary welding equipment for this class of work. The tanks are mounted on a sheet steel platform and the framework required is of strap iron 1½ in. x ¼ in. Rubber mats ⅛ in. thick are installed underneath the tanks and are kept in position by



A High-Speed Drill Used at Atlanta Which Always Keeps Ahead of the Job

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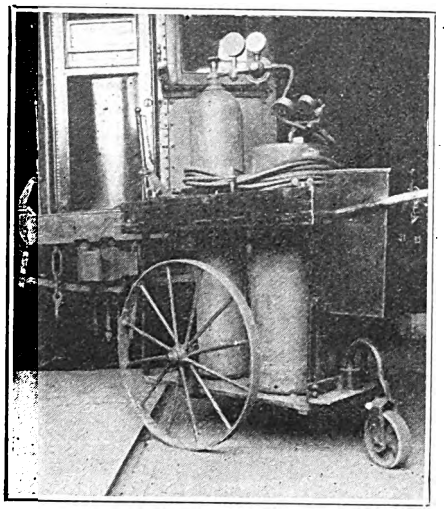
angle iron brackets at the bottom. A steel top plate is used for keeping the tank in position at the top. The holes through which the tanks pass in this plate are larger than the diameter of the tanks and leather pads are used to fill in the space.

The large wheels for the wagon are 30 in. in diameter and were obtained from discarded hand baggage trucks. A third wheel, 8 in. in diameter, is arranged at one end to swivel and to take the load at that end. There is a pocket the entire length of the framework about 6 in. wide for holding the welding rods and torches. A tool box is constructed on the end of the framework and in this is installed a



Convenient Type of Wagon for Oxyacetylene Welding Equipment

Pyrene fire extinguisher, a rack for holding various sizes of welding tips and various welding torches. A piece of iron conduit forms the handle. This is welded to the frame and is bent to the necessary shape.

Charging Pull-Ins Against the Inspector

IN THE shops of the Memphis Street Railway, Memphis, Tenn., each car inspector is required to turn in daily a signed report showing the number of cars he inspected that day and listing the parts examined. A copy of the form used for this purpose is shown in an accompanying illustration. The inspector is then held responsible for the satisfactory performance of these cars.

When a car is pulled in from the road on account of trouble which might have been prevented by proper inspection, the master mechanic looks over the daily reports to de-

Dick Prescott Resumes His Work

Unaware of Impending Events

THOMAS MULLANEY was standing as Mr. Milburn entered his office. From his attitude and manner, it would have been apparent to a keen observer that the visit of the general manager did not catch him entirely by surprise as it had Steve White, the carpenter foreman, since Steve had called Mullaney's office and informed him of the important visitor who was headed that way.

"Sit down, Mr. Milburn," said Mullaney, as soon as Dick had closed the door. Although this was his first meeting with the new general manager, Mullaney had already acquired a wholesome respect for his ability as an executive. Both through letters and telephone orders and also from opinions expressed by department heads, the feeling had spread throughout the company that here was a boss who knew his business and was accustomed to carrying out his ideas.

An unannounced visit from the general manager, coming out to the shop thus informally and unattended, was new in the long years of Mullaney's experience and was so unlike previous precedent that he could not avoid mentioning the fact.

"This is kind of a little surprise to us, Mr. Milburn. We ain't accustomed to havin' the general manager visit this shop very often."

"Well, I've been trying for several days to get out here to go through the shop with you and this is the first afternoon I've had the opportunity. I want to take a turn through the various departments today to get acquainted, and you may be assured that I shall keep closely in touch with the shop in the future. This is one of the most important spots on the property. You see, you are in a position to make or lose a great deal of money for the road. In addition, you men out here are a vital part of any program of improvement which is undertaken, for without efficient co-operation from this end it will be impossible to maintain the kind of service that I feel this property must give if it is really to fulfill its responsibilities to the car riders."

"Well, we ain't got a great deal out here to talk about, Mr. Milburn. I've been in this shop for well nigh on thirty years and it's always been considered, so far as I could figure out, a kind of necessary nuisance. About the only time we have ever seen the general manager has been when we had to go down to take up demands by the men for more pay."

Mr. Milburn said nothing in reply, but showed by his manner that he was ready to start out into the shop. Thomas Mullaney reached for his old slouch hat and led the way into the outer office.

In the meantime Dick Prescott had returned to the damaged car upon which he had been working as a carpenter's helper, unaware that this little incident would result in opening for him the kind of an opportunity which he earnestly desired.

"Who was the guy that was all dressed up?" said Bill Newman, a carpenter who had grown gray and wrinkled in the Consolidated shop.

"Why, that was Mr. Milburn, the general manager."

"What kind of a guy is he?"

"Oh, he seemed very pleasant indeed."

"Asked a lot of questions, didn't he?"

"Yes, quite a number. He was very much interested in many details about the shop."

"Kind of had Steve White flustered for a minute, didn't he?"

"Why, I don't know. I guess Mr. White was surprised to see him."

"Well, that's the kind of a boss I like to have. One who ain't too good to get right out on the job hisself to see what's goin' on. That's the kind of a guy that knows a man by his first name after he's worked in a shop twenty years, like I have. How kin these guys downtown know what this shop needs widout gettin' out here once in a while to see what the joint looks like, eh? I'll bet'cha this fella knows his business, an' if he don't he'll learn pretty quick."

Dick did not need to reply, for Bill, who had just caught sight of the figures of Mullaney and Mr. Milburn entering the carpenter shop door, suddenly became very industrious and discontinued his comments.

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Form 4004

The Memphis Street Railway Company

DAILY REPORT OF CARS AND EQUIPMENT INSPECTED

Day of Week..... Date.....

PARTS INSPECTED	CAR NUMBERS								
Trucks, Truck Bolts, other Parts	1	104	141	178	404	523	560	611	708
Brakes	2	105	142	179	405	524	561	612	709
Brake Chains	3	106	143	180	406	525	562	613	710
Wheels and Axles	4	107	144	181	407	526	563	614	711
Sand Boxes	5	108	145	182	408	527	564	615	712
Floor Gongs	6	109	146	183	409	528	565	616	713
Motors, Bolts, Gear Cases	7	110	147	184	410	529	566	617	714
Armature Clearance	8	111	148	185	411	530	567	618	715
Fenders	9	112	149	186	412	531	568	619	716
Outside Journals, Lubrication	10	113	150	187	413	532	569	620	717
Motor Leads	11	114	151	188	414	533	570	621	718
Carbon Brushes	12	115	152	189	415	534	571	622	800
Brush Holders	13	116	153	190	416	535	572	623	801
Lubrication	14	117	154	191	417	536	573	624	802
Trolley Wheels, Poles and Bases	15	118	155	192	418	537	574	625	803
Trolley Ropes and Trolley Catchers	16	119	156	193	419	538	575	626	804
Grab Handles	17	120	157	194	420	539	576	627	805
Steps	18	121	158	195	421	540	577	628	806
Gates	19	122	159	196	422	541	578	629	807
Doors	20	123	160	197	423	542	579	630	808
Seats	21	124	161	198	424	543	580	631	809
Registers	22	125	162	199	507	544	581	632	810
Bell Cords and Straps	23	126	163	200	508	545	582	633	811
Glass	24	127	164	201	509	546	583	634	812
Signs	25	128	165	202	510	547	584	635	813
Headlight Glass	26	129	166	203	511	548	585	636	814
Air Compressor, Lubrication	27	130	167	204	512	549	600	637	815
Air Governors	28	131	168	205	513	550	601	638	816
Air Valves	29	132	169	206	514	551	602	639	817
Air Gauges	30	133	170	207	515	552	603	700	818
Controllers, Circuit Breakers, Fuse Boxes	40	134	171	208	516	553	604	701	819
Lamp Circuits	41	135	172	209	517	554	605	702	820
Heaters	42	136	173	210	518	555	606	703	821
Push Buttons	43	137	174	400	519	556	607	704	822
Cars Washed—Inside	44	138	175	401	520	557	608	705	823
Cars Washed—Outside	50	139	176	402	521	558	609	706	824
	60	140	177	403	522	559	610	707	

The car parts and apparatus as above checked have this day been inspected and are in good order.

.....Inspector

.....Foreman

NOTE—Each employe is required to check the parts and apparatus which he is designated to inspect and numbers of cars inspected, by running line through same. No two inspectors will report on the same blank form.

When repairs are made, car number and material used thereon must appear on reverse side of this report.

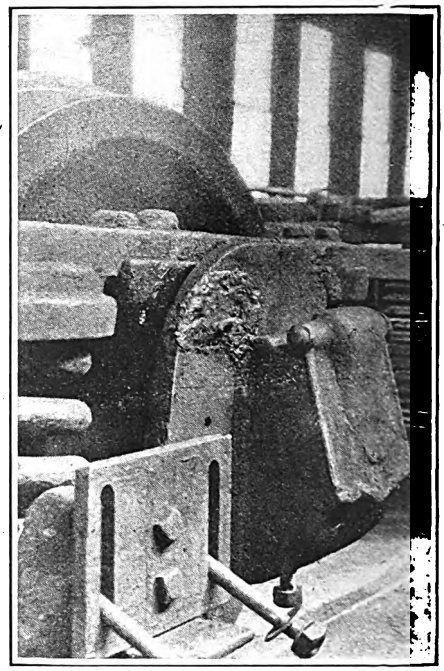
Form Used by Inspectors to Report Numbers of Cars Examined

termine which inspector last examined the car, and charges the failure against him. On a large chart which is posted on the bulletin board in the shop, the number of the cars pulled in are entered under the proper date opposite the name of the inspector responsible. If no cars are pulled in during the course of a month an inspector is credited with 100 per cent efficiency, and 10 per cent is deducted for each pull-in.

This report of the comparative efficiency of inspection was developed in October, 1923, the record for that month being shown in an accompanying table. The charts are posted the first of each month and have created quite a lot of friendly competition among the shop men. For April, 1924, the latest month for which complete records are available, every inspector had a record of 100 per cent efficiency.

Building Up Worn Equalizing Bars

DUE to the vertical motion of the truck equalizing springs considerable wear takes place on the equalizing bars where they rub against the pedestal. In the truck overhauling program at the shops of the Philadelphia & Western Railway the equalizing bars are taken off and the worn faces built up by electric welding. When the equalizing bars are replaced they are turned around with worn faces outside.



Worn Face of Equalizing Bar Built Up

A spacing block is also set on top of the journal box between the two equalizing bars. This comes between the two pedestal jaws, thus tending to keep the equalizing bars away from the end of the truck pedestal and so reduce the wear.

THE MEMPHIS STREET RAILWAY COMPANY—MONTHLY EFFICIENCY REPORT, DAY AND NIGHT INSPECTORS

Month of October, 1923

	Inspector	Date 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Per Cent Efficiency
Air	Puryear, R. M.																																100
Armatures, motor be rings, brush-holders, etc.	Davis, G. T.																						549										90
	Burnette, G. L.							556																				544					80
	Stacks, J. T.																		209														90
	Fowler, W. A.																																100
	Palmertree, T.																																100
	Fry, W. R.													549				581															80
Brakes	Gresham, L. D.																																100
	Gresham, E. G.																																100
	Harriman, A. S.																																100
Car bodies, doors, fenders, etc.	Hearn, H.																																100
	Hughes, E. H.																																100
	Helms, E. E.																																100
	Murran, Jas.																																100
	Bailey, W. A.																																100
	Reavis, C.																																100
Electrical equipment	Yancey, A. T.								210																								90
	Spencer, C. C.									571																							90
	Hopper, C. E.																		552														90
	Murry, F. T.																																100
	Clinton, J. W.																																100
Journal oiling Trolleys	Spraggin, H.																																100
	Sherwood, L. K.																																100

Percentage based on 10 failures.

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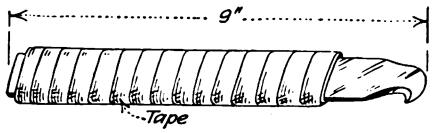
Handy Commutator Trimming Knife

AFTER commutator slots have been milled, a burr of copper is left on the edge of each bar. Also, when commutators are turned in a lathe some of the copper is drawn over the edge of the slot, and some who have studied the problem closely



This Knife Is Used for Trimming the Edges of Commutator Bars

believe that the drag of the turning tool tends to "hard draw" the copper at the edge of the slot.

A simple type of knife, used in the armature room of the Kansas City Railways Company, has been found to be very handy in finishing the edges of the commutator slot after either milling or turning operations. This type of knife is quickly made from a discarded hack-saw blade by grinding the end to the proper shape and covering the remainder of the blade with plenty of tape to form a secure handle, as shown in the accompanying illustration. The knives are made up in pairs; that is, they are ground right and left hand. The hook-shaped cutting edge near the end is dragged along the edge of each slot and quickly trims off the burr so smoothly as to require no sanding of the commutator when the operation is completed.

Removing Coils from Impregnated Armatures

WHERE windings have been impregnated or coated with varnish or hydrolene gum, it is sometimes thought that the coils cannot be repaired and that they must be stripped out and the armature entirely rewound. Many windings which have been coated with varnish or filled with certain impregnating compounds can be repaired satisfactorily, however, and some suggestions for removing coils from impregnated armatures are given in an article by J. L. Rylander of the Westinghouse Electric & Manufacturing Company, published in December, 1923, issue of *Electric Journal*. Windings filled with bakelite or cement, however, cannot be repaired satisfactorily.

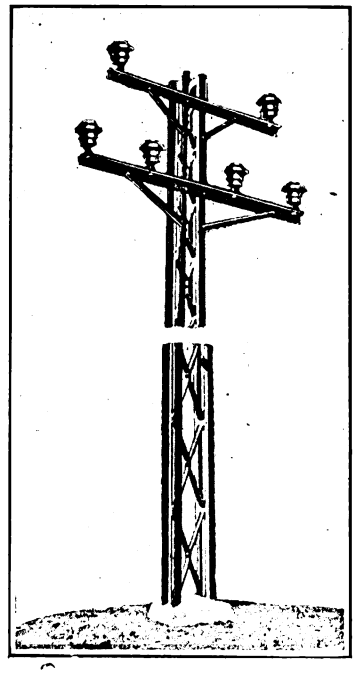
To remove a few coils from varnish treated or impregnated armatures, the slot and end portions of those coils that are to be raised should be covered with a coat of paraffine, about ¼ in. thick. The part of the winding where the coils are to be raised should then be heated. The varnish softens at about 100 deg. C. and loses its sticking quality and the melted paraffine cuts into the varnish sufficiently to act as a lubricant. The best method of heating the armature is in an oven, where the complete winding is heated until the innermost part of the coils and insulation reaches the required temperature. A blow torch can be used if applied with discretion.

In some cases where the varnish has not been sufficiently warmed, the coils will stick to the paper slot liner and in such cases it is advisable to insert a thin knife along both sides of the coil, the full length of the slot between the coil and the paper. This will separate the coil from the paper slot liner. If both the bottom and top coil are inclosed in a paper cell the top coil can be raised easily. The principal thing is to apply plenty of paraffine and heat the whole winding to approximately 100 deg. C.

New Equipment Available

Truscon to Make Steel Poles

ANNOUNCEMENT has just been made by the Truscon Steel Company, Youngstown, Ohio, that the new steel pole department of that company is now ready for a quantity production schedule and is prepared to manufacture steel poles of all sizes



Truscon Steel Pole Made from Channel Iron

up to 50 ft. in length. The Truscon steel pole is adaptable for use on transmission and distribution lines, telephone, trolley and street lighting systems and for many other purposes.

A feature of this pole is its simplicity of construction, being pressed from 5-in. to 12-in. steel channels or I-beams. It is so designed that no special equipment is needed by the lineman in ascending or descending, thus eliminating pole steps or the necessity for use of spurred climbers. It is made by pressing a portion of the web of the channel or I-beam out to a predetermined angle, then riveting this pressed-out section to a like section of another channel or I-beam.

Before production was begun and the pole was placed on the market, it was subjected to practical tests under varying conditions over a period of two years. It is claimed by the manufacturers that when this pole is anchored in concrete and painted about once in five years it will last indefinitely. Due to simplification of manufacture and quantity production cost of the steel pole is said to be about the same as that of wood poles; in some sections of the country it is less.

Where more than ordinary strength of pole and extra length is required, the pole can be made in combinations of two or more.

A complete line of fittings has been designed for the steel pole to fit any size standard cross-arm, either wood or steel. The cost of these fittings, which will all be galvanized, is no more than the cost of ordinary through bolts used in general construction work.

The element of public safety has not been overlooked in the design of the copper steel pole. Due to a lack of pole steps and because of the sharp angles formed in joining the riveted web sections, it is impossible for any youngster or other person than a lineman to ascend the pole.

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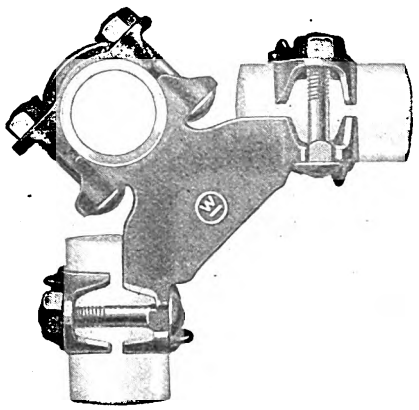
Interchangeable Pipe Fittings

A LINE of structural pipe fittings for use with common wrought iron or steel pipe in the erection of electrical switching equipment, racks, railings and bench frames has been placed on the market by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

These fittings consist of a relatively few unit castings which may be arranged to produce a large



Side Outlet Tee Constructed with Interchangeable Pipe Fittings

variety of combinations. They are made of malleable iron. The principal feature of the design is a ribbed yoke which clamps over the pipe with carriage bolts to the other unit part. Since the bolt spacings are uniform, parts designed for a certain size pipe are interchangeable with all others for that size. The form of the yoke and other unit parts is such that a considerable area of contact with the pipe is secured. As the fittings are bolted up they yield slightly, due to the malleable characteristics of the iron, until a perfect fit is obtained.

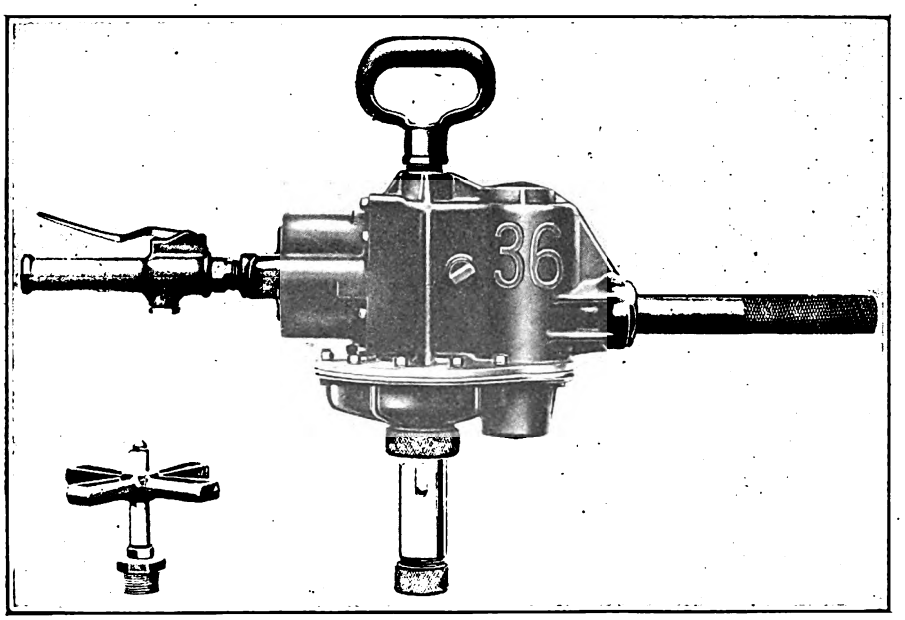
The fittings are designed for two standard pipe sizes, 1¼ in. and 2 in., and for combinations of these sizes, with a few fittings of ¾, 1 and 1½ in. size for light switchboard frames and for clamping insulators to pipe frames. They are furnished in either a black gloss baked finish for indoor use or are galvanized for outdoor installations.

Portable Air Drill

IN ORDER to meet the demands for a portable air drill for reaming service, the Chicago Pneumatic Tool Company, New York, N. Y., has brought out a new drill designated as No. 36 Red Giant. It weighs 35 lb. Particular attention has been given to provide perfect balance, so that it is easy to handle and control. The spindle is an extension type with a tang slot for convenience in ejecting the reamer or drill.

The cylinders are of the double-acting type, and provided with packing glands which prevent leakage of air into the crank-case. The pistons are turned from special low-carbon steel bars and accurately ground to size. All valves are of the balanced piston type and have no pressure holding them to their seats. As they move but one-twentieth of their length and are devoid of rocker arms and gears, they require very little power for operation. The valves are located between the cylinders with very short ports, thus providing air control close to the cylinders and effecting economy in the use of air.

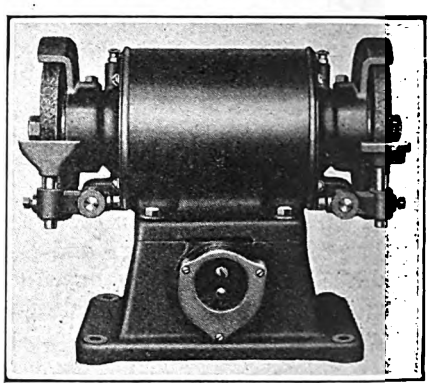
The crankshaft is forged from high grade nickel steel, heat-treated to give high tensile strength in the throws and hardness at the wearing points. It is mounted on three ball bearings, the extra one insuring proper shaft support on both sides of the main drive gear and reducing friction. Splash lubrication is used and as there is no air to bleed from the crank chamber, no lubricant is carried out with the escaping air and lost.



High-Speed Portable Air Drill

Six-Inch Bench Grinder

A NEW bench grinder of small size has been brought out by the Hisey-Wolf Machine Company, Cincinnati, Ohio. The grinding wheels are fitted directly on the spindle, and the grinding rests are adjustable and can be removed if desired. Two grinding wheels 6 in.



Small Grinder for Very Light Grinding

in diameter are used and the height of the grinder from the bottom of the base to the center of the spindle is 8 in. The grinder weighs 70 lb.

Ball bearings completely inclosed from dust and grit are provided with heavy felt protector washers on each side of the bearing housing. The grinder is driven by a ¼-hp. motor, and a motor switch is conveniently mounted and protected in the base. The switch is equipped with thermostatic control which provides the same characteristics as a fuse, and gives maximum protection to the motor. Safety combination wheel guards as shown in the illustration can be supplied if desired. This guard is adjustable to any angle and can be moved back as the grinding wheel wears, thereby giving full access to the grinding wheel with maximum guard protection. It is interchangeable with the standard open-end guard.

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Association News & Discussions

Canadians Hold Successful Convention

Rail Joints, Operating Problems, Traffic Congestion and Safety Were Main Topics at the Ottawa Meeting, Which Was Held Jointly with the Canadian Electrical Association—Exhibits Attracted Attention

THE Canadian Electric Railway Association and the Canadian Electrical Association combined this year to hold their annual conventions at Ottawa, June 11 to 13. The entertainment features and the exhibits were held in common, while the sessions of the two associations were conducted independently. The total attendance at the convention was about 400, of which nearly half were railway men.

On account of the resignation of President H. H. Couzens of the railway association, who has gone to Rio de Janeiro within the last month to become vice-president of the subsidiaries of the Brazilian Traction, Light & Power Company, the meetings of the electric railway association were presided over by D. E. Blair, its vice-president and superintendent of rolling stock Montreal Tramways.

The secretary in his annual report stated that there are now 35 member companies which operate 87 per cent of the trackage in Canada and 93 per cent of the equipment. In addition there are 31 associate members who are manufacturers of electric railway equipment.

Safety Committee Report

The safety committee, W. R. Robertson, general superintendent Hydro-Electric Railways, chairman, presented an elaborate report on safety work in Canada. A number of plans were advocated to insure greater safety of street railway operation. One that was particularly stressed was the inauguration of the so-called boulevard stop, where the street with car tracks is considered a main thoroughfare and vehicles approaching on intersecting streets are required to make a safety stop before crossing. This system, according to the report, does not affect the street railway so much as it helps the automobiles, as those running on the main streets so designated are able to proceed without delay at the crossings, while those approaching have greater safety.

In Toronto it was found that 53 per cent of the automobile accidents occur when vehicles turn out from the parking space without warning, and only 3 per cent are at intersections. Automobiles running into cars furnish 35 per cent of the accidents.

In the discussion J. F. H. Wyse, manager Ontario Safety League, contended that the greatest thing to reduce accidents is to obtain legislation requiring each automobile or truck driver to secure an individual license. C. L. Wilson, Toronto, suggested that a physical examination, including eyesight, should be a prerequisite to obtain such a license. C. B. King, London, Ont., urged uniform reporting of accidents throughout Canada in order that they might be studied and the proper remedies worked out.

Mr. Robertson stated that on his road reports are prepared of all accidents, which are used as a basis for the preparation of charts. Copies of these charts are posted in the trainmen's rooms and others are given the municipalities for the use of the police departments. He thinks that this publicity for the accident records has been instrumental in the campaign for the establishment of boulevard stops on his lines. Mr. Blair thinks that in order to get uniform reports of accidents, blanks should be prepared for the use of all railways.

I. S. Fairty, Toronto, stated that he was opposed to too many boulevard stops or similar restrictions. He also opposes licenses for motorists. Street cars should be given the right-of-way over vehicles he said.

The standards committee, D. E. Blair chairman, reported on the progress of electric railway standardization in Canada, and the co-operation between this association and other bodies in the United States and Canada.

Valuation and Depreciation

The committee on valuation and depreciation, H. E. Weyman, general manager Levis County Railway, chairman, presented a report recommending the Interstate Commerce Commission standard classification of accounts for electric railways, including the sub-accounts covering motor vehicle operation as adopted at the 1924 convention of the American Electric Railway Accountants' Association.

On the subject of depreciation the committee stated that there are numerous features to be given consideration in connection with the depreciation of electric railway accounts. Two classifications of depreciable property are recognized: Property that must be replaced in the form of individual units, such as cars, buildings, etc., and property whose replacement is a more or less continous process, such as track. The straight-line method of figuring depreciation charges was recommended, and it was recommended that a minimum cost figure should be set below which the book value of the part should not be depreciated. Obsolescence was considered separately from true depreciation, and it was the sense of the committee that this item might well be amortized in future years, since the replacement of the part was on account of the more efficient or more satisfactory service to be rendered by the new part.

Track Welding Discussed

A paper was read by A. T. Spencer, Toronto, describing the results obtained from welding of track joints on the lines of the Toronto Transportation Commission. His paper is abstracted elsewhere in this issue. A lively discussion followed, which was taken part in by many of the members. J. B. Tinnon, Metal and Thermit Company, New York, emphasized the necessity of watching the joints and taking care of them before the development of serious trouble. He spoke briefly of the tests now being made under the auspicies of the American Electric Railway Engineering Association way committee.

Attention was called to the lack of unanimity of opinion of way engineers regarding methods for seam welding joints by E. B. Entwisle, Lorain Steel Company, Johnstown, Pa. He recommended post-heating of any type of joint to anneal the metal. R. M. Dominey, Windsor, who has used both carbon and metallic arc welding, gave some of his experiences in track welding. C. B. King, London, Ont., stressed the necessity of making a continuous rail. He described experiments he had made using base plates, but with steel rods welded to the web of the rail in place of joint plates. By filling the gap between the rail ends an arch effect is produced, he stated, that makes the joint rigid. Mr. Tinnon called attention to the difficulty with deposited metal of getting the same composition to fill such a gap as there is in the body of the rail. A special form of joint plate is preferred by H. E. Weyman, Levis, Que., for use with old rail in order to get the correct alignment of the butting rails.

Mr. Blair spoke of the welding of the 60-lb. or 70-lb. A.S.C.E. section rail in Montreal in 1918, which was done with the carbon arc process with loosely fitted joint plates and base plates, seam welded. This type of joint has been found very satisfactory in practice, not a break having occurred on some 2½ miles of track.

Questioned regarding expansion joints, Mr. Spencer stated that in Toronto he has left an open joint for expansion about every 1,500 ft. of straight track. Special work and curves are not welded. He also stated that he has had some measure of success in the welding of manganese steel.

A paper was read by A. H. Foster,

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Brantford, describing some of the problems of street railway operation in a medium sized city. This paper is abstracted elsewhere in this issue. Discussing the paper, Mr. Robertson mentioned the combination of pay-as-you-enter fare collection inbound combined with pay-as-you-leave outbound as a method of simplifying operation and reducing congestion. He also called attention to the advantages of cars designed for modern operation, mentioning the new car designed for the Hydro-Electric Railways. This car, weighing about 26,000 lb., has an energy consumption of about 1.4 kw.-hr. per car-mile.

R. M. Reade, Quebec, stated that for the assistance of one-man operators he has put tickets on sale at various agencies, such as cigar stores. These tickets are sold outright to the agencies in bulk at a discount of 5 per cent, so that no risk is involved to the railway. With this assistance in fare collection the one-man cars have been able to make the same speed as two-man cars.

Mr. Weyman feels that the logical cash fare is 10 cents, with reduced rate tickets arranged to take care of any reductions that are desirable. On his line these are now selling at four for 30 cents. This rate, he said, is not liked by the public, the men or the company. He feels that tickets should be sold in such units as can be handled easily, such as 25 cents or 50 cents. The 10-cent fare does not affect the regular rider, who uses tickets exclusively. Fares are accounted for by means of registers, and the register reading must agree with the fare box collections within 4 per cent. If the discrepancy is greater than that the operator must return the difference.

To cut down service loses traffic, according to Mr. Weyman. Of the total operating expenses, 70 per cent are fixed when one-man cars are used, regardless of the number of cars actually in service, up to the limit of the number owned. On a small property the car-mile is not a reliable basis for comparison on account of the large proportion of the charges which are fixed in amount.

His road formerly purchased several types of second hand cars from time to time. The amount of repair stock it was necessary to keep on hand was very great. Fortunately a fire enabled him to standardize on new equipment, so that he has been able to introduce operating economies and reduce the amount of stock.

Leonard Tait, London, Ont., stated that his company has discarded the register and is weighing the tickets instead of counting them.

H. K. McLean, St. John, N. B., gave his experience with the weekly pass, which he thinks has increased the riding in St. John. This pass is sold on Mondays for $1, and is good for the week. Tickets also are sold at the rates of three for 25 cents, or 14 for $1. The receipts are now running about 10 per cent cash, 14 per cent tickets, and the remainder are riders on the passes.

Mr. Robertson stated that he is not using a register, and also is weighing the tickets instead of counting them. For the conductors' returns he has designed a special safe which is installed in the partition between the conductors' room and the accounting office. It has 24 separate compartments, one being assigned to each conductor. The conductor's turn-in is placed in one of the compartments, which is then closed and locked automatically. It can be opened by means of a combination in the accounting office, the contents removed and the outer door reset.

In Ottawa the paving charges are assessed against the property owners, according to Major F. D. Burpee. This has been found very desirable in the business district, as the stores are benefited by the presence of the street railway. In the residence districts the advantage to the property owner is not so obvious.

The reports on motor vehicle operation and on valuation and depreciation were carried over for another year.

THE NEW OFFICERS

The following officers were elected for the ensuing year:

Honorary president, Lt.-Col. J. E. Hutcheson, general manager Montreal Tramways.

Honorary vice-president, Acton Burrows, proprietor *Canadian Railway* and *Marine World*.

Honorary advisory council: T. Ahearn, Ottawa; F. A. Gaby, Toronto; S. J. Hungerford, Montreal; George Kidd, Vancouver.

President, D. E. Blair, superintendent of rolling stock Montreal Tramways.

Vice-president, W. S. Hart, treasurer Quebec Railway, Light, Heat & Power Company and vice-president Three Rivers Traction Company.

Treasurer, E. P. Coleman, general manager Dominion Power & Transmission Company.

Auditor, C. B. King, manager London Street Railway.

Executive committee: The president, the vice-president, the treasurer, the immediate past-president (F. D. Burpee, Ottawa) and A. H. Foster, Brantford; G. Gordon Gale, Hull; D. W. Harvey, Toronto; D. W. Houston, Regina; M. W. Kirkwood, Galt, Ont.; A. W. McLimont, Winnipeg; M. A. Pooler, St. John, N. B.; W. R. Robertson, Toronto; H. E. Weyman, Levis; C. L. Wilson, Toronto.

JOINT LUNCHEONS HELD WITH ELECTRICAL ASSOCIATION

At the joint luncheons, which were held Wednesday, Thursday and Friday, a series of talks of interest both to the railway men and the electrical men were given. The first luncheon was presided over by G. Gordon Gale, vice-president Hull Electric Company. He introduced Mayor Napoleon Champagne of Ottawa, who gave an address of welcome. Following this there was a witty talk by Col. H. C. Osborne, who paid a striking tribute to the services of the engineers in the improvements that have been effected in the utility field through their efforts.

The Thursday luncheon was presided over jointly by P. T. Davies, president Canadian Electrical Association, and Mr. Blair. The speakers were H. T. Sands, vice-president National Electric Light Association, who spoke on public relations, and James W. Welsh, executive secretary American Electric Railway Association, who pointed out that traffic congestion in the larger cities is the greatest obstacle to street transportation. The electric railway industry must not be stampeded by the motor bus, he said, but must make public transportation more popular and private transportation less so by comparison. The electric railway should be the carrier of the people, and should keep a firm hold on the transportation business.

On Friday the speakers at the luncheon were George Oxley of the National Electric Light Association and Morris Buck, associate editor ELECTRIC RAILWAY JOURNAL. Mr. Buck spoke of the campaign of modernization which is now well under way in the United States and the work being done along these lines by the American Electric Railway Association and the technical press.

Thursday evening the delegates were guests at a dinner held at the Chaudiere Golf Club. The toast to the King was proposed by the joint toastmasters, Messrs. Blair and Davies, and responded to by the entire assemblage. Following this was a toast to "Our Guests," proposed by Major Burpee and responded to by the Hon. George P. Graham and P. D. Zimmerman of the N.E.L.A. "The Ladies" was proposed by Mr. Blair and responded to by Don M. Campbell. The final toast, "The Technical Press," was proposed by Col. D. R. Street and responded to by Acton Burrows, *Canadian Railway and Marine World*, and Dr. Walter Carr, *Electrical News*.

EXHIBITS A FEATURE

The exhibits this year were if anything better than those at the convention last year. Every space was filled and there were several outdoor exhibits of buses and the new one-man car of the Hydro-Electric Railways built by the Ottawa Car Manufacturing Company.

Among the exhibitors were: Don M. Campbell, Preston, Ont.; Canada Street Car Advertising Company, Montreal; Canadian Car and Foundry Company, Montreal; Canadian Cleveland Fare Box Company, Preston, Ont.; Canadian General Electric Company, Toronto; Canadian National Carbon Company, Toronto; Canadian National Safety League, Toronto; Canadian Porcelain Company, Hamilton, Ont.; *Canadian Railway and Marine World*, Toronto; Canadian Steel Foundries, Montreal; Canadian Westinghouse Company, Hamilton, Ont.; Cheatham Electric Switching Device Company, Louisville, Ky.; Crouse-Hinds Company of Canada, Toronto; Differential Car Company, Findlay, Ohio; Dominion Insulator & Manufacturing Company, Toronto; W. L. Donnelly, Ottawa; Economy Electric Devices Company, Chicago, Ill.; ELECTRIC RAILWAY JOURNAL, New York; *Electric Traction*, Chicago, Ill.; *Electrical News*, Toronto; *Electrical World*, New York; Ferranti Meter & Transformer Company, Toronto; Galena Signal Oil Company,

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Toronto; Inventions, Limited, Montreal; Lincoln Meter Company, Toronto; Lyman Tube & Supply Company, Montreal; Metal & Thermit Corporation, Toronto; Nachod Signal Company, Louisville, Ky.; Northern Electric Company, Ottawa; Ottawa Car Manufacturing Company, Ottawa; Railway & Power Engineering Corporation, Toronto; Reo Motors (Capital Motors), Ottawa; Sangamo Electric Company, Toronto; Sarnia Bridge Company, Sarnia, Ont.; the N. Slater Company, Hamilton, Ont.; Southam Press, Montreal; Spielman Agencies, Montreal; United States Steel Products Company, Montreal; the White Company, Toronto.

Welded Rail Joint Practice in Toronto*

How the Transportation Commission Has Welded 17,500 Joints in Two Seasons of Track Construction

BY A. T. SPENCER
Assistant to General Manager Toronto Transportation Commission

SINCE 1921 there have been welded on the tracks of the Toronto Transportation Commission about 17,500 joints, of which about 11,000 were in connection with new track construction and 6,500 in reclaiming joints on track which has been in service a number of years. The work done covers joints on 122-lb. grooved girder rail, 90-lb. grooved girder rail, 80-lb., 7-in. high T-rail and 100-lb. A.R.A. type "A" T-rail. Of the 11,000 joints welded on new work there have been no failures. Five or six joints, where old standard plates were used on old track, have failed. No failures have occurred on old track where new plates have been used.

Because of the amount of track rehabilitation and extensions which was done in 1921-22, the equipment owned by the commission is, of course, much more extensive than would normally be the case. It consists of:

1. Six machines of the dynamotor type mounted on road wheels. These are used chiefly for joint welding with the carbon arc.

2. Three metallic arc machines used chiefly for welding steel bond terminals. A very successful job of joint welding can be made with these machines, though the speed of welding is considerably lower than with the carbon arc. Tests carried out at the University of Toronto showed that as far as conductivity and strength were concerned the metallic arc produced just as strong a joint as the carbon arc.

3. One Burke welding outfit consisting of a Burke welding machine mounted on an old single-truck passenger car. It is of the dynamotor type and is connected for two operators. It is used chiefly for building up special track and cupped rail joints at night.

Five kinds of welding rods are commonly used, as follows:

1. 5/32-in. diameter bare low carbon rod with carbon content of 0.16 per cent used in metallic arc welding of drain plates, joint plates and building up cupped rail.

2. 5/32-in. diameter bare high carbon rod with carbon content of 0.58 per cent used for metallic arc welding of cupped and worn rails.

3. 5/32-in. diameter flux coated, low carbon rod with carbon content of 0.28 per cent used for metallic arc welding of steel terminal bonds.

4. 5/32-in. diameter bare low carbon rod, with carbon content about 0.10 per cent. These are standard electrodes for joint welding with the carbon arc and are also used in welding track drain plates and heavy welding repairs to steel castings or forgings.

5. 3/16-in. diameter coated manganese rod, known as Wanamaker rod, manganese content of about 14 per cent, used for repairing and building up manganese special track work.

In all welding, with the exception of building up manganese steel special work, the rail is positive.

The joint plates used in most cases have been 24 in. long of 1/4-in. mild steel, with carbon content of 0.25 per cent to 0.35 per cent, and are planed to fit accurately the fishing surfaces of the rail section. Four bolt holes are punched, this operation being done before the plates are planed, as otherwise humped joints or concave joints will result because of uneven fishing surfaces.

It is generally accepted that welding to the base of the rail should not be done where the base is less than 3/8 in. thick. In 1923 a number of joints were installed, using a 1 1/8-in. plate with the base chamfered so that the base weld would be set inward to where the rail base was the required thickness. Angle bar plates and continuous joint plates have also been used with good success by shearing off the base of the plate, but the writer believes that new planed plates will give the best results.

Considerable argument has arisen regarding the length of weld required and its location on the seams in order to give the strongest and most satisfactory joint. As this is now one of the matters under test, the writer will not express an opinion except to say that tests made in Toronto indicate that, in order to produce 100 per cent conductivity in the 122-lb. rail section, it is required to have four seams of from 20 to 22 in. long.

It is considered important that the welding on opposite seams should not end or begin opposite each other.

The use of the defining bar was discarded after a sufficient number of operators had been thoroughly trained. The hand-feed method is used, whereby the operator controls the arc with the welding handle in his right hand and feeds in the welding rod with the left hand. This was found to be the most satisfactory method both as to speed and quality of the weld.

In laying the track, the track gang is responsible that the fishing surfaces of both rail and plates are clean and free from rust before being bolted up, and the track at the joint is properly lined and surfaced before the welders begin work. The plates are drawn up tightly with four bolts and the welders are instructed not to begin their work if the joint is not correct as to line and surface. The joint surfaces will not always be found to be correct. Where the surface is good the order of welding is as follows: (1) Inside bottom seam; (2) outside bottom seam; (3) inside top seam; (4) outside top seam.

On concave joints the above order is followed, but the two top seams are tacked with spot welds each side of the rail joint after the bottom seams are welded. If the joint is found to be slightly convex, or where the surface is good but the rail noticeably undercut, the order is changed and work done as follows: (1) Outside top seam; (2) inside top seam; (3) outside bottom seam; (4) inside bottom seam.

Using from 175 to 200 amp. at 50 volts, the penetration secured is about 1/8 in. deep in plate and rail. By holding this current the welds obtained have proved stronger and more ductile than welds made with a higher current and deeper penetration.

The speed of welding is about 2 in. of seam per minute. On an average the speed secured over a day, including moving of machines and incidental details, is one to one and a quarter joints per hour.

After welding, the seams are brushed and the whole joint painted, after it has cooled, with water-proof black paint to prevent corrosion of the welded metal.

It is important that the rail surfaces at the joints be ground as soon as possible after welding and before car service is operated.

The allowable variation in rolling rail section at the mill is such that seldom will two new rails match perfectly. Sometimes even after rails are carefully ground to a true surface, car traffic will show that the work has not been done properly.

The writer believes that no type of welding or mechanical joint under service will insure entire freedom from cupping and that all types of joints must be watched. Should the receiving rail show signs of polishing it is almost certain that cupping will occur later, which, if not attended to in the early stage, may develop serious failure of the joint.

The writer also believes it is too often assumed, when a series of joints is completed, that all can be forgotten for some time, and he knows of no better example of when "a stitch in time can save nine" than in the careful watching and, when necessary, the giving of slight grinding attention to a polished receiving rail at the joint.

Regarding costs of seam-welded joints, it will be found that in the type of joint above described about 2 lb. of welding rod will be used per joint and that, including this and covering a series of joints, the cost of each, exclusive of plates, will average about $1.80 per joint, including mov-

*Abstract of a paper at the convention of the Canadian Electric Railway Association, Ottawa, June 11-13, 1924.

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ing of machines and delays, with operator's wages at 65 cents per hour.

In none of the joint welding done in Toronto has the rail been preheated before welding. It is interesting to note in connection with one set of joints sent to Washington for test by the American Bureau of Welding—and which was preheated before welding—that when subjected to the bending tests the joint apparently could not be completely destroyed, though perhaps in other respects it did not show up any better than other types of joints.

Problems of a Railway in a Medium Sized City*

Some of the Essentials that Will Help Make for Successful Operation in the Face of High Costs—Inducing the Public to Ride

By A. H. Foster
Manager Brantford Municipal Railway, Brantford, Ont.

THE small roads must look upon the large ones as their big brothers, and religiously consult the technical journals and railway associations for information concerning improved practices if they wish to run their properties as they should be run. I do not mean that all the good ideas emanate from the large properties, as I believe that as much adaptability and resourcefulness exist on the smaller roads.

Much depends on a proper roadbed. It is the first step in good railway operation. It will permit of higher car speed, lower maintenance costs to both track and rolling stock, smoothness and comfort in riding. I do not mean that it is necessary to indulge in the more expensive classes of construction or the heavy section rails now available, but I do mean the track construction should follow the best accepted practices, such as will fit the purse of the railway and meet the requirements of the rolling stock and possible volume of traffic. While there is much diversity of opinion as to the desirability of steel ties and monolithic construction in trackwork, I think the smaller roads, particularly, when required to lay permanent pavements will secure good results by the use of this type of construction. Some of the steel ties on the market secure their bearing practically under the base of the rail and for this reason will reduce the initial cost by thousands of dollars per mile over other classes of construction on account of the reduction in the amount of excavation and concrete required.

Under most conditions an 80-lb. rail is ample, an A.S.C.E. section for gravel or ballast construction and a high section rail for paved or permanent roadway construction. In most of our roads the wear on the rail itself has in the past not been the determining factor in the life of the track, but rather joint conditions have been the cause of failure. For this reason rails with a length of 62 ft. should be used, the extra cost over the shorter lengths being offset to a great extent by the reduction in the cost of splice bars, bolts, bonds, welding, etc.

A large part of track troubles are due to joint conditions. No reasonable expense should be spared and close attention should be given to this important item of track construction and maintenance. Most of the trouble originates in the loosening of the bolts in the splice bars, caused by improper fitting of the plates or perhaps by failure of the bolts themselves. There can now be purchased in Canada or the United States heat-treated bolts with tensile strength and elastic limit nearly double those of the ordinary low carbon bolt, and they should be used exclusively for railway work.

The electric welding of joints is now past the experimental stage and will prevent to a great extent the troubles usually met with. I think that no road is so small that the use of this type of rail jointing cannot be justified. Rail joints should also be ground so as to present an absolutely true running surface, which will prevent the battering and cupping of rail ends.

Curves are often laid by rule of thumb and to the requirements of gage only. This is a mistake, as much discomfort in travel, damage to rolling stock, and slowness of car movement can be avoided by properly laid out and spiraled curves.

Where car routes diverge, we have installed electric switches, and spring switches have been installed at turnouts so that our operators are not required to stop or leave the car. There has always been a dislike on the part of carmen to either stopping their cars to get out to turn switches, particularly if weather conditions are bad, or performing contortions with a switch rod through a hole in the floor.

While steel poles may be desirable, their cost usually prohibits their use except in the business sections. In Brantford we install cedar poles slightly longer than are actually required by the railway, leaving the upper portion available for our power and lighting utilities, which pay for this privilege.

Traffic Conditions and Requirements

In the smaller cities, street car riding may be in part due to necessity, but usually it is one of convenience and habit. All railways must cater to the short-haul rider, but the small properties almost entirely on this class of business. In most cities of say 50,000 population or under, a more frequent service is usually provided than can be justified by the traffic. Regularity is essential or otherwise patrons will walk.

It is not always possible to increase the average speed of our cars in keeping with the less congested thoroughfares encountered in the smaller cities, many of which give a 10-minute, or less frequent, service. This is caused by a variety of reasons. Stopping places have to be established at frequent intervals to encourage and accommodate short-haul passengers. Usually there exist considerable stretches of single track, operated with turnouts, making the movement of one car dependent on that of another. On account of the comparatively infrequent service it is necessary to establish transfer points where positive connections must be made.

A regular and easily remembered schedule is more efficient than an irregular one, although with closer headways. In other words a 10-minute service to meet all conditions is more profitable than a 9-minute or even an 8-minute schedule that might vary from time to time.

One-Man Cars a Necessity

In the class of cities I am referring to a service with reasonable headways can best be rendered by means of light-weight one-man cars. I am of the opinion that any conditions that permit of the use of small light-weight cars also will permit of one-man operation.

As to the safety of one-man car operation, during the past year, with an operation of more than half a million car-miles, we did not pay one cent for personal injuries and less than $100 for damage or collision claims.

Ticket Fares Desirable

On the rate of fare depends to a considerable extent the volume of business, and hence the amount of revenue. In the smaller cities there are greater limitations as to the amount which can be charged, as riding is not a necessity to a large percentage of the population. As a comparison in regard to the riding habit, the following figures are given:

City	Population	Revenue Passengers per Capita per Annum
Cornwall	7,382	88.0
Sarnia	14,637	79.0
Guelph	18,019	72.7
Kingston	23,954	36.8
Kitchener and Waterloo	27,491	93.5
Brantford	29,395	109.3
London	59,100	212.3
Hamilton	108,143	177.2
Providence	237,595	227.0
Indianapolis	314,194	272.0
Toronto	538,771	354.0
Cleveland	796,836	367.0

In this section of the country a 6-cent fare is about the limit that can be charged, as a larger fare would result in a reduction of traffic sufficient to offset the increased revenue from the larger rate. In Brantford, where a 6-cent cash fare is charged, more than 75 per cent of our riders use tickets, which may be purchased in multiples of 10 at the 5-cent rate, and we find that only transients or casual riders pay the cash fare. The benefits of tickets we believe are considerable,

*Abstract of a paper at the convention of the Canadian Electric Railway Association, Ottawa, June 11-13, 1924.

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as persons in possession of tickets already paid for will ride much more frequently than the cash rider. Particularly in one-man car operation the use of tickets is desirable as it facilitates the work of the operator, who is required to make a money transaction for only every 10 rides or more.

Delays Occasioned by Making Change

Even with a small ratio of cash riders, we considered the delay in making change of sufficient importance to give some thought to the matter, and if possible reduce the delay to a minimum. A 6 or 7-cent fare required that in making change five coppers were always necessary and we felt that any method that would lessen the operation of counting these five coins would be a step in the right direction. We found that there were on the market certain types of what have been termed "high-speed changers," that are inexpensive, light, portable and accurate and that any required number of certain coins could be ejected by a single operation without actual count and which could be adjusted to meet any usual requirements.

Equipment Maintenance a Serious Problem

Maintenance is a serious problem on a small road. With the large variety of work to be done, the volume does not permit of the employment of men whose duties are confined to one or two operations, but rather these men must be familiar with, and perform more or less individually, many classes of repair and maintenance work.

Usually the smaller the road the less spare rolling stock is available, and crippled cars must be placed back into service in the minimum time. To accomplish this, shop equipment must be chosen carefully, and although a large variety may not be justified, every shop should have at least a fair-sized lathe, a good drill, power hacksaw, shaper, pipe and bolt-threading machine, grinders, pit pump, blacksmith shop and crane, as even with local machine shops available for repairs, the cost and delay in getting work done prohibit their use to a great extent.

In the small shop many hundreds of dollars may be thrown away via the scrap pile, on account of the inability to repair broken or worn material. I know of no equipment that will assist more in lessening this waste than an oxyacetylene cutting and welding out fit and an electric welder suitable for shop and track use.

In certain cases, co-operation between railways not too widely separated as to distance will prove to be of value. I have in mind the Brantford and the Kitchener street railways, neither of whose operations would perhaps permit of the purchase of portable crossovers, so it was decided that one property would buy a left-hand and the other the right-hand turnout, and that work being done that would require their use should be laid out so as not to conflict.

Careful watching of the stores will result in appreciable savings for any electric railway. Usually the small or medium-sized roads have a comparatively large variety of rolling stock. Car purchases are made infrequently and standardization is sacrificed by the railway for the newer types of equipment. Frequently second-hand cars may be purchased with cheapness as the main consideration. A comparatively large variety of repair parts must be kept on hand and stocks must be kept at a minimum so as to not tie up a considerable amount of money, and that in the event of discarding or scrapping equipment, large losses will not be incurred by disposing of store supplies. Properties with much of the older styles of equipment find that in the event of materials on hand becoming exhausted great delay will be experienced in deliveries with attendant inconvenience.

As a general remark in closing, I would say that no efforts should be spared to have neat, well-informed, and courteous car operators, and clean, well-ventilated and well-heated cars if the good will of the public is to be retained, which is absolutely necessary if the railway is to be a success.

Midwest Association Has Lively Convention

Transportation Salesmanship, Taxation, Bus Operation and Traffic Problems Were Topics of a Well-Balanced Program of General Interest—Courage and Co-operation Urged by Railway Commissioner

"ANYTHING is possible when we have to do it. And your industry has reached the crisis in its career when the 'must' of the situation has become the dominant note. The public, whether it realizes it or not, must have street car service. It must be educated to that fact. You who are in the business must find ways and means of giving that service. . . . That genius for overcoming obstacles that has been a characteristic of American progress will find a way in your industry."

In these words, H. G. Taylor, member of the Nebraska State Railway Commission, and president of the National Association of Railway and Utility Commissioners, voiced the spirit that must dominate the thinking of the railway executive of the day. The statement was made in his address, printed elsewhere in this issue, delivered at the banquet concluding the first annual meeting of the Midwest Electric Railway Association, held in Omaha, Neb., on June 11 and 12.

Commissioner Taylor's address was a fitting climax to a meeting punctuated throughout by positive and progressive statements. In a paper presented at the first day's session F. G. Buffe, general manager for the receivers, Kansas City Railways, expressed the modern railway executive's creed of continuous and uninterrupted service. His paper is abstracted elsewhere in this issue. As a result of this same attitude manifested throughout the meeting, a spirit of optimism permeated all of the discussion.

Mayor J. C. Dahlman of Omaha welcomed the members of the association to the city on Wednesday morning. He said that transportation is one of the most important problems of the cities and the entire country and that faith, sound judgment and determination were required to cope with it.

St. Louis Traffic Problems

Taking "Traffic and Congestion" as his topic, R. J. Lockwood, assistant manager for the receiver, United Railways of St. Louis, described some of the traffic problems and the work for the relief of street congestion that has been done in that city. He pointed out the advantages to the riding public and to the railway of the widening of Twelfth Boulevard, which has permitted a track relocation eliminating six right angles and five blocks of route. The new traffic ordinance passed there last March confers on the traffic council power to regulate parking, establish safety zones, and to control traffic.

To give an idea of the St. Louis problem, Mr. Lockwood pointed out that the city proper has an area of 61.4 square miles, with 950 miles of streets. The population is 803,000, and St. Louis County has an additional population of 107,000, mostly adjacent to and commercially a part of the city. The towns in Illinois just across the Mississippi, with some 91,000 people, make a total metropolitan population of about a million people. Street railway service in the city and county is furnished by the United Railways, which has 37 car routes covering 483 miles of tracks. It operates daily 1,412 cars and handles a million and a quarter total passengers.

The principal traffic problem in St. Louis, said the speaker, is in the central business district, about one-half mile square. The streets in this area have roadways of 30, 36 and 50 ft., only three being of the latter width.

The population within the corporate limits of the city has increased approximately 40 per cent in 23 years, while the street car traffic has increased 109 per cent in the same period. As 80 per cent of all street cars terminate or pass through the congested district, an idea of the effect of increased street car travel on the traffic may be gathered.

The recent and acute factor in traffic congestion is the automobile. In 1917 there were 24,301 licensed automobiles in St. Louis; in 1918, 27,496; in 1919, 37,414; in 1920, 53,230; in 1921, 69,433, and in 1923 slightly more than 120,000. This is an increase in six years of approximately 400 per cent. Now there is an automobile for every 6⅞ people, as compared with one for every 30⅞ in 1917.

Another recent addition to traffic congestion is the bus, of which 72 are operating at present on four routes aggregating 20 street miles. About 80 per cent of this is on streets with street cars, and all four routes penetrate the

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congested district on Washington Boulevard between Twelfth Boulevard and Third Street.

In November, 1922, the department of streets and sewers checked the traffic entering and leaving the congested district on 39 arteries of travel for the 11-hour period from 7:30 a.m. to 6:30 p.m., and found the following conditions:

	Number	Per Cent of Vehicles	Per Cent of Passengers Carried
Street cars ..	12,342	10	68
Automobiles ..	69,509	59	25
Trucks and wagons	36,729	31	7

The total movement was 118,580 vehicles, or an average of 10,780 per hour.

The large number of automobiles for the number of people they carry is not their only serious contribution to street congestion. Harland Bartholomew, city plan engineer, estimates that in the congested district the streets afford parking space for only about 2,500 cars. When this space is filled the street area available for traffic movements is reduced 36 per cent.

The effect of the increased congestion just described on street car service has been to reduce the average schedule speed about 1½ per cent since 1917 and to increase street car-automobile collisions 17 per cent in the same period. Especially during the hours of greatest demand the street cars are getting behind schedule. Checks show that in a distance of some 1¼ miles on Washington Boulevard the cars are losing about 8 minutes, and for a like distance on Olive Street the cars are losing about 16 minutes.

The first order of the traffic council was to prohibit parking on Olive Street from Twelfth to Fourth Street and around the Olive car loop, except commercial vehicles, for a period of 15 minutes. The effect of this has been to speed up the Olive Street cars 33⅓ per cent in the congested district and materially to reduce the peak-hour delays.

The speaker stated that he agrees with Mr. Bartholomew in the statement:* "The provision of parking space in city streets is not a public obligation. The parked vehicle must give way to the moving vehicle." By eliminating parking during the peak hours more than 50 per cent additional roadway would be available for moving traffic, the moving automobile traffic would be reduced about 25 per cent and the street cars would be required to handle only about 2 per cent more passengers.

The speaker also agreed with Mr. Bartholomew's conclusion that expensive street rearrangements or subway construction do not in themselves constitute a solution of street congestion. One mile of subway construction in the congested district of Boston cost some $8,000,000, and the St. Louis street car traffic does not justify such an expense.

The street improvement plan was indorsed by Mr. Lockwood. Recently St. Louis voted $87,000,000 for civic improvements, of which $12,000,000, augmented by $8,000,000 secured by assessment against surrounding property, is to be devoted to street widening and other traffic changes. To fit the tracks to these changes will cost the United Railways approximately $1,500,000. The program will take ten years to complete, but when it is through there will be a system of major streets that, with proper traffic regulations, will improve conditions greatly.

*ELECTRIC RAILWAY JOURNAL, March 8, 1924, page 366.

ECONOMIC FACTORS IN CITY

Some of the more important economic features affecting street railway transportation were discussed in a paper by E. A. West, superintendent and chief engineer Denver Tramway. He stated that the time has come when railway managements must speak out and present their views frankly in discussing the many questions affecting the industry. He pointed to the dangerous congestion due to the crowding of the business districts of American cities, and stated that it is rapid transit of the masses by the electric railway that has made our cities possible. Certainly there is no other means of transportation in sight to supplant it.

The development of new suburban districts by electric railway extensions is no longer possible, as the automobile has introduced an element of uncertainty into the problem, making it necessary for the railway to wait until the territory is built up before extending into it.

The politician and promoter types of manager are gone, in Mr. West's opinion. In their place we have earnest individuals who are striving to give efficient service, recognizing that this is the only sound basis for the industry to work on. An awakened public conscience is making it harder for a certain type of politician and newspaper to use local public utilities for footballs.

While the street railway is a natural monopoly, there are many forms of competition, including the bicycle, the low-price taxicab, and the jitney. But the most disastrous form of competition the railways are up against is the private automobile. This will never be done away with, according to the speaker. Its effect can only be reduced by better service, by increased speed, by courteous, considerate treatment of the passenger, combined with the high cost of automobile operation.

The importance of good public relations was stressed by the speaker. Adherence to schedules, clean and well-painted equipment, good ventilation and heating, and good seating arrangements and lighting are advocated as means of furthering this.

In introducing new equipment, he felt that it should conform in general appearance with the old, as the general type of car has become known, and the patrons of the lines not favored with the new style cars will charge the company with discrimination. Cars can be remodeled and new cars can be added embodying the latest features of mechanical and electrical equipment and arouse no dissatisfaction, when the general outward style is retained.

It is beginning to look as if the automobile problem will take care of itself, according to the speaker. It is reported that already in some cities automobile owners are beginning to leave their cars at home and go back to the street cars. However, there is one phase of this auto situation that all of us must watch. As the situation now exists our peaks morning and evening are soaring higher and our valleys are going lower, and as you know, economically the cost of peak-load transportation is the highest because of the investment in power, rolling stock and buildings needed for peak requirements.

In considering the traffic congestion problem, in spite of all that has been said to the contrary, this matter can be introduced more smoothly, if solved by interests outside the street railway. It is a grave mistake, in Mr. West's opinion, for the management to take the lead in solving it. No doubt the street car company experts should be consulted, and without question will be called in to help out in the matter before anything final is decided. If the management is popular in a town, then it will be asked to participate in the traffic congestion study. If not popular, it won't be asked; and forcing a way in will make matters worse. We are concerned in the traffic problem, but perhaps not as much so as we think. These figures for Denver illustrate this:

AREA OF DENVER DOWNTOWN STREETS IN PER CENT	
Devoted to parked automobiles.....	22.8
Devoted to street car traffic.....	1.4
Available for automobile traffic.....	75.8

In the discussion which followed Mr. Lockwood compared the relative value of all-day parking prohibition with rush-hour restrictions only. P. H. Conroy said that none of the business streets in the average American city had ever been intended to carry the automobile traffic of the present day.

A careful distinction between economics and economies was urged by S. B. Irelan, vice-president and general manager St. Joseph Railway, Light, Heat & Power Company. Too much attention, he said, has been given by utility men to methods of making economies, and too little to the broader question of the economic value of more convenient, frequent and comfortable service with a rate of fare sufficient to provide such service.

F. G. Buffe said that there are many indications that the automobile problem is solving itself. This was held to be particularly true in the larger cities. Americans are notorious in going to extremes in any wave of development, and the wave of automobile use is even now beginning to recede, he claimed. As a result of the expense and danger of the automobile many who have been using it as an everyday convenience will again be excellent prospects as street car customers, provided that modernization of equipment and improvement in service have in the meantime made the street car ride sufficiently attractive.

Mr. West illustrated the results which could be accomplished by selecting the proper equipment for cars by citing the increased schedule speeds made in Denver. Schedule speeds prior to 1923 in that city averaged 9.7 m.p.h. including all dead time, layovers, etc.,

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and also including trailer operation. As a result of increasing the acceleration, and with little increase in the free running speed, the schedules were increased to 10.5 m.p.h.

Field of the Bus

"The Bus and Its Place" was the subject of a paper by Bruce Cameron, general manager for the receiver, Joplin & Pittsburg Railway, Pittsburg, Kan. He pointed out the difficulties and large expenses of constructing a new railway, as compared with the ease of establishing a bus line. The place of the bus, he said, is (1) in sparsely settled communities; (2) in new territory yet unable to support a car line; (3) on streets where there are no car lines, and yet where the car lines are near enough that new lines would not pay; (4) in large city parks where there are no car lines; (5) as miscellaneous feeders to existing car lines, where service is needed at certain hours or in certain periods of the year only. In all such cases he believes the buses should be operated or controlled by the railway in such a manner as to avoid duplication of service.

The interurban situation is quite similar, according to Mr. Cameron. There are communities that are built up around industries of short duration, that would not warrant the construction of rail lines. Also for pioneer work where there are no interurbans the bus can be used during an experimental period to determine whether railways will pay. Then, too, there certainly is a field for the bus as a feeder to interurban railways, he said.

An independent bus operator should not be permitted to operate along the same route on a city street as the car line, neither should a bus line be permitted to operate on a hard surface road paralleling an interurban line, for the simple reason that it is not sound economically—it destroys capital and is a repetition of service, to the end that neither makes any money—therefore, cannot exist.

Without question, buses are here to stay. They are operating and people are riding in them and will continue to do so. They should be taxed equally with the railroad, and pay their part of the expense, and should not be permitted to operate without certificates of convenience and necessity, and under the regulatory bodies, the same as the railroad, and then and in that case a few years will tell us what the traveling public wants—rail or rubber, and until this is settled both systems of transportation, with rare exceptions, will continue to lose money.

In the discussion, Mr. Buffe said that there was no question of the usefulness of the bus under certain conditions for feeder or auxiliary service, but that the application of this form of transportation must be approached as an individual problem for each community or district under consideration.

Mr. Irelan said that the operation of buses by electric railways may be expected to raise a question of a common fare for both buses and street cars with transfers between them. In addition, he said that when the railways begin to operate buses in conjunction with the rail lines, the question of paving costs soon comes up and there is a tendency to demand that the railway pay the cost of paving. Mr. Campbell discussed the advisability of cooperating with independent buses by allowing them to use existing railway terminals so as to make them feeders to the interurban lines.

The A.E.R.A. Modernization Program

R. F. Carbutt, railway engineer H. L. Doherty & Company, New York, and regional vice-chairman of the committee on city operation of the American Electric Railway Association, prefaced his paper on "Bringing the Latest and Best to Railway Men" by saying that the industry is coming back only in spots, here and there, because many properties do not make use of the modern and efficient methods which are developed on individual properties. Mr. Carbutt's paper is abstracted elsewhere in this issue.

The street railway industry is today burdened with indirect taxation amounting to around 10 per cent of the gross, is the conclusion of S. B. Irelan, vice-president and general manager St. Joseph Railway & Light Company, St. Joseph, Mo., in a paper on "The Indirect Tax and the Street Car Ride." In addition to the federal, state and local taxes that are paid by all corporations and individuals, public utilities are perhaps taxed heavier under this form of tax than any other class, said the speaker, as in the past the utility business has been considered very prosperous.

There are in addition a number of special taxes on utilities and on street railways in particular, such as taxes on intangibles, franchises or easements, gross receipts and net receipts. These are in addition to the taxes levied on other business, corporations and individuals.

Other indirect taxes consist of many service burdens; paving construction, repairs and maintenance; street cleaning and sprinkling; snow removal; bridge and culvert construction and maintenance; licenses for cars, wires, track, poles and advertising; free transportation of police and firemen; and in some states a special tax for the support of the public service commission.

The speaker stressed the importance of the paving burden, stating that the industry actually is investing 3.5 to 4 per cent of its gross revenue in interest charges and replacement of paving alone.

The conclusion of Mr. Irelan was that now is the time for the industry to present its argument and facts to the public toward the elimination of these indirect and unusual taxes. In this movement, he said, the Midwest Electric Railway Association should aid by presenting the facts uniformly to the proper state officials.

In the ensuing discussion Mr. Lockwood said that the United Railways of St. Louis had paid out 12 per cent of its gross revenue last year in taxes of one kind and another, including maintenance of paving. In describing conditions in St. Louis, he said that the company is required to make the investment and pay the interest charges for paving the 17-ft. strip in the track zone, and then is required not only to maintain this paving, but its cost is added to the capital account of the company, and is again assessed in the form of general taxation.

A form of indirect taxes of unusual interest was described by Mr. Buffe. He said that the practice in Kansas City is to charge the company one-third of the cost of construction of bridges and viaducts. Mr. Welty cited a unique argument which had been used in Omaha to answer the railway company's requests for relief from paving burdens. In this case, he said, one of the reasons advanced for having the railway continue to pave its right-of-way was that its paving was so much better than that put down by contractors for the city, that it was of advantage to the city to have the company continue paving its strip.

Future of the Interurban

A paper on the past, present and future of the interurban railway was presented by Charles W. Ford, general superintendent Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo. He traced the history of the interurban through its early stages, showing how many roads were projected and built without sufficient justification from a financial standpoint.

Since 1914, he said, there have been practically no new developments, and few extensions to existing lines. This, however, is an indication that the wildcat promotion days are past.

Additional sources of revenue have been developed by the interurbans, such as express freight and carload freight. Increased fares and increased passenger traffic also have assisted in allowing the companies in the Middle West and Southwest to show reasonably good operating reports.

As to the future, Mr. Ford feels that the bus and the truck are not going to replace the interurban railway, as it is the cheapest and most dependable mode of travel between cities in well-developed territory. Regulation of competition will come in due course, and with the advent of lighter cars the riding can be increased and headways shortened. Freight, particularly in carload lots, should be solicited, and industries should be encouraged to locate along the lines.

Mr. Ford's paper was discussed by a number of those present. Increasing competition from private automobiles and buses was held to be forcing the electric railroads in many locations to depend more and more on freight hauling as a source of revenue.

Revision of the Constitution

A committee consisting of R. J. Lockwood, chairman; R. B. Campbell, Bruce Cameron and Otis Turner of St. Louis reported on certain revisions of the constitution of the association. The most important of these was the provision for three regular meetings per year, and the inclusion of the grade of honorary membership. The recommendations of the committee were adopted.

Reports of the retiring president and of the secretary-treasurer showed the association to be in a healthy financial condition at the end of its first year of activities. President D. L. Fennell,

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superintendent of transportation Kansas City Railways, said that one of the objects in the organization of the association had been to give department heads and subordinate officials of the various companies an opportunity of getting better acquainted with the general problems of the industry and of taking part in the proceedings and discussions.

Officers and members of the executive committee for the ensuing year were elected as follows: President, Charles W. Ford, general superintendent Kansas City, Clay County & St. Joseph Railway; vice-president, E. Stenger, receiver the Denver Tramway; secretary-treasurer, J. A. Weimer.

Members of the executive committee: Two-year term, S. B. Irelan, R. A. Leussler, R. B. Campbell and D. L. Fennell; one-year term, H. B. Cobban, F. G. Buffe, R. J. Lockwood and A. E. Reynolds.

The executive committee held a meeting immediately after adjournment of the general session and elected R. J. Lockwood as chairman.

On Wednesday evening the association was entertained by the Omaha & Council Bluffs Street Railway at a dinner given in the Omaha Athletic Club. This was followed by a theater party in which the members of the association were the guests of the local railway.

Service and the Man Who Sells It*

BY F. G. BUFFE
General Manager for the Receivers Kansas City Railways

THE Rotary Club motto, "He profits most who serves best," is particularly applicable to the street railway industry. Although we are in the selling business, we cannot be compared with the salesman who was happy because he made one sale every five years, his business being the selling of suspension bridges. We sell our product to every man, woman and child in the community an average of 275 times a year. We have 26 opportunities a month of making a friend of every citizen, and it is too often the case he will remember the one time when service was poor and forget the 25 times when it was good. We are in a different position from any other utility that sells service because we come in daily contact with our customers, under trying conditions. The light, gas and water companies render a monthly bill, whereas we collect at the time service is rendered.

There are other factors that make it difficult to please our patrons. We are living in a rapid age, dealing with a public educated to speed and rubber tires. This induces a psychology which affects us adversely. Our customer has been educated to believe that street car service is not rapid. The noise, the stops and starts tend to irritate him. There was a time when the street car was the fast means of urban transportation. The average man does not take into account that, all things considered, due to traffic congestion and parking difficulties, street car speed on the average is as good as the automobile, because he does not get the same sense of motion that he does in the automobile.

The street car business today is competitive, not so much with other public conveyances, but it has to meet competition of the private vehicle and overcome an adverse mental condition. The claim that our transportation service is the best—on the average the fastest, cheapest, the most convenient and the safest—is no longer accepted as a fact but requires proof and salesmanship.

The industry magazines of the last few years are full of articles on merchandising transportation selling service, training employees, proper publicity, and other methods of overcoming this mental hazard, and the time of our meetings and conventions is largely occupied with similar subjects. We have been forced to add an up-to-date sales department to an organization which in the past has been entirely concerned with operation and the manufacture of service. Some companies have gone so far as to add commercial managers. The weekly pass, which is an effort to wholesale transportation, is being tried.

Street railway service naturally falls into two divisions, one which the public sees and with which it comes in contact, and that part behind the scenes of which the public has but a hazy idea.

The public judges service by the cars; the riding qualities of the track, the headways and load conditions, and the appearance and actions of the trainmen. These are the show windows. Our patrons do not come in contact with the average two men per car behind the scenes. They do not realize the investment in shops, power plants and distribution systems, nor do they have any concrete idea of the tremendous organization and the constant effort in the background which is just as vital.

Such a situation has a tendency to reflect itself in the organization itself. It is comparatively easy to convince a platform man that part of his job is selling service, but sometimes difficult to convert the shop man to the idea that he is similarly engaged. The public to him is remote, and there is no direct contact, no immediate connection.

We of the street railways, regardless of our jobs, whether in the office, on the platform or in the pits, must work for just one end—transportation. Every other activity of necessity must be subordinated to this one objective. A track department may have ideas on track, the proper time for construction, temporary service, etc., but its ideas must in the end conform to good transportation service. In Kansas City we allow ourselves only 5 per cent of our total equipment out of service at any time for all shop and mechanical purposes. It would be easier to work out a shop schedule based upon 10 per cent, but to do so would not permit us to give our standard of service, so the shops have to do the necessary thing and adjust their program to transportation needs.

The first essential in training this sales force behind the scenes is to educate and instruct supervisory officials. It is surprising how much effort is needed along this line. Too frequently is it the case that foremen, dispatchers, inspectors and those officials who come in most direct contact with the men under them, and upon whose shoulders falls the immediate responsibility of carrying out orders and policies, do not get the inspiration that comes from contact with others in the same work in other cities by attending meetings and visiting for purposes of comparison. Very often, due to an insufficient number of supervisory officials, their work is of a nature that leaves but little time for reading or development. All this is wrong, and happily is one of the conditions that gradually is being corrected in the industry. Salaries should be commensurate with those for equal responsibility and effort in other lines. There should be every effort to bring technically trained young men into the industry.

The training of the supervisory force should not stop with department heads, but should be carried down until every man who exercises authority in any degree has been thoroughly imbued with the spirit of salesmanship and the ideal of service.

How often does one hear a stranger say: "You have the finest set of men I ever saw," or the reverse? A surly, slovenly transportation force is the quickest route to public condemnation. Transportation salesmanship requires among many others some of the following qualities: Neat appearance; a pleasant smile and manner; tact in enforcing fare and transfer regulations; helpfulness to passengers, especially old women and children; good judgment; a thorough knowledge of the city, routes, transfer points, etc.; a pride in his job and in his company; the conviction that he is a salesman selling a necessary service but at the same time a competitive one.

Employees in other departments should understand that they are the company's representatives both on and off duty; that poor work in any branch in the end means poor service. They should get the spirit of public service and realize in every operation they perform that they are quasi-public servants.

COMPANY PUBLICATIONS HELP

Company publications are very effective if properly edited and prepared. Such a publication cannot be all lectures and good advice. It must be snappy, entertaining, provide good reading for the employee and his family, promote a co-operative spirit, and develop an organization morale. It must be a newsy magazine devoted to the organization and its doings, and must be written from the standpoint of the employee rather than that of the company.

Practically every company today has some form of committee system, either

*Abstract of a paper before Midwest Electric Railway Association, Omaha, Neb., June 11-12, 1924.

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union or non-union, and it is a mistake to allow this elaborate machinery to function solely for the adjustment of grievances and the settlement of wage disputes. Every proper matter of policy that affects operation or the employee, directly or indirectly, should be brought before and worked out by these committees. The men should understand that they are vitally interested in all the operations of their company; that their advice is valued and their co-operation required.

Give Praise for Meritorious Work

Don't be afraid to praise your organization. When some big thing has been accomplished, encourage and foster the spirit that your particular organization is the best in the country. If the organization has done a meritorious thing—has handled unusual crowds—has operated with a low accident record—say so. Let the men understand that you realize these things are not done solely for a money return but because they are proud of their organization and the service they are rendering.

One of the most effective methods of getting the sales and service idea over is by personal talks to the men by company officials. They bring in the personal touch and are more effective than the printed page. We are all humans, all on the the same payroll, and all working for the same purpose. Give me the friendly organization every time for results.

Bringing the Latest and Best to Railway Men*

The Use of Modern Methods in All Departments of the Electric Railway Is Advocated—Don't Be Afraid to Copy Good Practices Even Though They Are Not Original

By R. F. Carbutt
Railway Engineer H. L. Doherty & Company, New York

IN CONNECTION with the work of the American Electric Railway Association committee on city operation, I have been impressed with a situation which exists in our industry. This I shall attempt to analyze on the basis of the observations made in visiting various railway properties in New York State and New England. The situation to which I refer is that generally, as an industry, we do not make use of modern methods of electric railway operation that are in effect here and there throughout the industry.

Information regarding modern methods is collected and disseminated by Electric Railway Journal, *Electric Traction*, *Aera*, by committee reports and papers. We discuss them in our conventions and meetings such as you are holding here in Omaha today, but we don't put them into general effect. The modern methods to which I refer are not the ones that require a large expenditure of capital. Up to date, from New England and New York State alone, I have received seventy comprehensive one-page descriptions of modern methods, only a very small number of which require the purchase of new equipment. They are modern methods of securing public good will, of developing good relations between management and employees, of training personnel, of popularizing electric railway service, of securing economies in operating and maintenance practice and of securing relief from paving burdens and other imposts.

Use Methods Tried by Others

You say "Why copy the ideas of others, why not be original?" Originality is, of course, highly meritorious. We should be looking for the new ways of doing things. But lots of us can benefit merely by applying to our own property modern methods proved feasible and profitable by others in our industry.

We should not be backward, either, in putting it up to the manufacturer of the materials and equipment we use to give us better and more efficient and less costly materials and equipment for use in electric railway transportation. But we have not begun to scratch the possibilities before us until modern methods in use here and there are widely used in the industry.

Apply Modern Methods to Present Systems

I do not mean to infer by anything I have said that adopting modern methods means discarding our present general scheme of providing transportation by the electric street railway and electric interurban railway. I am not opposed to the use of the gasoline passenger bus or the interurban bus by the electric railways, and do not hesitate to recommend its use where it is economically justified, but I believe in co-ordinating the gasoline bus with electric railway operation, and not in the substitution of the bus for the latter.

I could give you many specific references to prove that what we need is the adoption of modern methods in the operation of our present systems, but for the sake of brevity and to emphasize the fact that the condition just referred to does exist, permit me to quote from the 1923 report of the Charles A. Coffin Prize Committee, composed of C. D. Emmons and James H. McGraw:

"From the representations of the winning company, the committee finds that on this property there have been carried to fruition most of the things that have been talked about for years as the remedies for various troubles. On this property the remedies have not only been talked about; they have been executed. Thus the winner stands out as a railway that has largely accomplished the task of gaining public good will, of merchandising transportation, modernizing service and equipment, improving the financial structure, and so on. There is no one great achievement on which the committee has based its award, but rather upon the accumulated results of a great many small accomplishments."

Mr. Budd did not claim originality of methods for the Chicago, North Shore & Milwaukee, but merely the use of modern methods we have talked about. In expressing his appreciation and thanks for the award of the Coffin Prize on behalf of the Chicago, North Shore & Milwaukee Railroad, Mr. Budd said in part:

"We have done little that is unusual, and little that is original. Practically all our methods are methods and engineering practices that are discussed in this great American Electric Railway Association and in its committee meetings. We have simply taken advantage of every opportunity that presented itself to modernize and make popular electric railway transportation."

Efficient, Humanized, Personal Service

Doubtless this same policy of adopting modern methods in use here and there accounts for the recent success of another company directed by Mr. Budd, the Public Service Company of Northern Illinois, in securing the Coffin Prize for distinguished accomplishment in the light and power field. Many inspiring things were said at the 1924 National Electric Light Association convention in Atlantic City and many methods advocated that showed great care in their preparation, but a few words uttered by Mr. Budd at the N. E. L. A. convention this year gave me a thrill and stand out clearly in my memory above the expressions of other speakers. In accepting the Coffin Prize from President Johnson Mr. Budd regretted time did not permit him to tell a little about the winning company, but he said the company he represented "was endeavoring to give an efficient, humanized, personal service." That statement is a very broad one and summarizes in a few words what might have been profitably elaborated into a very lengthy description of methods, policies, activities and efforts. I have tried to visualize, many times, since hearing that expression, what it would mean to the banking credit of the electric railway industry if we were all giving an efficient, humanized, personal service. The unregulated competing bus and even the private automobiles would not present the problem they do today, if we all gave that kind of a service.

My sympathies are entirely with the electric railway operator, and I appreciate fully that no class of men give of their strength and personal sacrifice for the service of the public to the extent that he does. I want to suggest a reason or two for the lack of a more general application of the many improved methods developed by individual properties.

Now just why does this condition exist? One reason is because most railway organizations have been cut down to a skeleton form during the

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economic pressure of the World War and post-war period. The result is that the average street railway and interurban company does not have free lances on its staff who have the time and the funds at their disposal to investigate the modern methods being used and apply them to their property. In many cases there is no one available even to review the trade journals and work up the application of modern methods were described.

Special Committees Can Help

And now what is the remedy that may at least be of some help and can be of great help if properly used? Through the suggestion of the man who has been winning these prizes a committee was appointed last November to make a survey of the entire street railway and interurban industry, throughout the entire United States, with the object of collecting a description of modern methods in use and disseminating this information throughout the industry.

In the case of some companies, of course, this will not suffice. It will be necessary and advisable for some of us to call in specialists to study our situation thoroughly, diagnose our ailments, and prescribe remedies after careful and due consideration of all the facts in the case. But many of us will be able vastly to improve our situation if we will use the information Mr. Budd's committee is collecting and apply the methods to our own property.

The handbook the committee is preparing will consist of one-page summarized, comprehensive descriptions of each modern method called to our attention so they will not be burdensome for you to read. You will be able to use this handbook to check against your own operation and see just how modern you are.

The result of all this will mean that the small company which does not have free lances on its staff with the time and funds at its disposal to investigate the modern methods used by others will have part, at least, of this service made available to them at a very moderate cost.

Some Have Lost Faith

Another reason the condition referred to exists in the industry, that is, modern methods not universally used, is, I believe, that some of us have lost faith in the soundness of our electric methods of handling transportation and we don't bestir ourselves to keep modern. Psychology has had a lot to do with the situation. Some of us have listened and believed some of these false prophets that have told us we were all wrong and sick and about to die.

These false prophets overlook the fact that the conditions are not the same in the application of the two general systems where the gasoline bus is recommended to supersede the electric street cars. If gasoline buses are to be operated by a number of irresponsible people, of no financial standing or credit, not required to give continuous service, over definite routes, at stated intervals and during all seasons; not required to protect passengers from damage and accidents; unregulated as to accounting system; permitted to charge a higher rate of fare; relieved of paving, snow removal, sprinkling and cleaning streets, burdensome taxes and other imposts; of course they can compete with the electric street car.

Instead of believing these false prophets let us believe men like Peter Witt and Henry L. Doherty.

In an interview in the June *Aera* Peter Witt is quoted as follows:

"I am not worried about the future of the street railways. Economic law rules the roost—the most efficient and most economical facility for any particular purpose survives. Vehicles mounted on steel wheels running on steel rails are moved at least expense and with greatest speed. That's why the street cars will continue to carry the crowds, and why the bus and private automobile are not going to put them out of business. Street railway operators must make their service more attractive, their cars more commodious and comfortable, and city governments must co-operate with them."

In the annual financial review, supplement of the New York *Tribune* for Jan. 7, 1924, Henry L. Doherty, commenting on the railway's return to prosperity, was quoted as follows:

"The street railway business received a severe jolt by the high level of prices for labor and material caused by the war, but these companies are gradually getting back on their feet. The business is still intrinsically sound, and can supply service to the public at a price the public can afford to pay, and well below the price which would have to be charged by any other form of transportation where the same service is rendered."

To summarize the one thought I have attempted to convey, let us universally, as an industry, have faith in our electric street railway and electric interurban scheme of handling transportation; apply modern methods to their operation; co-ordinate this service with bus operation where economically justified; and in every community, attempt to give efficient, humanized, personal service.

Welding Shops and Electric Rolling Stock Discussed by A. R. A.

At the Atlantic City Convention of the American Railway Association Mechanical Division, Just Closed, Reports Which Have Points of Particular Interest to Electric Railways Were Made by Several Committees—Electric Locomotives Discussed

SESSIONS and exhibits for the mechanical division of the American Railway Association were held at Atlantic City, June 11 to 18. Some of the committee reports presented have sections of interest to electric railways and these are abstracted herewith.

Autogenous and Electric Welding

The report of the committee on autogenous and electric welding contained several plates showing the effects of welding on the metal in the tread and flanges of wheels and the structural transformation of axles. In the case of electric welding of steel and steel-tired wheels the difference in physical properties found at different depths from the point of application of the metal is evidently due to the order in which the various layers of filler metal were applied. The hardest zone is produced under application of the filler metal while the base material was relatively cold, acting thereby as a more severe quenching medium against the zone heated by the arc of welding than in cases where the tire had been to some extent preheated by previous heat of welding. In this case the maximum increase in hardness and strength of the base material, due to the transformation of the structure by welding, was approximately 40 per cent and the hardness of the applied low carbon metal was approximately 55 per cent of the original hardness of the tire material.

The structural transformation of tires by gas welding showed a reverse condition, inasmuch as the heat imparted to the base material has a slower penetration than the electric arc, and instead of increasing the hardness and strength in the transformed zones, the physical properties were lowered as a result of annealing by the slow application of the heat. The maximum decrease in physical properties of the base material by gas welding amounted to approximately 24 per cent. The hardness of the filler metal itself is approximately the same for the gas and the electric weld, but the gas weld shows distinct decarburized zones forming the junction between the applied filler metal of the base material. Similar conditions were found for rolled steel wheels.

Welding of steel and steel-tired wheels will invariably cause a distinct local change in structure with resultant internal stresses unless the material is properly preheated and annealed after welding. It has to be considered further that the applied filler metal, either carbon or alloy steel, has, in most cases, different hardness and physical characteristics than the base material; moreover, with the gas welding process a pronounced decarburized area is formed between the base material and the filler metal. For this type of welding it is very probable that the filled-in areas will slough out readily by parting along the decarburized zone. Against this the electric weld has the pronounced disadvantage that unless a rather deep penetration of the heat is obtained, with consequent increase of internal stresses, the filler metal will not adhere properly. The committee holds that there is no doubt that if welding of this kind would be permitted rulings as to proper preheating and annealing would in a large number of cases be disregarded, and wheels and tires in a state of high internal stresses

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would be placed in service, with the result that failures directly due to the welding would occur.

Welding of Axles

A similar condition of structural transformation due to welding exists on axles where the carbon ranges above 0.30 per cent. The transformation in structure with corresponding internal stresses at points in an axle where bending stresses of any magnitude occur will readily permit development of detail fractures, and welds can, therefore, not be permitted on any part of the axle, with the exception of the building up of end collars, where practically no bending stresses exist. Such welding may be done by the electric welding method without preheating or annealing. The gas method is not recommended unless it is controlled so as to avoid the possibility of excessive heating during welding, which may, if not properly controlled, cause transformation of the structure at the point where bending stresses occur.

The report of the committee illustrated the service failure of a railroad motor car axle on which the inner fillet of the journal bearing had been rebuilt by the electric process. The fractured face showed a distinct progressive failure starting from the zone of applied filler metal. The longitudinal etching showed the pronounced structure transformed which caused internal stresses, evidently the direct cause of development of rupture. The pronounced structural transformation indicated that the axle was not preheated or annealed after welding.

On low carbon steel the transformation of structure due to welding heat is not very severe, and while it is desirable to remove all local transformation of structure by annealing, in a number of cases the service stresses of the welded member are such that welding may be done without subsequent annealing. The general rule, however, applies that on account of the more gradual heat applied by the gas welding method the transformation in structure is less abrupt and the internal stresses imparted to the material are, therefore, not as severe as those obtained by the electric welding method. Moreover, the fusion obtained by the gas welding method is better and the filler metal shows less slag and oxide inclusion than that applied by the electric welding process.

While it is possible to weld, with relative small reinforcement, wrought iron by either the gas or electric method, so that the yield and ultimate strength closely approximates the strength of the bar itself, the filler metal shows practically no ductility. Fatigue tests on specimens of uniform cross-section, welded and non-welded, wrought iron bars, tested under identical conditions of deflection, showed the resistance of the welded section against vibratory stress to be approximately 50 per cent of the non-welded bars, gas welds being slightly superior to electric welds. Good quality area caused the vibratory fractures in practically all cases to occur through the base material adjacent to the reinforced section, at about the same number of deflections as were obtained for the non-reinforced welds. This is evidently due to localization of bending stresses caused by increased stiffness of the reinforced section. Therefore on wrought iron where the resistance to vibratory stresses is of prime importance, such as in arch bars, welding of cracks cannot be permitted, according to the report. Worn places may be built by either the gas or the electric welding method, provided the original cross-section of the bar has not been reduced below a specified minimum. Where the built-up parts are subjected to vibratory stresses it is preferable to anneal subsequent to welding.

All cast-iron parts, except cast-iron wheels, may be welded. The gas welding method should be used wherever possible. Welds of 100 per cent strength, without reinforcement, can be obtained readily by proper preheating, using cast-iron welding sticks.

Welding of flat spots on cast-iron wheels produces a similar condition as is found on welded wrought-steel wheels and tires. The welding heat causes a distinct change in structure of the material adjacent to the weld. Moreover, on account of the relatively high internal stresses which exist in all chilled cast-iron wheels, such welding could only be done by careful preheating of the wheel followed by uniform cooling, inasmuch as heat locally applied would readily cause cracks through the chilled area like those produced by excessive brake-shoe action, or even entire rupture of the wheel. The filler material itself would be much softer than the chilled portion of the wheel, and a filled-in area would offer little resistance to wear. It is doubtful that cast-iron wheels would be properly preheated and cooled when welded, hence wheels in a state of highly unbalanced stresses might be placed in service. The committee therefore recommends that any welding on cast-iron wheels be prohibted.

In general, it may be stated that welding or heat cutting will impart internal stresses to the base material which are in approximate direct ratio to the carbon content and in inverse ratio to the original temperature of the base material. These stresses are produced by the local transformation of structure, which is caused by heating the surface metal to a temperature above the recalescence point and the underlying cold base metal acting as a quenching medium. With normal conditions any detrimental effect on the base material can be removed by subsequent annealing or sufficiently high preheating. Welding or heat cutting of medium or medium-high carbon steel should, therefore, be done only under careful supervision, and in no case should any such welded or cut material go into service without full assurance that after these operations were performed the entire part was annealed at a temperature above the recalescence point of the steel or that the affected zone, which increases in depth with the increase in thickness of material, was removed by machining.

The committee recommended that the welding of cracks or fractures be not permitted on such parts as air reservoirs, brake levers, drawbars, steps or step straps, and wheels.

Specifications for welding wire submitted as recommended practice were drawn up to cover the usual grades for electric and gas autogenous welding. These were prepared in co-operation with the American Welding Society. No attempt was made to cover welding wires for certain special purposes, as it was felt that these special grades of wire might not be applicable to the general purposes and would cause confusion among users, if included in a general specification.

Wheels and Wheel Mounting

The report of the committee on wheels contained information in regard to the application of new specifications adopted last year for cast-iron and rolled steel wheels. Considerable information was also given in regard to developments in cast-iron wheel design and cast-steel wheels. Since at present the manufacture of cast-steel wheels involves a patented process, the committee did not feel that a standard specification should be issued now.

The type of wheel mounting gage used by the railway association has been subject to considerable criticism during the past year. This mounting gage was primarily designed for use on cast-iron wheels, and when used on steel wheels special conditions are found to exist which make it unsatisfactory.

Where two sharp-flanged wheels are mounted together use of the standard gage results in improper mounting. That is, when the wheels are turned they will be found to be spaced too wide. This practice of mounting two sharp-flanged steel wheels is common practice on many roads, as they dismount sharp-flange wheels to re-mate, in order to save metal on mated wheels.

The opinion of the committee as to the proper way to mount rolled steel wheels is to use a spreader gage, such as is used in mounting locomotive tires. This gage should be 53⅜ in. long. The committee does not recommend that this be made a standard gage of the association, but suggests that the individual railroads equip themselves with gages of this type for checking the mounting of rolled steel wheels.

The standard steel wheel gage adopted in 1923 is gradually coming into general use. Generally speaking, this is giving satisfactory service.

Electric Rolling Stock

The report of the committee on electric rolling stock contained a summary of answers to questions covering the period for inspection and repairs which showed eight roads favoring mileage, one favoring hours or days in service and one favoring input. Two others recognized power input as a factor but considered mileage more practical. The wide variation of mileage specified between periods of inspection and repairs indicates the difficulty in establishing definite figures. Five roads reported in favor of daily inspection and five against it. At present all roads practice the customary daily inspection and a more or less perfunctory electrical inspection to determine whether or not the equipment responds to various control operations.

The report of the committee on design

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of shops and engine terminals included answers to questions regarding the serving of machine tools by traveling cranes, which indicated that the consensus of opinion is that a traveling crane should serve all the largest machine tools. A study of replies to a question in regard to location of locker and washroom indicated that the majority of shops which do their work on the first floor also have their lockers and washrooms on the first floor or in an outside building. Practically all the shops that do their work on the balcony have lockers and washrooms on both floors.

Electric Locomotive Discussed

Following the paper on electric locomotives by F. H. Shepard, Westinghouse Electric & Manufacturing Company, which was abstracted in last week's issue of the JOURNAL, J. A. Carmody, New York Central, presented some facts in regard to the performance of their locomotives. He said that now, after 17 years of passenger service, the original 35 Type S locomotives are about to be shopped for general overhauling. During these 17 years the 35 locomotives have made an average of 450,000 miles each or approximately 2,200 miles per locomotive per month. The average cost for maintenance, including inspection, repairs, renewals and painting, has been about 6 cents per locomotive-mile. It is estimated that the cost of general overhauling will be about $12,000 per locomotive. The additional 12 locomotives purchased in 1908 have been giving equally gratifying results.

A comparison of advantages of electric versus steam locomotives was given by W. L. Bean, New York, New Haven & Hartford Railroad. He said that the first group of 40 electric locomotives purchased by his company are about 17 years old and have run approximately a million and a half miles. They are still used in heavy express service.

Southern Equipment Men to Meet at Erie

THE regular July meeting of the Electric Railway Association of Equipment Men, Southern Properties, will be held at Erie, Pa., on July 23 and 24. The first day of the session will be spent in discussing various problems that are common to these railways, and exchanging ideas. The second day of the meeting will be spent in inspecting the local shops and carhouses.

Wyoming Association to Meet

A TWO-DAY convention of the Wyoming Utility Association will be held at the Elks Club, Casper, Wyo., June 23 and 24. Among the papers the following should be of interest to electric railway men:

"The Motor Bus as a Public Utility," by William B. Cobb, Casper; "Uneducating the Public," by George E. Lewis, Denver, Col.; "Winning Public Confidence," by C. L. Titus, Cheyenne.

Recruiting Transportation Employees*

One of the After Effects of the War Has Been a Noticeably Reduced Efficiency of Transportation Employees—Present Methods of Their Engagement and Discipline Are Described

By D. PRINS
Transportation Engineer Brussels Tramways, Brussels, Belgium

THE thirty-one companies which replied to the data sheet sent out by the association report lower efficiency and less regard to discipline among transportation employees than before the war. This is shown in the larger number of accidents, higher consumption of energy in car operation, waste in material and carlessness in fare collection. The subject will be considered under four heads, namely (1) motormen, including chief motormen, (2) fare inspectors, (3) conductors, (4) a special report on the supervision given to motormen by the Brussels Tramways Company, especially in connection with the subject of energy consumption.

Motormen, Including Chief Motormen

Practically all of the companies replying report the employment of chief motormen, as well as motormen. The number of chief motormen on the different systems varies greatly, but the following are typical: Amsterdam has 25 chief motormen to 304 cars and 10 buses, or an average of one to every 12½ vehicles. Antwerp has an average of one chief motorman to every 43.2 cars, Brussels one to every 33 cars and Copenhagen one to every 36.5 cars. The duties of a chief motorman are not only to instruct new motormen and check up the performance of the older men, but also to help out the inspectors in case of accident where their technical knowledge of car operation will be of help, to watch out for operating economies in the car service, etc.

Generally, these chief motormen are promoted motormen, though two companies report they are recruited exclusively from among the inspectors and three others use their inspectors to perform the duties of chief motormen. A number of companies require a minimum service of 10 years before appointment as chief motorman, and the age limit is usually between 35 and 40 years. After instruction, a candidate for such a position has to pass an examination before being appointed. On most roads the chief motormen are instructed to pay special attention to means for securing economy in energy consumption. In Brussels, economy is secured entirely through this force, as meters are not used, but this point will be taken up in greater detail later.

If these men are chosen carefully, their services are fully warranted. Their examination should be partly oral and partly written. They should be asked, for example, what steps in the way of rerouting to take in case of a breakdown at an important crossing or elsewhere on the line, etc. They ought to be subject to re-examination periodically, and it is advisable at least once a month to have such a man return to the front platform as a motorman for one or more trips to keep familiar with a motorman's duties. Periodical physical re-examinations are also desirable. On systems operating from 200 to 400 motor cars a chief motorman for every 30 cars is a reasonable allowance.

The regular motormen, on the properties replying to the data sheet, are recruited from various fields, varying with the location of company. Thus, the Bordeaux company reports its force recruited 50 per cent from agriculturists, 20 per cent from city laobrers, drivers, etc., and 30 per cent from the semi-skilled trades. The company in Nice gives the percentages mentioned as 27 per cent, 31 per cent and 42 per cent, whereas Bucharest reports that 97 per cent of its force of motormen came from the farms. In Paris the company declines to employ skilled or semi-skilled men, because it finds that these men accept a job on the platform only as a stop-gap and will return to their better paid trade as soon as opportunity offers.

A number of companies (10 out of 31) select their motormen from among the conductors. Thus, in Copenhagen every platform man is first taught the work of a conductor. Then after two years he learns how to be a motorman. Then he serves alternately at the two jobs until his seniority is such that he may be permanently assigned to one service or the other. Thus, this company has 594 men working only as motormen and 468 who work sometimes on one end and sometimes on the other end of the car.

Generally the companies report the minimum age for employment as 21 to 25 and the average maximum age at 35.

The period of instruction for motormen, according to the reports received, is about six weeks. In Paris, from 17 to 21 days of this time is spent in the school and six days on the road. Several companies like Bordeaux and Naples have a special school car, which operates over the system. In Brussels use is made of a text book, giving all the information which the company believes the motormen require.

A number of companies do not pay student motormen for the period spent in instruction. Others pay a certain sum, but only at the end of the period and if the man is employed. On certain properties a government examination is required before a man qualifies. About half of the systems reporting have re-examination of the men at periods of from two to six months, a year, three or five years.

Where economy meters are used, it is customary to give some sort of a bonus to the men for savings effected. The Bordeaux system has worked out an ingenious formula for the purpose.

*Abstract of a report presented at the biennial meeting of the Union Internationale de Tramways, de Chemins de fer d'Intérêt local et de Transports Publics Automobiles, Paris, June 16-21, 1924.

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This formula is

$$P = \left(B - K\frac{B-b}{n-1}\right) N$$

in which P is the amount of monthly bonus to be paid, B is a selected maximum for the daily bonus, b is a selected minimum for the daily bonus, n is the number of motormen winning bonuses, N is the number of days' work during the month by the man, and K is a factor whose value is 0, 1, 2, up to $(n - 1)$, according to the rank in the saving of energy. In practice on this road, $B = 0.7$ franc or 3.5 cents and $b = 0.15$ franc or 0.75 cents. Then the best motorman, if he worked 28 days, would receive in cents at the end of the month $P = 3.5 - 0\left(\frac{3.5 - 0.75}{n - 1}\right) 28 = 98$ cents, and the lowest motorman would receive $P = \left(3.5 - (n-1)\frac{3.5 - 0.75}{n - 1}\right) 28 = 21$ cents.

Havre gives its bonuses at the end of the year, but only to employees who have no demerits for other faults. Marseilles gives an award of 16 francs (80 cents) per month to every motorman who has had no collision or accident for which he was responsible.

The European system of zone fares requires a corps of fare inspectors who board the cars at intervals and inspect the tickets to see that passengers are not over-riding the distance for which they have paid. Since the war the conditions under which fare inspectors operate have become more arduous, partly because the electric railway systems have not expanded with the traffic so that the cars are crowded, and partly because of the laxity already mentioned in the standards of the conductors in collecting fares.

On most roads there are one or more chief inspectors to supervise the services of the inspection force. The total number of inspectors, as compared with the number of cars in service, is given for 14 principal cities in the accompanying table. To some extent, as regards street inspection, the duties of the chief inspectors correspond to those of the chief motormen as described, so that companies having a considerable force of chief motormen have a small force of chief inspectors and vice versa. As a rule, these men are recruited from existing personnel, either motormen or conductors.

Bonuses can be given for meritorious service, but it is somewhat dangerous to base them on the car-mile run during the day, as in Naples. The reason for this is that the inspectors have authority to short-route cars and should do so when the traffic requires it, but if their bonus is based on the car-miles run, they might instruct the motormen to increase the speed of their cars in the suburbs in order to avoid turnbacks. This would increase the car-miles run, but it would be at the expense of the service.

As with motormen, statistics as to the previous calling of conductors are on the various properties. In Paris skilled workmen are not desired for the same reason as with motormen. Christiania gives preference to those men who have passed an examination for non-commissioned officer.

The period of training also varies greatly. The maximum is probably Alexandria, where with the natives employed from 30 to 40 days is common, down to Naples and Lausanne, where the minimum is three days. In Paris five days are given in the school and from four to eight days on the road. In Brussels the time is nine days, divided as follows: One day theoretical instruction in the school, three days practical instruction on the line, the fifth day at the school with a couple of hours in the motorman's school to teach the manipulation of the brakes, the lighting circuit and the conduit plow, three days on the line, and the last day examination. Of the 31 companies reporting, only four felt the need of a school for conductors. Paris, which has three schools, uses a movie film showing all of the operations required in the daily work of a conductor.

In general, student conductors are paid while learning, though among the 24 companies reporting payment, seven withhold the amount until after the man is accepted. In Paris, as with motormen, the student conductor receives 14 francs (70 cents) if he does not quit learning voluntarily, and after he has been in the service six months gets 2.50 francs (12½ cents) more per day for each day served as apprentice. Only six companies pay anything additional to teacher conductors for instructing and on those properties the payment is only from 15 centimes to a franc (¾ cent to 5 cents) per day.

Eight companies still report the employment of some women conductors. Generally the pay is about 10 per cent less than that paid to men conductors.

Only a very few companies pay any bonus to conductors. Those which do are: (1) Naples, where the bonus is based on the gross receipts and car-miles; (2) Christiania, which has a merit system for bonuses; (3) Havre, which gives conductors the same bonus as the motormen but reduced in case of demerit; (4) Orleans, where the bonus is based on the receipts, and (5) Paris, which has a profit-sharing system for all employees.

INSPECTORS, CARS AND BUSES ON VARIOUS FOREIGN PROPERTIES

	Number of Ticket Inspectors	Number of Motor Cars	Number of Trail Cars	Total Cars and Buses per Inspector
Alexandria	65	72	57	2.0
Amsterdam*	21	304	224	25.6
Antwerp	37	216	137	9.5
Barcelona*	64	371	117	7.7
Brussels	78	463	371	10.6
Buenos Aires	230	1,570	750	10.0
Copenhagen*	54	426	440	16.2
Glasgow	82	974	...	11.8
Havre	42	102	41	3.4
Leeds*	42	370	...	8.9
Marseilles	161	425	451	5.4
Paris*	1,963	1,821	868	1.9
Rotterdam	24	201	156	14.8
Strasbourg	26	125	190	12.1

* These properties also operate buses as follows: Amsterdam, 10; Barcelona, 5; Copenhagen, 13; Leeds, 7; Paris, 1,115.

To become a motorman on the Brussels Tramways system, a candidate must be a Belgian, at least 22 years old and not more than 35 years old, except that a man having an honorable discharge from the army is accepted up to 40 years. The candidate also must have passed a satisfactory eye test. Then if his references are satisfactory he is allowed to take the examination for motorman.

His period of instruction lasts 15 days, during which he receives a daily wage of 5 francs (25 cents). During the first three days he reports at the school at 7:30 a.m. to receive theoretical instruction and in the afternoon operates a car under the direction of an instructor. The instructors are qualified motormen with at least ten years of experience and are paid 25 centimes (1¼ cents) per trip taken with a student. After the student motorman has run his car over a lightly traveled route he makes trips over other lines on the system, in each case being accompanied by an instructor connected with the depot from which the line runs. About the middle of his instruction period the man returns to the motorman's school, where the chief instructor examines him to see whether he remembers the instructions given. The three last days of the apprenticeship are devoted to an examination in the school and on the line, to determine whether he can qualify. It is estimated that the instruction of a motorman, including the payments to the instructors, costs the company about 93 francs ($4.65). A motorman is not fully accepted until he completes six months of service.

The motorman's school contains a full-sized car front platform with controller, hand brake, air brake, sanders, etc., also short full-sized sections of overhead trolley and underground conduit construction. Recently a few psychological tests have been added to determine whether the prospective motorman can think quickly enough to be depended upon in cases of sudden emergency to avoid accidents.

Instruction in car operation does not end after a man has been accepted. He is questioned from time to time on the principal rules, and if he seems unfamiliar with his work, he is required to take another course at the school. To help him, the company gives to each motorman a book entitled "What a Good Motorman Ought to Know."

Special instruction is given in regard to means of securing economy in energy consumption. Up to the present the company has not equipped its cars with meters, because it believes its local conditions would prevent their satisfactory use. Some of the lines are level, but many of the others are on steep grades, so that it would be impossible to establish any bogie per car-mile for energy consumption. Moreover, it is not the practice to operate either the same cars or the same motormen each day over the same lines, and experience has shown that even on the same lines the energy consumption per car-mile varies greatly according to traffic and other conditions.

In consequence, the company has put up the responsibility of economy in energy consumption to a special corps of men consisting of 16 "chief motormen," or inspectors, who travel over the system daily, watching the performance of the men and coaching them on what to do. There are about 470 motor cars on the system. The result, in the opinion of the management, has been satisfactory, as shown by the following figures on watts per car kilometer: 1916, 872.8; 1917, 867.4; 1918, 869.8; 1919, 861.3; 1920, 869.6; 1921, 846.7; 1922, 841.0.

The chief motorman receives a bonus monthly, depending on the saving made, as determined by the substation meters.

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American Association News

Executive Committee

WHILE waiting for the arrival of President Budd, J. N. Shannahan, first vice-president, presided at the meeting of the executive committee held in New York on June 20, and disposed of the routine business. Other members present were Secretary J. W. Welsh, C. L. Henry, M. B. Lambert for H. D. Shute, J. G. Barry, J. H. Hanna, A. A. Hale, C. E. Morgan, J. K. Punderford, E. M. White, H. A. Johnson, W. H. Hyland, F. R. Coates, C. R. Ellicott, L. H. Palmer for C. D. Emmons, and L. S. Storrs.

Reports were heard from the secretary and from various standing committees, including finance, meetings and subjects, publicity, company membership, and individual membership. Mr. Coates, as chairman of the meetings and subjects committee, recommended that Wednesday be set aside as the day of the convention at Atlantic City in October on which no business meetings be held, the idea being to devote the entire day to the inspection of exhibits. His recommendation also provided that the meetings of the American Association should be held on Tuesday, Thursday and Friday mornings. The executive committee approved.

At this point President Budd arrived and took charge of the meeting. Mr. Henry reported for the committee on national relations. Speaking of the railroad labor bill, he said that the probability was that electric lines would be excluded when the bill comes up at the next Congress.

A motion was made on the floor of the Senate to reduce the car fare to 5 cents in Washington, D. C., but was lost on a point of order. An appeal was taken from the decision of the chair but the chair was sustained by a two-thirds vote. On Section 15a of the interstate commerce act, Mr. Henry said that the Interstate Commerce Commission had sent out a questionnaire and meant to make a decision for each individual road on the basis of the reply. In connection with the hearings on depreciation, Mr. Henry said that the commission will probably make a tentative order and then call for hearings on it. He was anxious that the electric railways should be prepared to present their case in the most effective manner and asked that the association authorize this work.

The exhibit committee reported to date that 71 manufacturers have made application for 41,694 sq.ft. of space, which compares with 18,000 sq.ft. on the same date last year. Of this space, 35 per cent has been applied for by bus manufacturers. There will be about 85,000 sq.ft. of space available this year. The executive committee approved the following resolution submitted by the exhibit committee:

Whereas, certain manufacturers of automotive equipment brought buses to Atlantic City during the 1923 convention and parked such vehicles at advantageous points in the vicinity of prominent hotels and extended invitations to various railway delegates to accompany their representatives on demonstration trips, and

Whereas, such practices tend to defeat the purposes of the exhibition by reason of such railway delegates absenting themselves at various times from the exhibition proper and thus perhaps neglecting the study of exhibits of other manufacturers; therefore, be it

Resolved, that this executive committee in meeting assembled this 20th day of June, 1924, hereby vote to look with displeasure upon any manufacturers having exhibits at any place other than that designated by the association.

Some discussion followed about the possibilities of emphasizing good management and modernization at the October convention. It was also suggested by Mr. Welsh that opportunity ought to be given railways to exhibit new devices or methods they had developed. Mr. Budd commented that if there were better facilities at Atlantic City he would send a new five-car train down there, and he thought other railway companies would be glad to show some of their new equipment. It was first thought that it would hardly be worth while to do this, in view of the fact that the only place such cars could be exhibited would be on one of the near-by streets. However, on further thought it was decided that with proper publicity at the convention directing attention to these cars, it would be worth while and plans will be set in motion to get car manufacturers and railway companies to provide a real exhibit of new electric railway equipment at Atlantic City.

As Mr. Collier expressed it, if there is anything which typifies electric railways it is mass transportation, and we need to have more in the exhibits which reflects the main work of the industry. The bus is new and attracts a good deal of interest, but it is not the vehicle of mass transportation, except as an auxiliary.

The exhibit of railway company devices and methods will probably be provided for by allotting space to the committees on city and interurban operation, whose function at the convention will be to bring forward the new methods and equipment they have found in visitations during the year.

President Budd suggested that in line with the work of pushing the idea of modernization, a committee of three should be sent to England, and perhaps France, to study the principal features of railway and bus operation there, and to see what there was of particular interest at the British Empire Exposition at Wembly. He suggested that if the association would send one man, he would send another and would ask Mr. McGraw to send one of the editors of ELECTRIC RAILWAY JOURNAL, as the third. Mr. Collier moved the appointment of this committee and approval of the plan. The executive committee passed the motion. Later on Mr. Budd took the matter up with Mr. McGraw and he promptly agreed.

Mr. Storrs reported for the committee on co-operation with the National Automobile Chamber of Commerce. He said that an effort was being made to determine whether the Chamber and the Railway Association could agree upon a common plan for relief of traffic congestion. Plans have been set in motion to bring together and collate all suggestions for relief made to date. These will be briefed and sent to the committee for consideration at its next meeting. It is planned that the committee may possibly father the idea of having a scientific survey made by an organization of experts, and perhaps of working out a complete plan for some one city to serve as a model. If this seems desirable, the matter will again come before the executive committee for approval.

Mr. Storrs brought before the committee a recommendation that the by-laws be so amended as to include within the membership of the association the bus subsidiaries of railway companies and to include the revenue from bus operation by railway companies as the basis upon which dues are to be figured. The sense of the meeting was to approve the plan in principle, but it was referred back to Mr. Storrs' committee to bring in a definite recommendation for rewording of the by-laws.

Mr. Budd then told the committee of the plan which has been worked out with universities in Illinois to establish public utility courses. This will be covered in a later issue of the JOURNAL. He also gave a last-minute report of the status of the campaign to sell $5,000,000 of prior preferred stock of the Chicago elevated lines on the "passenger partnership" plan, as the company calls it.

G. C. Hecker, of association headquarters, read a very interesting paper on revenue and expense from bus operation as shown by a number of electric railway companies, but the figures are not available for publication. Following this Mr. Budd commented that if the executive committee could do so, it ought to impress on railway men everywhere at every opportunity the importance of taking up the bus in its own and contiguous territory. He expressed again his regret that railway men were not prepared to take up the buses earlier. He thought the work of The Milwaukee Electric Railway & Light Company was an outstanding example of what can be done when a railway really takes hold of this new form of transportation. This company is acting as the medium through which the public is served with power, gas and all transportation service in its entire territory. This policy toward the bus has been satisfactory from the standpoint of public relations and has been an insurance that the railway would continue to dominate the service in its territory. Mr. Budd thought this program was worth whatever it had cost, though he believed most of the Milwaukee company's bus lines were self-supporting.

Mr. Budd said that the reaction of the people to the bus is very remarkable. They will champion the agency which gives them the service first, and if that is the railway then it goes to the railway's credit.

The next meeting will be held on July 18 at 2 p.m., at or near Cedar Point, Ohio.

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The News of the Industry

Wage Offer Refused

Cleveland Railway President Promised Three-Cent Increase—Open Shop Basis Alternative

John J. Stanley, president of the Cleveland Railway, on June 17 made the motormen and conductors of his lines a new wage settlement offer. The proposal from Mr. Stanley followed the threat of the men to strike because the company had refused to grant them a wage increase of 12 cents an hour, as determined by a board of arbitration. The company characterized the finding of the board as "fraudulent." Mr. Stanley offered the men a rate of 57 cents an hour for the first year, 60 cents an hour for the second year, 61 cents an hour for the third year, 63 cents an hour for the fourth year, 65 cents an hour for the fifth and each succeeding year of service, with 10 cents an hour additional for all motormen and conductors acting as instructors of new men. The company's present wage scale calls for 55 cents an hour for the first three months of service, 58 cents an hour for the next nine months and 60 cents an hour after the first year.

The executive committee of the union voted unanimously to refuse the company's offer. Mr. Stanley was so informed at a meeting on June 18, and asked if he had any further concessions to make. He replied in the negative.

"This is my final offer," said Mr. Stanley. "It either must be accepted or I shall operate on an open shop basis, in accordance with the notice we had posted in the carhouses last Saturday."

William Polk, president of the union, said: "Things look dark."

It was the general opinion that the car men were likely to call a strike not later than Aug. 21.

Mr. Stanley said that if the men accepted this offer he would resume contractual relations with the union. If the men refused the offer it is said that the company will operate on an open shop basis.

Because of the men's refusal to meet Mr. Stanley before 10 o'clock on June 14, the company posted notices in all carhouses that dating from that time the company was being conducted on an open shop basis. Mr. Stanley said that the refusal of the union officials to discuss wages with him abrogated their contract.

It was expected that the posting of this notice would precipitate a strike, so the City Council brought Mr. Stanley and the officers of the union together. This meeting resulted in the men and Mr. Stanley agreeing to a truce of one week.

In a communication to the City Council on June 16 Mr. Stanley said he would be willing to have a new board of arbitration go over all the evidence submitted at the recent arbitration. He suggested that the new board consist of City Manager Hopkins, Mayor Townes and Federal Judge Westenhaver or an appointee of Judge Westenhaver. Mr. Stanley stated that he would abide by a decision of this board, but that to meet any award this board might grant, the City Council would have to raise the rate of fare, which is now limited to 6 cents by the Tayler grant.

Both Mr. Hopkins and Mayor Townes refused to act as arbitrators. The letter was not without good results, however, for it resulted in the resumption of the direct negotiations between the men and Mr. Stanley.

When the men received Mr. Stanley's offer, they asked for further time so that the union's executive board might decide whether to lay the matter before the entire union membership.

Tacoma Mayor Offers Fare Schedule

The latest development in the effort of the city officials to secure a 5-cent fare on the lines of the Tacoma Railway & Power Company, Tacoma, Wash., is the submission to the company of a proposal, framed by Mayor A. V. Fawcett, who heads the fight for lower fares. The Mayor has the united support of the Council to his proposal, which contains provision for an experimental period of revised fares. The proposal takes the form of an ordinance. The Mayor submitted it after he had refused to approve an ordinance proposed to the city by the Tacoma Railway & Power Company.

Mayor Fawcett's ordinance provides that the company will file and put into effect a six months' experimental tariff with the Department of Public Works at Olympia providing for fares as follows: Cash fare, 10 cents; weekly pass, $1, school tickets, forty for $1; tokens, twenty for $1, good for single ride. No transfers are to be given on tokens except on outbound cable cars, inbound cars on Twelfth Street line, North K Street line, South K Street line, and North and South Tacoma Avenue line.

It stated that the company might substitute buses for railway lines or supplement its railway service with buses.

The proposition submitted by the company, which Mayor Fawcett failed to approve, provided for twenty tokens for $1, continuation of the weekly dollar pass and a 10-cent cash fare. It also provided that if, under the administration of a proposed co-operative committee, the street railway fails to make a profit in two months the city tax its net instead of its gross revenue; if at the end of another three months the system is still losing, the fares be readjusted until a profit is shown.

Seeks Ten Cents

Poughkeepsie Company Would Raise Rates from Eight Cents and Discontinue Commutation Tickets

Application has been made to the Public Service Commission by the Poughkeepsie & Wappingers Falls Railway for permission to increase its cash fare within the city of Poughkeepsie, N. Y., and the village of Wappingers Falls and the fare zones between these places from 8 cents to 10 cents. The company also requests that it be permitted to discontinue altogether its monthly commutation tickets and to make certain additional charges for chartered cars. Fares now collected from school children are to be permitted to remain unchanged.

On June 4 the company filed with the U. S. District Court a complaint against the existing rates, and asked for an injunction which would restrain the Public Service Commission and the Attorney General from enforcing the rates then in effect.

A hearing on the motion for a temporary injunction was held before Judge John C. Knox in Federal Court in New York on June 10. Charles G. Blakeslee, counsel for the Public Service Commission, appeared in opposition to the motion, stating that the commission would be willing to act immediately on any new petition of the Poughkeepsie & Wappingers Falls Company. Judge Knox reserved decision. On June 11 attorneys for the railway and the commission appeared before Judge Knox and attorneys for the railway moved that the case be discontinued. This was agreed to by the commission and the Attorney-General. Judge Knox ordered the case discontinued.

A writ of certiorari was granted by the Supreme Court on July 9, 1921, after the commission had refused the company's petition for a 10-cent fare, but had issued an order granting an increase in fare from 7 to 8 cents. The commission filed a return to the writ on Sept. 23, 1921, after which the railway took no further steps until April 10, 1924, when notice of argument for the term of Supreme Court commencing May 6 was served on the commission.

The Supreme Court action was discontinued on May 21, and on June 4 the Federal Court action was started.

In its new petition the railway alleges that the existing rates are insufficient to yield a reasonable compensation for the services rendered, are unjustly and unreasonably low, do not provide sufficient income so that necessary reservations can be made for surplus and contingencies, and that in effect they are confiscatory.

In support of its application for a 10-cent fare the company places the probable original cost of its physical

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property at $1,207,613.98, including $35,000 for working capital. It estimates the fair and reasonable present value of the property at $1,600,000 exclusive of working capital, and the reproduction cost new at $1,900,000. It said the 8-cent fare granted by the commission in 1921 has failed to provide a net return of 8 per cent on the rate base established at that time.

P.R.T. Bus Ordinance Up to Commission

The bus ordinance of the Philadelphia Rural Transit Company, a subsidiary of the Philadelphia Rapid Transit Company, Philadelphia, Pa., passed recently by the City Council, was signed on June 16 by Mayor Kendrick. The measure grants to the Rural Transit Company a ten-year franchise for operating five lines of buses.

One line will operate the full length of Broad Street and another will ply between Broad and Sansom Streets and Sixty-third and Walnut Streets. A third will run between Germantown and Roxborough, and the fourth will cover a course from Bridge Street, Frankford, to Broad and Filbert Streets, by way of the Roosevelt Boulevard, Twenty-ninth Street and the Parkway. The fifth route will serve the far northeastern section, including Frankford and Somerton. The next step will be the submission of the franchise ordinance to the commission for approval.

Tentative Agreement Not Approved in Cincinnati

W. Kesley Schoepf, president of the Cincinnati Traction Company, Cincinnati, Ohio, has declined to approve certain provisions in the tentative agreement reached between the city of Cincinnati and the Cincinnati Street Railway, lessee of the system, for settlement of Cincinnati's traction situation. Mr. Schoepf explained that he was opposed to the provision calling for the appropriation of $30,000 annually for the maintenance of the office of the Director of Street Railroads and the method adopted for the repairing of streets in which rails are laid.

With reference to the Street Railroad Director's office, Mr. Schoepf said that he was opposed to the provision on general principles. He asserted that the money for the upkeep of the office would come out of the car riders' pockets. The office at present costs the city approximately $18,000 a year. Regarding the repair of streets between the rails, he said that the company operating the system should have full jurisdiction over the work. The agreement provides that the city perform the work at the cost of the operating company. The proposal provides for a 7½-cent car fare for three years and a capitalization of $28,000,000 for the operating company among other things.

The proposition is subject to the approval of the Mayor's traction committee and directors of the Cincinnati Street Railway. The matter will not be submitted to the directors of the Cincinnati Traction Company, in view of the fact that Mr. Schoepf is not in accord with all the provisions.

Economies in Toledo Approved

A program of economies estimated to save about $500,000 annually in the operation of the Community Traction Company system at Toledo has been agreed upon by members of the board of control. Among the proposals for putting the system back on a profitable basis without raising fares beyond present rates are the following:

Abandonment of the Indiana Avenue line at a saving of $54,000 annually. This has been before the Council on a previous occasion but was turned down. The Mayor will propose abandonment so that it can be acted upon by June 23.

Elimination of bus competition in the city limits at a saving of $100,000.

Extension of one-man car operation to include 30 per cent of the lines at a saving of $150,000 annually.

Rearrangement of schedules on all lines at an estimated saving of $136,000 a year.

Placing a new power rate in effect which would save the railway $76,000 a year without jeopardizing the case of the city or the company now before the State Public Utilities Commission.

The decision in the power case is expected very soon. If the state commission refuses to take jurisdiction then the city's action in Common Pleas Court will go forward. Through this case the city is attempting to secure a refund of $200,000 alleged overcharge for power from the Toledo Edison Company, under the contract in the Milner ordinance.

Buses Ruled Out at Duluth

Voters of Duluth, Minn., at a special city election on June 16 adopted an ordinance to regulate buses, the practical effect of which will be to bar local buses from the use of the streets. The vote was 10,354 for and 7,639 against, with ten precincts missing. The ordinance provides that all motor vehicles carrying passengers for hire, except taxicabs, vehicles engaged in the livery business and buses operated between Duluth and other municipalities, shall be prohibited from operating upon any street where double street car tracks are maintained. The Duluth Street Railway was active in the campaign in favor of the adoption of the ordinance.

Identification Cards in Muscatine Advanced Fifty Cents

The price of car rides for patrons using monthly identification cards in Muscatine took a jump when the City Council, by a vote of five to two, granted the Clinton, Davenport & Muscatine Railway permission to raise the rate for cards from 50 cents to $1 a month. The new rate is an average increase of from 6 to 7 cents for patrons using at least fifty tickets each month. Fare without tickets remains at 10 cents.

The company has agreed to continue workmen's and children's tickets. Permission was also granted the company to resurface between the tracks on Mulberry Avenue from Second to Seventh Streets, the work to be the same as that done on Second Street, on the condition that the workmen's monthly tickets, now sold for 5 cents and good only two hours in the morning and two hours in the evening, be continued instead of abandoned as proposed by the company, and that the tickets giving children two rides for 7 cents remain the same instead of being discontinued, as asked by the company.

Increased Wages in Springfield, Mass., May Mean Higher Fares

With a view to adjusting the income of the Springfield Street Railway, Springfield, Mass., to the requirements imposed by the arbitration award of June 11, when an eight-hour day and increased pay were granted to the employees, President Clark V. Wood and Vice-President Howard R. Whitney of the company met with Mayor Edwin F. Leonard and the transportation committee of the City Council June 16 and discussed tentative plans to increase fares from 7 cents to 10 cents, with tickets at reduced rates. For tickets a three-for-a-quarter rate is under consideration. The price for school children's tickets would be brought to 5 cents, as against 3½ now.

Reports that a sweeping introduction of one-man cars in the city was imminent were denied by President Wood. He said that present plans called for a maximum of fifty such cars in use at any one time, as against thirty-five at present. On some of the one-man cars two operators will be employed during the busiest periods.

Plans of the company, President Wood explained, look to bringing in $300,000 more revenue yearly. He said that owing to the business depression the gross income of the Springfield company during five months and twelve days had dropped $138,815, while the back pay of the men under the recent award will amount to $129,000. Mayor Leonard and Chairman John D. Shuart of the transportation committee expressed the view that it would be better for the public to have the fares increased than to have the service curtailed.

Wage Issue Deadlocked

Negotiations looking toward a settlement of wages affecting the employees of the Connecticut Company, New Haven, Conn., have been going on for some time with the result that the employees and officials are deadlocked, although the agreement relating to working conditions has been signed.

It developed that in an effort to bring about a settlement of the question of wages, the conference board recently submitted for referendum vote the question of giving the board power to go to the company with a proposition to sign up the agreement for an increase of 1 cent above the present scale, making it 58 cents an hour instead of 57. The referendum vote refused to give the conference board this authority and so matters stand just as they were, the trolleymen not receding from their demands for 75 cents an hour for operators of two men cars and 90 cents an hour for one-man car operators.

The Connecticut Company insists existing conditions demand that wages be permitted to stay where they are and the conference board is without authority to do anything but insist on the 75-cent wage agreement.

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Detroit Must Arbitrate

Circuit Court So Rules in Wage Case—City Announces Appeal—Negotiations to Continue

Circuit Court Judge Theodore J Richter on June 13 granted the mandamus asked by the union in Detroit to compel the Detroit Street Railway Commission to arbitrate differences regarding wages and working conditions. Plans were made immediately by the commission to appeal the case to the Michigan Supreme Court. The D. S. R. management will also proceed with its plans to deal with the rank and file of platform men through the employees' committee elected by the men in the carhouses. It has been announced by the commission that it will continue to ignore the union pending the Supreme Court ruling.

The writ ordering arbitration in the controversy was asked by the men following the failure of their union officers to gain recognition from the street railway management or to secure acknowledgment of or action on the demands submitted. The mandamus proceedings allayed the threatened strike and several months may elapse before the Supreme Court hands down a decision. In the meantime the railway management will proceed with its negotiations with the men through the employees' committee.

It is expected that the charter clause providing for the arbitration of disputes between the commission and its men will be one of the points of attack by the attorney for the commission. Attorney Wilcox, for the city, held that this provision is unworkable and unconstitutional. The clause in the city charter is as follows:

> In case of a dispute over wages or conditions of employment, said board is hereby authorized and directed to arbitrate that question or questions, provided each party shall agree in advance to pay half of the expenses of such arbitration.

Judge Richter stated that he would have hesitated to hold the charter provision good were it not for the fact that the commission arbitrated with the men in 1923. This, he said, gave a practical construction to the charter provision.

The questions involved in the matters before the court were outlined by Judge Richter in his opinion as follows:

> 1. Do the petitioners in this case duly represent the platform employees of the Department of Street Railways in, as is designated in said resolution of Feb. 7, 1923, their associated capacity?
> 2. Is there an arbitration provision in the charter and is it workable?
> 3. Were proper demands made for the refusal of which mandamus will lie?

In his opinion the judge said in part:

> 1. That these petitioners truly represent the platform employees can, I think, hardly be questioned. Continuously since Feb. 7, 1923, they and their predecessors have without question represented the platform employees in their dealings with the Department of Street Railways and its managers. It is my judgment that within the provisions of the charter and within the provisions of the resolution of Feb. 7, 1923, and according to the course of conduct had between the platform employees on the one side and the Department of Street Railways on the other in the past, the petitioners here do in truth and in fact represent the platform employees.
> 2. The charter provision does exist. It provides for arbitration when disputes arise. This provision is a part of the same basic law creating the respondent commission. It was put in the charter for a purpose. It is true that the charter provision in and by itself does not provide the machinery of arbitration, but in the past, in recognition of the charter provision and in recognition of the necessity for the machinery, those in authority promulgated the resolution of Feb. 7, 1923, set up the machinery to be employed in arbitration and proceeded to arbitrate under it. The men are seeking to avail themselves of it. The department claims that it is not bound to arbitrate except as, when and how it chooses. It is my opinion that the course of conduct between the parties, and the proceeding since the promulgation of the resolution of Feb. 7, 1923, have provided the machinery which makes the arbitration provision in the charter effective, and I so hold.
> 3. The demands were made on April 22, 1924. They were prompted in part by the request of the assistant general manager of the Department of Street Railways as to whether there would be any demands by the platform employees. This he wanted to know for the purpose of his budget. The demands were made at a time when the resolution of Feb. 7, 1923, was in full force and effect, and the respondents realized that, as shown by the testimony when they sought, on May 24, to rescind the resolution of Feb. 7, 1923. It is contended that the resolution of Feb. 7, 1923, is not binding upon the city without the approval of the Mayor or Common Council. This agreement of Feb. 7, 1923, is an employment contract with each employee working thereunder, providing for his working conditions and methods and means of adjusting them. It is not necessary that it be approved by either the Mayor or the Common Council.
> It is next contended that the resolution expired under the terms of the arbitration award of Aug. 18. This is not true, as the arbitration award was made in pursuance of and became a part of it.

During the progress of the case the court suggested a means of arbitration which it believed would satisfy all. In furtherance of this suggestion the court granted the parties more than a week's time to agree. It says that it was from time to time informed by the attorneys for both sides that progress was being made toward a settlement and toward securing the means of arbitration. At that time the court had heard only a small portion of the testimony and had not heard the argument and had no opinion either way on the merits of the controversy, but believed that it had provided a suggestion which would have settled the question satisfactorily.

Jamaica-Babylon Electrification Under Way

Actual work in connection with the Long Island Railroad's plans to electrify its double-track line between Jamaica and Babylon, a distance of 28 miles, began a few days ago with the installation of the ties used for holding the third rail. Over 30,000 of these ties have been ordered and they are now being delivered.

Orders for third-rail sections have been placed to the extent of about 6,000 tons, and a substantial tonnage has already been shipped from the steel mills. Jumper cable and conduits to be used at street crossings, third-rail insulators, protection board and fittings and other necessary third rail material have been ordered, including about 37,000 track rail bonds. Manufacturers have promised early delivery.

All poles, cross-arms and fittings for transmission lines have been ordered. Some of this material has been received and other consignments are now in transit.

Equipment for the six substations to be erected at Laurelton, Lynbrook, Freeport, Wantagh, Amityville and Babylon has been ordered and the construction of these buildings will commence in the near future.

Equipment has been ordered for changing the present system on the Montauk Division to Babylon.

With the exception of the substation buildings proper, the work will be carried on by the company's own construction forces.

Final Hearing June 26 on Queens Line Fare Plea

General Lincoln C. Andrews, receiver, and officers of the New York & Queens Railway, Long Island City, N. Y., made formal request in person on June 19 to the Transit Commission for permission to charge an increased fare. Unless the commission consents, Justice Joseph Aspinall of the Queens Supreme Court has declared that on June 26 he will grant the receivers' petition for the scrapping of the lines and the forfeiture of the franchises.

General Andrews proposed that the lines should be permitted to exact temporarily a 10-cent fare from casual passengers, but that regular riders should have the privilege of buying company tokens at the rate of four for 25 cents, each good for a ride. The commission could determine after a trial of the plan just what would be a tariff at cost.

The final hearing will be held on June 26.

No Large Scale Pennsylvania Electrification at Present

Plans for the electrification of the Pennsylvania Railroad from New York to Philadelphia, from Philadelphia to Washington and from Philadelphia to Pittsburgh are under way, according to a representative of the company, but the "general railroad situation and the inadequacy of available funds make improbable the beginning of electrification work on a large scale in the near future."

This statement was made as the result of inquiries concerning the connection between the Conowingo power development and the Pennsylvania Railroad. When the decision to build this $60,000,000 electrical plant was announced recently the statement was made that it was to be used in supplying power for the Pennsylvania Railroad from Philadelphia to Washington.

Officials of the Pennsylvania did not deny the eventual possibility of an electrification, but they took the position that there is no telling when the plan can be carried out. The chief obstacle to such an improvement, it was stated on June 16, was the lack of funds.

Will Substitute Buses

The Janesville Traction Company, Janesville, Wis., has informed the City Council that it will abandon service on its Washington Street line in favor of a bus system. The company states that this step would be more practical than paying for the extra cost of paving between its tracks on Washington Street, which section was included in the city's 1924 paving program. Incidental to this action, the company also has under consideration a proposal to extend its bus service through the Blackhawk district on the east side, which territory is without any public form of transportation at present.

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New Parking Regulations Proposed in Baltimore

New parking regulations covering all vehicles have been prepared for Baltimore by Charles D. Gaither, police commissioner, and submitted to Mayor Howard W. Jackson for his approval. The Mayor will make a study of the rules and if he approves them they will probably become effective on July 1. The United Railways & Electric Company and the bus companies operating in the city are much interested in the new rules.

One of the proposed regulations provides that no vehicle shall be permitted to stand longer than actually necessary to take on or discharge passengers, freight or merchandise on any street having tracks, within 75 ft. of any corner where cars take on or discharge passengers, or at any point where such standing vehicle may interfere with the free turning of a car from one street to an intersecting street, or with the free passage of any such street car along or across any street, or within 25 ft. of any intersecting curbs where there are no car stops, or opposite any safety zone, or within 20 ft. of the end of any safety zone. Another rule would use the trolley poles of the United Railways & Electric Company for the display of conspicuous signs setting forth the regulations at that particular point in the downtown section of the city.

Most of the rules deal with the business section of Baltimore. On some of the streets parking for a longer period than to receive or discharge passengers, freight or merchandise is prohibited entirely between 7:30 a.m. and 6 p.m. On others in the central section the prohibited hours are from 7:30 to 9:30 a.m. and 4:45 to 6 p.m. Parts of certain streets are designated as through streets with special parking regulations.

On many of the streets upon which it is proposed to make changes in the present parking rules the new regulations are not to apply on Sundays, holidays and after 2 p.m. on Saturdays.

Veteran Employees of Bamberger Electric Made Directors

As a reward for their many years of service and in recognition of the knowledge they have gained during the long periods of practical experience in the operation of the Bamberger Electric Railroad, Salt Lake City, Utah, five veterans in the company's employ were recently named members of the board of directors. The combined term of service of these men with the road is 108 years. Their election to the board took place at the special meeting of stockholders held on June 3.

The veterans named as directors are: John W. Walsh, vice-president, eighteen years of service; J. B. Bean, secretary, twenty-six years; N. S. Wiltsie, general superintendent, fifteen years; R. B. Needham, traffic manager, sixteen years, and E. A. Vail, chief engineer, who has been with the company for the past thirty-one years.

Julian M. Bamberger, president and general manager, was chosen to serve with Mr. Walsh and Br. Bean as a director for three years. Mr. Walsh was named vice-president and Mr. Bean secretary. Mr. Wiltsie and Mr. Needham will serve on the board for two years, and former Governor Simon Bamberger, treasurer of the company, and E. A. Vail will serve one-year terms.

Pittsburgh Baseball Dashers Have Dash

"If it doesn't draw attention it isn't an advertisement." This is a well-known advertising axiom very often overlooked. Not only is it the motto of the commercial department of the Pittsburgh Railways, but it is put into practice by the company. In calling attention to ball games many electric railways have for years been content to run "Baseball Today" or some similar calm statement on the dashers,

Caricature Picturing "Rabbit" Maranville in Action

ignoring the popular appeal in the personalities of the players. Every league team has stars at bat or in the field, or both, who are good copy. In the case of the Pittsburgh Pirates "Rabbitt" Maranville is known all over the circuit for his antics on the field and as a sterling player, bar none. It is intended to use this player personality for striking publicity just as the stars in the movies or theatrical world are played up by house owners as drawing cards.

Probably twenty-five men, or whatever the player limit is, will still be cavorting about on Forbes Field by the middle of the summer. They will represent the survival of the fittest in a hard competitive test. A few rookies and many oldtimers will find themselves battling side by side. As the season goes on memories of the fans about the personalities of the older men will be revived by the railway in its posters and striking characteristics of the new players will be presented. Ball players are human. They crave praise. The act of an individual now and then among them may arouse censure, but by and large ball players are a very human lot, prompted by the same hopes, desires and ambitions that characterize humanity in general.

So the Pittsburgh Railways has started with Maranville as the first subject of its posters. Other players will be pictured skillfully in characteristic poses. The cost of the posters with the distinctive appeal is very little, if anything, more than that of the non-illustrated kind. As between the appeal that pulls and the mere formal announcement the Pittsburgh Railways found that the management of the Pirates, which pays the bill for the posters, fell in with the new idea at once and heartily.

Springfield Jitney Men Pin Hope on Political Overthrow

Judge Wallace R. Heady at Springfield, Mass., has continued from day to day the cases of Thomas M. Brunton and George Mallis, convicted jitney drivers.

Richard J. Talbot, counsel for the jitney men, says it would be possible for the bus men to take their case to the Supreme Court and ask for a decision on the right of the transportation board to issue licenses, but with the City Council in its present condition, they would have little to gain by the move. He believes that the question whether the independent buses are resurrected lies now wholly with the voters, and he looks to the coming municipal elections to change conditions.

Mr. Talbot issued a statement in which he said:

> The right of appeal does not arise upon a continuance from day to day, but only if and when a case is finally disposed of by sentence. I do not anticipate any disposition which will make an appeal advisable, for the bus operators have followed the suggestion of Judge Heady and discontinued operation.
>
> The court has not decided that the free operation of a bus is unlawful. We have never contended that unlicensed buses could be operated for hire and did not anticipate that the public would refuse to ride free during the period of protest.
>
> If bus service is to be restored it must be under settled conditions which will allow the operators to replace their vehicles with up-to-date equipment worthy of this progressive city. The privilege of granting such a right rests with the people through their chosen representatives. Unless that right is made secure by the present officials, or the City Council to be elected in December, no operator will invest his funds in expensive equipment. We have made the best fight that we knew how to make against forces the strength of which no man of experience will underestimate.
>
> The problem of restoring service is now with the voters, who I believe will vote as they talk. If they do the restoration of independent bus service is only a matter of time.

Settlement Agreement Reached in McKeesport

The city of McKeesport has settled claims against the Pittsburg Railways amounting to $100,000 on the basis of the payment of $75,000. The terms of the settlement include an agreement on the part of the railway to do considerable paving in the city within two years.

The agreement provides for payment by the company to the city of $25,000, within thirty days, the remainder, $50,000, to be paid in ten equal installments without interest. The city is to discontinue all suits against the company and to accept $5,000 a year as a

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franchise tax, instead of $10,000 a year, for three years, including the current year, after which a new agreement may be made. The railway is to make certain improvements during 1924 and 1925. The terms of the agreement are subject to approval by the Public Service Commission.

The agreement ends a long fight. The franchise tax alone amounted to $66,000. It accumulated while the company was in the hands of receivers, when the United States District Court refused to order receivers to make payment to the city.

News Notes

Publication Reappears.—The United Railways "Bulletin," published monthly for distribution among the employees of the United Railways, St. Louis, Mo., made its reappearance with the June issue after six months of suspension due to the death of its editor, William Vincent Brumby. The new editor is R. C. Rogers.

Bus Service Extended. — The Winnipeg Electric Railway, Winnipeg, Canada, will put two new bus services in operation. One of these services will operate on Archibald and Provencher Streets in St. Boniface and the other will serve territory on St. Mary's Road.

Sunday Excursions Advertised.—The Kentucky Traction & Terminal Company, Lexington, Ky., is arranging Sunday boat-trolley trips this summer. The round trip rate of $1 includes a 34-mile boat ride along the Kentucky River and a 56-mile trolley ride through Lexington and Frankfort. The company is advertising the trip extensively.

Conferences on Wages.—The Boston Elevated Railway, Boston, Mass., is engaged in daily conferences with representatives of the carmen's union about wages and working conditions. The men have submitted a demand for an increase of about 25 cents an hour, raising the maximum to 95 cents an hour, and the company has requested the men to take a reduction of 5 cents an hour. There are other conditions involved, such as a six-day week and vacations.

Special Excursions to Celebrate Rehabilitation of Indiana Road.—A novel traction trip for the purpose of acquainting patrons of the line with new cars and other facilities recently put into service was made recently by the Indianapolis & Cincinnati Traction Company on the Greensburg division. The excursion was offered at 50 cents for the round trip, any distance, either direction and on all trains. Not more than seventy-five passengers were permitted on any one car. A similar trip on the Rushville division is planned soon. Special permission was granted the company by the Public Service Commission to make the reduced charge for the day. On June 16 officers and invited guests were taken over the road in a special car to celebrate the rehabilitation of the line. The tour was in the nature of a twentieth anniversary and marked the completion of the change-over in operation from alternating to direct current.

"Rylite" Chosen.—The name of the new magazine which is to be published monthly by and for the employees of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., is the *Rylite Employees' News*. J. H. Pritchard submitted the accepted name. He will receive the $25 prize. Mr. Pritchard is employed as distribution superintendent in the line department. The contest for a name was started in May. In all 321 entries were received. The company has now started another contest offering $20 in cash prizes to employees for the best constructive suggestions.

Freight Business on the Increase—A recent report made public by the Illinois Traction System, Peoria, Ill., operating the largest electric trunk line railway in the world in Illinois, shows that during the year 1923 the road handled 46,067 cars of freight, representing close to 1,850,000 tons. The freight business of the system has been steadily increasing from year to year. In 1921 the system handled 32,000 cars and in 1922 a total of 37,000 cars were hauled.

Permit Granted.—The Atlantic Coast Transportation Company, a subsidiary of the Atlantic Coast Railway, Asbury Park, N. J., has been granted a permit to operate at that place and also to operate a double-deck sightseeing bus. The company will establish a terminal at the foot of Asbury Avenue, Asbury Park.

Gets Increased Fare. — The City Council of Colorado Springs, Col., has sanctioned the Colorado Springs & Interurban Railway's plea and awarded a 10-cent fare but added a proviso that the company must issue weekly passes costing $1.25 each. These tickets are good for as many rides as the holder cares to make during the week specified. The Council's grant will be effective after approval by the State Public Utilities Commission. President Strickler had notified the city officials that unless the company was permitted to increase its fare it could not operate; that a 10-cent fare was absolutely necessary.

Wants to Operate Boston-Lowell Bus Line. — The Eastern Massachusetts Street Railway, Boston, Mass., has applied to the Massachusetts Department of Public Utility for permission to operate buses from Park Square, Boston, to Lowell, Mass. The department several weeks ago granted a general order to the road to operate buses under which the company must apply for specific routes. The bus trip between Boston and Lowell will be made in less than an hour and a half and the fare for a single ride will be $1.

Consideration for Public Wins Praise.—In constructing a strip of new track past the police station, city hall, county building and business establishments the Grand Rapids Railway, Grand Rapids, Mich., is making special efforts not to interfere with traffic during the period in which the street is torn up. This effort brought commendation in the Grand Rapids *Press* of June 5 under the caption, "Considering Traffic on Street Jobs."

City Council Favors Increased Rates.—The Eugene City Council has adopted a resolution petitioning the Oregon Public Service Commission to grant the Southern Pacific Company a 7-cent fare on its railway lines in Eugene, Ore., an advance of 1 cent, and to authorize the company to sell four tickets for 25 cents. In return for this resolution the company agrees to put in standard concrete pavement between the tracks of its lines at any place in the city where streets on which its lines extend are to be paved in the future.

Seeks Increased Fares. — Increased cost of transportation and decrease of patronage were cited by Frank H. Shaffer, attorney for the receiver of the Cincinnati, Lawrenceburg & Aurora Electric Street Railroad, before the Cincinnati Council committee on street railroads for an increase in the cash fare from 7 to 10 cents. The ticket rate of 6½ cents is to be continued. The rate of fare is for that section of the system between Anderson's Ferry and the west corporation line of Cincinnati. The existing rate of fare expires on July 9 and the interurban company seeks a new rate for the next two years. Residents of the district served by the traction company informed the Council committee that they preferred a 7½-cent ticket rate and 8-cent cash fare. Mr. Shaffer, however, informed the committee that the 10-cent cash fare would be paid only by the excursionist and the casual rider. The question was taken under consideration by the committee.

May Operate One-Man Cars. — The Reading Transit & Light Company, Reading, Pa., has applied to the Public Service Commission to set aside the general rule which requires a member of the crew to alight and proceed ahead of the car at points where the railway tracks cross steam railroad tracks. It is said that abolition of this ruling will result in the operation of one-man cars in Lebanon.

Buses Permanently Enjoined.—Vice-Chancellor Buchanan at Trenton, N. J., recently made permanent the injunction against George Zellers, Sr., George Zellers, Jr., Frank Sidone and Louis Annello operating their buses on a route paralleling the line of the Millville Traction Company, Millville, N. J. The proceedings were instituted by the Board of Public Utilities Commissioners, which had issued orders directing that the defendants cease operation, but which was ignored. The injunction proceedings in the Court of Chancery followed. Annello was also charged with violating the order of the Chancery Court and he was cited to show cause why he should not be adjudged in contempt. Appearing for the commission on June 3, Thomas Brown said that counsel for Annello admitted that he was guilty of a violation of the court's order in that he had operated on the line of the railway for a distance of 300 or 400 ft., but did not take on or discharge passengers on the railway route. There was no intention, according to counsel for the defendant, to ignore the spirit of the order. The court adjudged Annello guilty of contempt and fined him $25.

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Financial and Corporate

Market Street Net $1,195,566

San Francisco Road Shows Increase of 18 per Cent in Net Over 1922 —Gross Up 2.35 per Cent

During the year ended Dec. 31, 1923, the gross earnings of the Market Street Railway, San Francisco, Cal., showed a susbtantial increase over 1922, with the exception of the earnings for the month of June, which were approximately $25,000 less than June, 1922. This was principally due to the fact that during June, 1922, the Shriners held their large convention in San Francisco, which it was estimated increased the receipts for the month by more than $30,000.

The increase in gross earnings for the year was 2.35 per cent. It is attributed principally to the normal increase in the population of San Francisco, although the increased use of automobiles has affected adversely the rate of increase in the gross earnings.

On April 29, 1923, there was a horizontal increase in the wages of the platform men. This is reflected in an increase of $112,450 over 1922 in the cost of conducting transportation and traffic. Offsetting this, however, was a decrease in the cost of power amounting to $96,251. The total operating expenses for the year were $12,596 less than for the year 1922, and the net income from operation after all charges including interest on the debt, but before deduction for federal income tax, increased $272,884 or in excess of 18 per cent over the preceding year.

Notwithstanding the increase in the wage scale the labor turnover for the year was materially greater than in 1922, principally accounted for by the fact that industry generally in California was much more active and the demand for labor considerably greater than during the preceding year.

The company reports no deferred maintenance work. In addition to the ordinary repairs and replacements more than 24,000 ft. of single track were reconstructed and more than 33,000 sq.ft. of new asphalt surface laid, and more than 220,000 sq.ft. reconstructed. Approximately 50 per cent of the number of cars operated daily passed through the shops for general overhauling, and in addition, sixteen new car bodies were built and put into operation, thus adequately taking care of the increased travel.

It was deemed advisable to increase the capacity of the substations of the company so as to take care of the normal demands for power which may be anticipated for at least two years.

In December negotiations were started for the refunding of the $9,250,000 of 5 per cent first mortgage bonds and the $4,250,000 of 6 per cent collateral trust notes, both of which issues fall due in 1924. These negotiations culminated in the sale of $13,000,000 of 7 per cent first mortgage bonds, the proceeds utilized for the refunding of the old debt. The only funded debt outstanding now is the issue of $13,000,000 of 7 per cent bonds.

Charles N. Black, president of the company, says that the negotiations for the purchase of the company's property by the city of San Francisco have been carried on more or less spasmodically during the past year, but little real progress has been effected.

STATEMENT OF INCOME AND PROFIT AND LOSS OF MARKET STREET RAILWAY FOR THE YEAR ENDED DEC. 31, 1923

Operating Revenue:		
Passenger	$9,747,376	
Other	62,016	
Total		$9,809,392
Operating Expenses and Taxes:		
Operating Expenses:		
Maintenance of ways and structures	$587,487	
Maintenance of equipment	640,938	
Power (including disputed charges)	1,346,159	
Transportation and traffic	3,507,318	
General and miscellaneous	754,345	
Total operating expenses	$6,836,247	
Taxes (other than Federal income taxes)	617,100	
Total operating expenses and taxes		$7,453,347
Net operating revenue		2,356,045
Other income credits:		
Interest and dividends	$63,197	
Other	11,356	
Total		74,553
Gross income		$2,430,598
Income charges:		
Interest on funded debt	$727,457	
Depreciation of railroads and properties	320,000	
Provision for 1923 Federal income tax	153,578	
Other	33,997	
Total		1,235,032
Net income for the year		$1,195,566
Surplus, Jan. 1, 1923		846,042
Profit and loss credits:		
Cancellation of reserve for undeposited United Railroads of San Francisco bonds in reorganization agreement		$263,000
Profit on purchase and sale of company's securities—Net	22,139	
Other	921	
Total		286,060
Gross surplus		$2,327,670
Profit and loss charges:		
Dividends on prior preference capital stock	$697,200	
Federal income taxes for year 1922	138,682	
Refinancing expenses	50,826	
Other	9,465	
Total		896,173
Surplus, Dec. 31, 1923		$1,431,496

OPERATING STATISTICS OF MARKET STREET RAILWAY FOR YEAR ENDED DEC. 31, 1923

Passengers carried:	
Cash fares 5c each	193,331,018
Special car passengers	31,025
School and other tickets, 2½c	3,135,831
Other tickets, 5c each	17,176
Total revenue passengers	196,515,450
Free transfer passengers	63,761,055
Total revenue and transfer passengers	260,276,505
Free passes	583,736
Total passengers	260,860,241
Percentage of transfer passengers to revenue passengers	30.82
Passenger revenue per revenue and transfer passengers, cents	3.75
Car hours	2,821,324
Car miles	25,391,329
Miles of single track leased, etc.	18.51
Miles of single track owned	256.27
Miles of single track operated	274.07
Number of passenger cars owned	749
Per Cent of Operating Revenue	
Operating expense	69.67
Taxes (railway only)	6.29
Operating expense and taxes	75.96
Operating income	24.04
Non-operating income	.76
Gross income	24.80
Deductions from income	7.47
Net income	17.33

Lake Shore Power Controls Toledo & Indiana

Through the exercise of an option secured a few weeks ago the Lake Shore Power Company, recently incorporated at Toledo, now controls the Toledo & Indiana Railroad, operating between Toledo and Bryan, Ohio. The interurban line and the electric properties will be separated under the new ownership. The Lake Shore Power Company controls the Central Light & Power Company of Williams County, the Wauseon Light & Power Company and several subsidiary distributing systems in nearby small towns.

Officers of the Toledo & Indiana Railroad are now L. G. Van Ness, Cincinnati, president of the Maumee Valley lines and of the Cincinnati, Georgetown & Portsmouth Railroad; Charles T. DeHore, Cincinnati, of the General Electric Company, vice-president; LeRoy E. Eastman, secretary and general counsel; and Marion M. Miller, president of the Home Bank & Trust Company, treasurer.

Directors are Judge Jason A. Barber, Toledo, who served for many years on the board; L. H. Schroeder, vice-president of the Central Trust Company of Illinois, Chicago; James W. Marshall, vice-president of the Chicago Trust Company; L. B. Breedlove, chief engineer of the Chicago Trust Company, Chicago; A. B. Gebhart Bryan, and the officers of the company.

With the exception of Mr. Breedlove the same men are officers and directors of the Lake Shore Power Company.

The new interests control all but $36,000 of the $1,400,000 outstanding Toledo & Indiana stock.

Stock Sales to Employees a Success in Chicago

The campaign for the sale of $1,000,000 of prior preferred stock to the employees of the Chicago Rapid Transit Company, Chicago, Ill., has gone over the top and at the latest count the total sales amounted to $1,294,100 to 5,136 employees.

The second division of the stock sale, by which the company undertakes to sell $4,000,000 in stock to the Elevated riders, is now under way, with every employee of the company a salesman. The daily newspaper being published during the campaign points out that with all the employees working the issue would be exhausted if each employee sold eight shares.

Of the total employees who pur-

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chased shares, with a dividend rate of 7.8 per cent, 794 subscribers paid in cash for 2,987 shares. The deferred payment sales amounted to 9,954 shares to 4,342 employees. Of the 5,700 employees of the company, it will thus be seen that only a few hundred did not take advantage of the company's offer to purchase at least one share of stock. The average holding of the employees, acquired during the campaign, amounts to slightly in excess of 2½ shares per employee.

The third issue of the second volume of the "Stock Sale News," which has been published daily during the campaign, contained this announcement:

The board of directors of the Chicago Rapid Transit Company, at a meeting held Wednesday, June 11, declared the first quarterly dividend since the reorganization of the companies. This dividend will be paid at the rate of 65 cents a share on the first days of July, August, and September to stockholders of record on the third Tuesday of the preceding month. This dividend is at the rate of $7.80 a share a year.

Birmingham Employees Buy 959 Shares in Three Weeks

Within three weeks after the plan was started approximately one-third of the employees of the Birmingham Electric Company, Birmingham, Ala., had subscribed to preferred stock of the company. Subscriptions are continuing and four departments, it is stated, have already subscribed 100 per cent, that is, each member of the department has taken at least one share of stock.

On June 17 three weeks after the preferred stock was first offered to employees, a total of 959 shares had been subscribed. The stock is no par value cumulative preferred and carries a dividend at the rate of 7 per cent a year. It is being sold to employees for cash at a price of $92 a share. On time payments the price is $97 a share, but after the first payment has been made, it is stated, dividends are paid at the regular dividend dates and no interest is charged on deferred payments.

Under the plan adopted, each employee may purchase up to ten shares of the stock, but not more than ten. Employees may, however, purchase up to ten shares for each member of their families, if they wish.

Daily bulletins are being issued showing the progress of the sales, and four of the seventeen departments have already reached 100 per cent in subscriptions. The Birmingham Electric Company has a total of 1,435 white employees, in addition to a number of negro employees. Several of the negro employees subscribed for from three to five shares.

In a letter to all employees of the company, published in "The Buzzer," weekly publication of the Birmingham Electric Company, J. S. Pevear, vice-president, expresses the hope that every employee will take at least one share of stock. He points out that the terms upon which it is offered are very liberal, and purposely so, for it is of benefit to purchasers of the company's securities to have the employees join them as investors.

"As owners of the stock," Mr. Pevear said, "we are going to look upon the company in an entirely different light, and aside from the satisfaction of having a good investment and the pride of partial ownership of the enterprise in which we are employed, we are also going to take a much greater interest in the daily conduct of its affairs."

Receiver for Michigan Road

Arbitrary Action of Village in Paving Matter Forces Representatives of Bondholders to Act

Stewart Hanley, Detroit, on June 17 was appointed receiver of the Grand Rapids, Holland & Chicago Railway, operating interurban lines between Grand Rapids and Holland. The action was taken on petition of the Continental & Commercial Trust & Savings Bank, Chicago, under the trust deed securing a $1,500,000 bond issue authorized in 1900. The receivership was precipitated, according to the petition, by the action of the village of Grandville in refusing to permit the company to operate cars through the village until the interurban has lived up to its agreement to pave between its tracks there.

Some years ago the village of Granville granted the railway company a franchise to operate cars over its streets, and with this franchise was an agreement on the part of the railroad to pave between the tracks when the village repaved the street and to use material in that paving similar to that laid by the village. About five years ago the village paved the street, but the company did not pave between the tracks, stating at that time that it could not obtain the material. Action by the village to compel compliance with the terms of the ordinance was delayed, but last year the village began suit in the Circuit Court at Grand Rapids to force the company to complete the work of paving. Judge Willis B. Perkins several months later granted the petition of the village and ordered the railroad to lay the paving. The company appealed to the Supreme Court of Michigan. That body upheld the findings of the lower court, refused the company's petition for a rehearing and ordered the company to begin paving by May 1 of this year.

On that date nothing had been done, but the village granted a thirty-day extension of time. On Saturday June 14, it took further action by erecting barricades at the village limits so as to block cars both east and westbound through the village. Passengers were thus forced to walk the mile stretch in the village.

Receiver Hanley in sixty days will report back to the court as to the progress. The company admitted all allegations in the bill and joined in the prayer for a receiver.

On the evening of June 17 the village had begun to lament at the consequences of its arbitrary action. It lifted the blockade which for three days has prevented cars from passing through the village. Service between Grand Rapids and Holland was resumed on regular schedule on June 18. Judge Sessions has stated he will authorize Mr. Hanley to issue receiver's certificates at once in order that money may be raised to pave between the tracks in Grandville this summer.

Bus Purchase Reported at St. Louis

An agreement has been reached by the reorganization committee of the United Railways and the owners of the People's Motorbus Company, St. Louis, whereby the bus lines are offered to the successor to the reorganized railways for $2,400,000. The terms of purchase said to have been agreed upon are: Holders of Class A to be paid $60 a share, which means $5 for the first year of operation and $5 additional profit. A payment of $300,000 is said to have been offered for all of the B stock, which brings the total to $2,400,000.

The bus company is now operating seventy-two buses on five lines.

Further progress is reported toward lifting the railway receivership. The reorganization committee for the railway has decided that the $30,300,000 United Railways general mortgage 4 per cent bonds maturing in 1934 should be allowed to run to maturity. In order to avoid default in these bonds it will be necessary to cause the interest due last January to be paid on or before July 1, 1924, as the mortgage permits a delay of only six months. This interest will be paid, together with 6 per cent for the use of the money during the past six months.

It is the opinion of the reorganization committee, publicly expressed, that the present bus system and the street railway system can be satisfactorily coordinated. The committee has no desire to see buses eliminated or to prevent expansion of the bus system.

As yet no settlement has been made with the Suburban bondholders, who are proceeding separately from other bondholders. It is expected, however, that it will be possible to effect a settlement by which the bondholders of the Suburban system can be protected and the system be maintained as a unit.

Both the city and the railway have appealed from the valuation handed down by the Public Service Commission of the State of Missouri. Here again it is hoped that a basis of settlement can be determined shortly through which the city will withdraw its opposition to the valuation, and the receiver of the railway will do likewise.

All these four matters are actively engaging the attention of the reorganization committee. They must be settled before any reorganization plans are definitely announced. It is hoped to determine all of them in the near future.

The Board of Aldermen of St. Louis, Mo., has turned over to its committee on resolutions a bill introduced by Alderman Wimer of the Twenty-seventh Ward which provides that the president of the board appoint a special committee of seven aldermen to interest themselves in negotiations being carried on for the reorganization. Mayor Henry W. Kiel has repeatedly stated that the city administration would not participate in the negotiations for the reorganization of the United Railways, but would await an application for a new franchise before indicating the city's attitude on the reorganization plans. The newspapers of the city have criticised the Mayor for this stand.

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Proceeds of Chicago Issue for Refunding.—The proceeds of the sale of the $6,500,000 of Chicago Rapid Transit Company first and refunding mortgage gold bonds, referred to in the ELECTRIC RAILWAY JOURNAL for June 14, page 952, will be applied toward the retirement of $8,000,000 of first mortgage bonds of the South Side Elevated Railroad which mature on July 1, 1924.

Receipts More than Expenses.—The receipts of the Seattle Municipal Railway, Seattle, Wash., during the month of May totaled $519,502 and the disbursements $487,796.

$1,000,000 First Mortgage Bonds Offered. — Blodget & Company and Stone & Webster, Inc., New York, are offering at 93 and interest to yield more than 6 per cent $1,000,000 first mortgage 5½ per cent gold bonds of the Baton Rouge Electric Company, Baton Rouge, La. The bonds, known as series "A," are dated June 2, 1924, due June 1, 1954. The proceeds from the sale of this issue will be used to retire the existing debt of the company, including outstanding first mortgage bonds, called for payment on Aug. 1, 1924, and to provide additional funds for construction purposes. The Baton Rouge Electric Company does the entire electric lighting, power, gas and electric railway business in Baton Rouge.

Abandonment Decision Deferred.—Decision in the hearing before Commissioner Harry V. Osborne at the State House, Trenton, N. J. on the application of the Trenton & Mercer County Traction Corporation for the abandonment of service between Pennington and Hopewell was reserved for two weeks. In the meantime submission of the proposal will again be made at a public mass meeting to the Hopewell people and to the people residing within the affected districts. At that time a new plan will be submitted by the railway, which wants to operate buses between the two towns.

Authorizes Abandonment.—The Pennsylvania & Maryland Street Railway, Elk Lick, Pa., has been granted permission by the Public Service Commission to abandon its 5-mile line between Meyersdale and Garrett, Pa. The bridge material and trackage have been advertised for sale. The company has operated the trolley line since 1907, but with the improvement of the main highway between Meyersdale and Garrett and resultant bus service business on the railway fell off considerably.

Bonds Called for Payment. — All of the outstanding first mortgage 6 per cent serial gold bonds of the Portsmouth Street Railroad & Light Company, Portsmouth, Ohio, except $25,000 which mature July 1, 1924, have been called for payment July 1, at 102½ and interest, at the office of the Guaranty Trust Company. The total issue of the bonds is $325,000. They are dated July 1, 1914.

Surplus in Rochester.—The quarterly report for the operations of the New York State Railways for the period ended April 30, under the service-at-cost contract on Rochester trolley, trackless trolley and bus lines, shows a net surplus of $14,616 from combined operations. Although a steady gain in passengers is shown on the bus and trackless lines a deficit of $2,949 from the operations of the two lines is reported. The trolley surplus is $17,564. The Dewey Avenue Bus line, connecting the end of the Dewey trolley line with the suburb of Greece, and the cross-town trackless line, connecting a growing residential district on the south side of the Genesee River with the industrial area on the north side, are operated by a subsidiary company, the Rochester Co-ordinated Bus Lines, Inc.

Vote to Omit Dividend Payment.—The directors of the Rochester & Syracuse Railroad, Inc., Rochester, N. Y., recently voted to omit payment of the quarterly dividend on June 15 on the 6 per cent non-cumulative preferred stock. From March 15, 1921, to March 15, 1924, inclusive, quarterly dividends of 1 per cent were paid on this issue.

Authorized to Execute Payment Deeds.—The Key System Transit Company, Oakland, Cal., has been authorized in supplemental orders by the Railroad Commission to execute mortgages or deeds of trust to secure payment of $229,000 of first mortgage 6 per cent bonds due July 1, 1938, and $236,000 of similar bonds.

Director Chosen.—John P. Frenzel, an Indianapolis financier, was recently elected a director of the Indianapolis Street Railway, Indianapolis, Ind., to fill the vacancy caused by the death of Dr. Henry Jameson, formerly chairman of the board.

Utah Interurban Had Profit in 1923.—The Salt Lake & Utah Railroad, Salt Lake City, Utah, was operated during 1923 at a net profit of $69,449, according to the annual report filed with the Public Utilities Commission. The company paid $36,450 in dividends. Operating revenue was $877,461, an increase of $124,969 over the preceding year. Operating expenses were $532,811, an increase of $55,603 over 1922. Taxes on equipment and railroad property were $69,912 and interest on equipment notes and other outstanding notes was $160,400. The road's passenger revenue was $335,975, a gain of $12,386 over 1922. Freight revenue was $482,137 for last year, an increase of $100,817.

Suffered Loss of $447. — For the calendar year 1923 the Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan., suffered a loss in its balance account of $447. In 1922 the company realized a surplus of $21,318. Passenger earnings for 1923 were $232,222, against $247,636 in 1922. The total gross earnings were $461,819 in 1923 and $468,903 in 1922. Operating expenses showed an increase from $292,466 in 1922 to $312 399 in 1923. The line operates 40 miles of track, connecting Kansas City, Kan., Edwardsville, Bonner Springs, Linwood and Lawrence, with an additional 30 miles projected to extend to Topeka.

Accumulated Surplus in 1923 $160,752.—The Pacific Coast Railway, operating from Port San Luis, Los Alamos, Santa Maria and Guadalupe, reports to the California Railroad Commission for the year 1923 that its operating revenue was $162,541 and operating expenses $187,842, giving a net operating loss of $25,301. Miscellaneous non-operating revenue amounted to $59,589. Interest, rent, taxes and other deductions totaled $93,935. The net corporate loss for the year was $62,646. The surplus at the beginning of the year amounted to $223,858. Miscellaneous additions to surplus for 1923 amounted to $454 and miscellaneous deductions were $913, leaving an accumulated surplus at the end of the year of $160,752.

Order of Dissolution Filed. — The Empire United Railways, Syracuse, N. Y., has filed, through its attorney, with the Secretary of State an order for dissolution.

Reorganization Plan in Effect.—The holders of the first and refunding mortgage 5 per cent thirty-year gold bonds of the Buffalo & Lake Erie Traction Company, Erie, Pa., were recently notified that the reorganization committee had declared the plan of reorganization operative and effective. The reorganization plan was outlined in the ELECTRIC RAILWAY JOURNAL, issue of April 19, 1924.

Bonds Sold. — Drexel & Company, Philadelphia, have sold at 98 and interest to yield about 6.15 per cent, $3,000,000 of 30-year 6 per cent general mortgage gold bonds of the Georgia Railway & Power Company, Atlanta, Ga. The bonds are known as series of 1924. They are dated April 1, 1924, and are due April 1, 1954. In a letter from H. M. Atkinson, chairman of the board, it was stated that upon the completion of the new 20,000-kw. hydroelectric plant, which will be provided for from the proceeds of these bonds, the company will have a total hydroelectric generating capacity of 160,000 kw. The purpose of the issue in addition to the 20,000-kw. development is to pay for additions to the generating and distributing system.

Permission Sought to Abandon Surface Routes. — Final hearings on the application of the Dry Dock, East Broadway & Battery Railroad, New York City, to abandon a portion of its route and franchise on First Avenue from Fourteenth Street to Thirty-fourth Street and on the application of the Forty-second Street Manhattanville & St. Nicholas Avenue Railway to abandon a portion of its route and franchise on First Avenue between Forty-second Street and Thirty-fourth Street were held on June 9 by the Transit Commission. Decision was reserved.

Abandonment Authorized. — The Pennsylvania Public Service Commission has granted the Scranton Railway permission to cease operation from the boundary line between the Township of Lackawanna and the Borough of Moosic on the north, to the intersection of Main and Broad Streets in the city of Pittston, on the south. The commission said that in the light of the overwhelming and practically uncontradicted evidence with respect to the operating losses which had been sustained on the line for years; with respect to the additional capital which must be put into the system to place it in safe operating condition; with respect to the lack of necessity of continued operation of the line and to the adequate transportation facilities now serving the communities, it believed that the proposed abandonment was proper for the convenience of the public. The length of line abandoned is about 8 miles.

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Terms of Power Deal Reported Met.—It is understood that so far as the owners are concerned the way has been cleared for the consummation of the deal under which the American Gas & Electric Company and the Appalachian Power Company are seeking control of the American Electric Power Company. One of the conditions of the offer of $62.50 a share for the common stock of the American Electric Power was that 75 per cent of the 189,200 shares be deposited for delivery to the purchasers against payment. This condition is understood to have been met. Several important railways are included in the holdings about to change hands. The most recent development publicly reported in connection with the deal is an intended inquiry into its terms by the Public Service Commission of Pennsylvania.

Talk of Canadian Utility Merger.—Plans are said to be rapidly developing for Montreal Light, Heat & Power consolidated interests taking over the entire group of Robert companies, including Quebec-New England Hydro-Electric Corporation, Canadian Light & Power Company, Montreal Tramways & Power Company and Montreal Tramways. It is proposed to form a holding company whose capital, it is understood, will be $20,000,000.

Dissenting Stockholder Seeks Greater Consideration.—Thomas E. O'Shea, a stockholder of record in the New York Railways, New York City, has petitioned the Transit Commission requesting that before proceeding further in its hearings upon the reorganization plan of that corporation the commission subpœna the Guaranty Trust Company to produce a list of the present holders of the company's refunding bonds. He asked also that "Harry Bronner's reorganization protective committee be compelled—through subpœna, if necessary—to disclose to the commission the names of the bondholders whom it represents, the number of bonds held by each bondholder, the dates of the purchase thereof and the prices paid by them in each instance." Stripped of its verbiage Mr. O'Shea's plea is a protest seeking greater consideration for the stockholders of the company under the terms of the proposed reorganization.

Brooklyn Company's Preferred on Regular Basis.—At the board meeting of the Brooklyn-Manhattan Transit Corporation on June 16 the second dividend of $1.50 a share on the preferred stock was declared, and it was learned that the company has adopted a policy of declaring regular quarterly dividends in the future. When the first preferred dividend was declared last April, the directors intimated that this first payment did not constitute the inauguration of regular dividends, but was more in the nature of interest on money contributed by the stockholders to make possible the reorganization. The company has made such progress, however, that it was able to place the shares on a regular dividend basis, the first of which has just been announced. Under the terms of the reorganization plan by which it succeeded the Brooklyn Rapid Transit the dividend on preferred shares does not become cumulative until July, 1925.

Personal Items

D. E. Blair Heads Canadian Association

Engineer of Equipment at Montreal and P. A. Y. E. Designer Honored

D. E. Blair, who was elected president of the Canadian Electric Railway Association at its annual convention in Ottawa on June 13, is one of the ablest of the younger group of executives of Canadian electric railways. When asked to tell his life history Mr. Blair modestly replied that it could be told in a very few words. For the past twenty-one years he has been superintendent of rolling stock of the Montreal Tramways. Prior to 1903 he held a similar position with the Quebec Railway, Light, Heat & Power Company,

D. E. Blair

which he joined in 1897, immediately after he was graduated from college.

But this does not tell the whole story. In the course of his work he has had much to do with the development of modern electric railway rolling stock. One of his earliest accomplishments in this line was the pay-as-you-enter car, which was designed under his supervision soon after he accepted his present position. The ability of the man is recognized not only in Canada but in the United States as well, and his popularity is attested by his elevation to the presidency of the Canadian association. At the recent meeting it was remarked that Mr. Blair was one of the two men present who had been at the first meeting of the association when it was founded, in 1904.

A native of Canada, Mr. Blair received his preparatory schooling in the Quebec High School, after which he took a course in electrical engineering at McGill University, receiving the degree of B.Sc. from that institution at the age of eighteen.

Whatever problem Mr. Blair attacks he pushes to completion with vigor, a characteristic which extends even to his avocations. In summer he is an enthusiastic tennis player. Since the development of the radio he has spent much of his spare time in the winter in the construction of radio sets. He is an enthusiastic radio listener at times, but his real interest is in securing the highest degree of technical perfection in the construction of the sets which he has built. Nothing but the *ne plus ultra* satisfies the man when working either as a professional or an amateur. Perfection in things mechanical is of course impossible, but if it were possible Mr. Blair would achieve it. Nothing less would satisfy him.

R. H. Filbeck was elected president of the Terre Haute Traction & Light Company, Terre Haute, Ind., at the recent annual meeting of the directors.

W. A. Robertson is now the new superintendent of the Jacksonville Traction Company, Jacksonville, Fla. He has been with Stone & Webster for about fifteen years. For the past several years Mr. Robertson has served as general superintendent of the Eastern Texas Electric Company, operating local and interurban lines in Beaumont and Port Arthur. He succeeds C. E. Bostwick, Jr., who, as noted in the ELECTRIC RAILWAY JOURNAL for June 14, has been made general manager of the White Stage Line Company, with headquarters at Tampa.

"Judge" and Mrs. S. D. Hutchins have just returned from a ten weeks' tour and vacation in Europe. Mr. Hutchins has been representative of the Westinghouse Traction Brake Company in the central territory for many years and is active in the affairs of the Central Electric Railway Association. For many years he has been chairman of the committee which arranges for the conventions of the association, and in that capacity is permitted carte blanche by the executive committee. The Judge was a little out of sorts physically when he went to Europe, and it is hoped that the errand of regaining his strength, on which his company sent him abroad, was accomplished 100 per cent.

J. F. Rodgers has resigned his connection as engineer with the department of way and structures of the Brooklyn City Railroad. Mr. Rodgers has long been engaged in electric railway work. Following the earthquake and fire in San Francisco he was assistant engineer in the rehabilitation of the property of the United Railways there. Before that he had been connected with the transportation department of that company. Subsequently he became connected with the Board of Supervising Engineers, Chicago Traction, as assistant engineer and later served with the Chicago Surface Lines as superintendent of track.

W. R. Huffer has been appointed traveling passenger and freight agent of the Indianapolis, Columbus & Eastern and the Columbus, Newark & Zanesville Railway. Mr. Huffer has been

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associated in the past with the Western Ohio Railway at Lima. His headquarters will be the public relations department, Columbus, Ohio.

Travis H. Whitney in Brooklyn Post

Former Public Service Commissioner Elected Vice-President of Brooklyn-Manhattan Transit Corporation

Travis H. Whitney on June 16 was elected vice-president of the Brooklyn-Manhattan Transit Corporation, which a year ago succeeded the Brooklyn Rapid Transit Company. The position is one that has been open since the company was organized. During the last five years Mr. Whitney has been engaged in private practice of law, but he has maintained a close interest in transit matters and since last year has been very deeply interested in railway affairs, particularly in Brooklyn as a public director of the company of which he now has been elected an officer.

Mr. Whitney was with the Public Service Commission for the First District of New York for twelve years. He was appointed secretary in 1907 by the original Hughes Commission and served for nine years, when he was appointed and served as a commissioner until 1919. He was particularly in charge of transit development and construction in New York City during the war period when the major part of the new elevated and subway lines were constructed or completed.

G. M. Dahl, chairman of the executive committee of the Brooklyn company, has stated that as a public director nominated by the Transit Commission Mr. Whitney's point of view has been very valuable and helpful in promoting a better understanding between the company and the public, a result of the greatest importance to both. It is Mr. Dahl's belief that as vice-president, Mr. Whitney, with his point of view based on public needs, will have a still greater opportunity to promote understanding and confidence between the public on the one hand and the company and its investors on the other.

There is sound substantiation for this expression of opinion. It is, indeed, a rare background of experience that Mr. Whitney brings to his new position. The original Hughes commission with which he served was one of the first regulatory bodies of the kind, and with all due respect to the successor members on that body the commission as originally constituted was particularly notable for the ability of the individual members and the extremes of thought which the men composing the commission represented. Precedents which that body set in its deliberations have been written into the regulatory law of the land, and as secretary of the commission Mr. Whitney's ideas were not without influence on the deliberations of the first New York commission.

Aside from the formal work of the commission, however, Mr. Whitney was by the very nature of his post, first as secretary to the commission and later as a member of that body, in a particularly advantageous position to judge the problems confronting the utilities and to grasp the point of view of a public ever seeking increased and greater public utility facilities. Moreover, while Mr. Whitney was in public office the panorama of local politics was ever before him. To very few persons, indeed, are opportunities presented similar to those which Mr. Whitney has enjoyed in his public posts.

Mr. Dahl himself has at the back of him experience in commission work and is particularly keen in his appreciation of the complexity of the problems presented in dealing with the public. Moreover, since his connection with the company Mr. Dahl has been the principal spokesman of the company with respect to major public relations matters. Mr. Dahl's announcement of Mr. Whitney's appointment has been interpreted to mean that in the future the bulk of this work will be carried on by Mr. Whitney.

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T. H. Whitney

Mr. Whitney was born at Gentryville, Ind., on June 22, 1875. He was graduated from the Harvard Law School, and began the practice of law in New York City immediately thereafter.

Obituary

H. M. Swetland, Noted Business Publisher, Dies

H. M. Swetland, president of the United Publishers Corporation, which publishes *Iron Age, Dry Goods Economist, Automotive Industries* and other important business publications, died at his home in Upper Montclair on June 15. He was one of the pioneers of modern industrial publishing and had been a leader in raising journalistic standards through his activities in the Associated Business Papers. At one time he was owner of *Power* and of *Engineering and Mining Journal* (as it was then called), both now owned by the McGraw-Hill Company.

Mr. Swetland was born in Chautauqua County, New York, in 1853. In 1880 he came to New York as reporter and as subscription and advertising salesman of the *Boston Journal of Commerce*. In 1884 he became Boston representative of *Power*, later coming to New York and assuming the management of that publication. In this capacity, he was associated with James H. McGraw, now president of the McGraw-Hill Company, and Emerson P. Harris. The association was discontinued in 1888 when Mr. Swetland purchased *Power*, the ownership of which he retained until he sold the paper to the late John A. Hill in 1900.

For many years thereafter, Mr. Swetland gave his chief attention to the publication of magazines serving the automotive industry. In 1911 he organized the United Publishers Corporation, which brought together publications in the steel, automotive, building and textile fields. He was elected president of that corporation and retained that office to the time of his death. He was also president of the National Publishers Association, the Class Journal Company, the Federal Printing Company, the U. P. C. Realty Company and the Swetland Realty Company, and a director of the Commercial Trust Company.

Mr. Swetland's work and contribution to industrial publishing are well set forth in the following tribute paid to him by his life-long friend and former associate, Mr. McGraw:

> Mr. Swetland's success as a man and a publisher was due to a rare combination of personal qualities and business acumen. He was a tireless worker, had great penetration, concentration, and perseverance. He was an organizer of the first rank, and was always a co-operator. His ideals in publishing were high, service to the readers of his publications being his first consideration. The publishing business has lost an outstanding figure in the passing of Horace M. Swetland, but his work will endure in the great institutions to which he gave unstinted devotion, and in the lives of those whom he trained in the technique of publishing and encouraged to make the best of their opportunities.

Mr. Swetland not alone won for himself marked distinction in American technical journalism and in those industries which his papers served, but —what he prized more—the high regard and respect of all his very wide circle of associates, business and social. To these, his passing brings a keen regret.

Edward D. O'Brien, assistant superintendent of public utilities at Seattle, Wash., since 1919, died there recently, at the age of fifty-one years. Mr. O'Brien had been in the service of the city since March 1, 1909. He was a graduate of the Armour Institute of Technology in electrical engineering. He was also a lawyer.

Vincent J. Waltz, claims attorney for the Community Traction Company, Toledo, died at his home there on June 1, following an illness of eight weeks. He had been identified with the Doherty properties in Toledo and particularly the traction lines for the last fifteen years in claims work. He was one of the organizers of the Toledo Safety Council and its first president until he was forced to resign because of ill health a few weeks ago. Mr. Waltz was born in Cuyahoga Falls, Ohio, forty-eight years ago. He was graduated from Ohio Northern University at Ada.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Status of Copper Market

Big Increase in Copper Production and in Domestic Consumption During 1923

Smelter production of primary copper from domestic sources increased approximately 51 per cent in 1923 over 1922, according to statistics of the Department of the Interior. At the same time there was an even greater increase in the value of smelter production, which was approximately 64 per cent greater than the preceding year, due to the high prices prevailing during the first quarter. Smelter output in 1923 was 1,434,999,962 lb. as against 950,285,947 lb. in 1922. The average price of copper delivered during the year was 14.71 cents per lb., an increase of about 1.2 cents per pound over the average figure for the year before. There was a very great increase in domestic production of new refined copper from both domestic and foreign sources, the rate being higher in 1923 than during any previous year except the abnormal years of 1916, 1917 and 1918.

Year	Smelter Production (Domestic)	Refinery Production (Domestic and Foreign)	Imports (Unmanufactured)	Exports of Metallic Copper	Withdrawn on Domestic Account
1913	1,224,484,098	1,615,000,000	409,000,000	926,000,000	812,000,000
1914	1,150,137,192	1,533,800,000	306,000,000	840,000,000	702,000,000
1915	1,388,009,527	1,634,200,000	316,000,000	682,000,000	1,137,000,000
1916	1,927,850,548	2,259,400,000	462,000,000	784,000,000	1,479,000,000
1917	1,886,120,721	2,422,000,000	556,000,000	1,126,000,000	1,395,000,000
1918	1,908,533,595	2,394,000,000	576,000,000	744,000,000	1,662,000,000
1919	1,286,419,329	1,770,000,000	429,000,000	516,000,000	914,000,000
1920	1,209,061,040	1,526,000,000	486,000,000	623,000,000	1,054,000,000
1921	505,586,098	951,000,000	350,000,000	628,000,000	611,000,000
1922	950,285,947	1,256,000,000	541,000,000	743,000,000	897,000,000
1923	1,434,999,962	1,980,000,000	676,000,000	829,000,000	1,300,000,000

Domestic consumption has kept pace with production and except for the years mentioned was also at the highest rate, but because of unfavorable conditions in Europe, which have retarded consumption in the important consuming countries there, and because of the increased production in South America and Africa, which has tended to increase competition in European and other markets, stocks have increased and prices are still below what the producers had confidently expected they would be at this time. The producers have offset the low selling price of copper, so far as they have been able, by decreased costs of production. These decreases have been obtained by increased efficiency of operation, by improved labor, by consolidation of mining companies, by closer co-operation between producers and manufacturers.

The stocks of refined new copper have increased from 216,000,000 lb. at the end of 1922 to 264,000,000 lb. at the end of 1923, and stocks of blister copper and materials in process of refining have increased from 361,000,000 lb. at the end of 1922 to 432,000,000 lb. at the end of 1923.

During the year the Calumet & Hecla, the Ahmeek, the Allouex, the Centennial and the Osceola companies formed the Calumet & Hecla Consolidated Copper Company and the Kennecott Copper Corporation absorbed the Utah Copper Company.

Some salient figures of the copper industry are given in the accompanying table.

Startling Statistics of Material Consumption at Chicago

A statistically minded person would find much material for study in figures of the Chicago Surface Lines, prepared by the company's auditor, designed particularly to contrast conditions in 1914 with those that prevail now. Thus to the man in the street who hears an occasional squeal as a trolley car passes by it might appear that the company seldom did anything to ameliorate this condition. Company figures, however, show that it used 60,039 gal. of car oil in the year 1923, 38,597 lb. of gear grease and 15,026 gal. of compressor oil.

A flat wheel? The company turned 16,190 pairs of wheels in 1923 and 17,062 pair the year before, and at the same time renewed 7,824 wheels in 1923 and 6,600 the prior year.

A car not properly swept? The company wore out 16,731 brooms in one year and swept and disinfected 1,201,580 cars in the same period of time. The area of the glass in the company's cars is 1,476,525 sq.ft. or the equivalent of 34 acres.

The total heater capacity of the cars is 42,222,860 watts. The motors number 11,960 with a total horsepower of 505,710.

More than 1,625,000 trainmen's trip sheets were printed in 1923, enough to make a stack 677 ft. high, and a total of 1,822,094,000 transfers was printed, sufficient if placed end to end to extend for 145,586 miles.

Compared with this, the report of the Chicago Surface Lines reveals, there is $1.38 revenue received in 1924 compared with the dollar of a decade ago. Just as enlightening are the figures of the cost of track construction. Starting in 1914, with the mile costing $47,446 to the peak in 1920 when the same mile cost $107,232, the figure now stands at $93,785.

Railway Market for Buses Growing Fast

At present writing, 155 electric railways are operating at least 2,000 buses. The realization that there is a real field for buses in the hands of the present electric railway companies, which now see themselves as "transportation companies," embracing all kinds of transportation vehicles in the service for which each is suited, is spreading rapidly.

On the basis of its records of bus purchases to date and its knowledge of the thinking of railway men, the ELECTRIC RAILWAY JOURNAL sees the future market for buses in the electric railway field about as shown in the following table, taking the average cost at $7,000:

BUS SALES TO ELECTRIC RAILWAYS

1922	240*	$1,680,000
1923	621*	4,347,000
1924	2,000	14,000,000
1925	7,000	49,000,000
1926	15,000	105,000,000

*Actual

$75,000,000 Common Authorized by Westinghouse

The Westinghouse Electric & Manufacturing Company at its annual meeting on June 11 increased the authorized capital stock from $125,000,000 to $200,000,000. The additional stock will consist of common shares.

President E. M. Herr said business was quite satisfactory so far as the Westinghouse was concerned, "especially considering the tendency of business in general to slow up at the present time." Mr. Herr said that while the company's business also is somewhat less than for the corresponding period a year ago, the decrease has not been of sufficient volume materially to affect operations, and the company's commercial officers believe that it will improve in the fall—to what extent, of course, depending somewhat upon the result of the political campaign.

H. P. Davis, vice-president of Westinghouse Electric, and Loyall A. Osborne, president of the Westinghouse International Company, were elected directors to succeed W. H. Woodin and J. C. Bennett, retired. Mr. Bennett continues as secretary and controller of the Westinghouse Electric.

Metal, Coal and Material Prices

Metals—New York	June 17, 1924
Copper, electrolytic, cents per lb.	12.60
Copper wire base, cents per lb.	14.875
Lead, cents per lb.	6.925
Zinc, cents per lb.	6.17
Tin, Straits, cents per lb.	44.625
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.325
Somerset mine run, Boston, net tons	2.175
Pittsburgh mine run, Pittsburgh, net tons	1.875
Franklin, Ill., screenings, Chicago, net tons	1.925
Central, Ill., screenings, Chicago, net tons	1.625
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.25
Weatherproof wire base, N.Y., cents per lb.	17.25
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N.Y., per gal.	$0.97
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	$11.75
Turpentine (bbl. lots), N. Y., per gal.	$0.835

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Rolling Stock

Third Avenue Railroad, New York, N. Y., has placed an order with J. G. Brill Company for fifty single-truck closed cars. Delivery will begin July 15 and will be completed by Sept. 1. These cars will have a length over all of 30 ft. 3½ in., a width of 8 ft. 2 in. and a truck wheel base of 8 ft. They will seat thirty-six people and weigh approximately 10 tons with all equipment. The car body is of all steel construction with headlining and is provided with arch roof. The equipment for these cars will be taken from some of the company's 500 type cars which are now in service and will include the McWhirter pedal control of the equipment and the air brakes.

Jamestown Street Railway, Jamestown, N. Y., is planning the purchase of eight or ten improved one-man cars for its Jamestown-Falconer line.

Lorain Street Railway, Lorain, Ohio, has ordered five new city cars of the Peter Witt type for its city lines.

Monongahela - West Penn Public Service Company, Fairmont, W. Va., expects on July 15 to receive the three cars ordered in April of this year. The specifications of these cars follow:

Builder of car body	Cincinnati Car Company
Type	Single truck safety car
Seating capacity	28
Weights — Car body	8,000 lb.
Weights — Truck	6,500 lb.
Weights — Equipment	4,000 lb.
Weights — Total weight	18,500 lb.
Length over all	28 ft. 8 in.
Wheelbase	8 ft. 6 in.
Width over all	8 ft. 2 in.
Height, rail to trolley base	10 ft. 3¾ in.
Body	Steel
Interior trim	Cherry
Headlining	Agasote
Roof	Arch
Air brakes	Westinghouse
Armature bearings	Bronze
Axles	Carnegie A.S.T.M. Spec.
Bumpers	Cincinnati Car Company
Car signal system	Consolidated
Car trimimngs	Bronze oxidized
Conduits and junction boxes	Duraduct
Control	Westinghouse K-63 BR
Couplers	Cincinnati
Curtain fixtures	Railway Supply & Curtain Company
Curtain material	Pantasote
Destination signs	Hunter illuminated
Door operating mechanism	National Pneumatic
Wheelguards	H-B
Gears and pinions	Nuttall helical
Hand brakes	Cincinnati
Heater equipment	Consolidated
Headlights	Ohio Brass dash type
Journal boxes	Symington
Lighting arresters	Westinghouse K-3
Motors	Two Westinghouse No. 508-A, inside hung
Enamel	Sherwin-Williams Old Dutch
Registers	International R-10
Sanders	Ohio Brass
Sash fixtures	Bronze oxidized
Seats	Wood slat
Slack adjuster	Gould automatic
Springs	Cincinnati
Trolley retrievers	Earle
Trolley base	Simplex No. 3
Trolley wheels	More-Jones 6-in. No. 2
Trucks	Cincinnati 139-C
Ventilators	Nichols-Lintern, type A
Wheels	Steel, 26 in. diameter
Power-saving device	Economy 100-amp. meter

Eastern Massachusetts Street Railway, Boston, Mass., has purchased three California type buses with a capacity of twenty-two persons each.

Olean, Bradford & Salamanca Railway, Olean, N. Y., recently placed an order for four new one-man safety cars, two for use in Olean city service and one each at Salamanca and Bradford. One car has already been delivered and has been put in service at Salamanca, according to announcement of District Superintendent A. C. Sloan.

Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich., contemplates the purchase of several new cars of the one-man type to use on its interurban short lines.

Pacific Electric Railway, Los Angeles, Cal., has placed an order for ten more double-deck buses with the Fageol Motors Company in addition to the order mentioned in the ELECTRIC RAILWAY JOURNAL, issue of May 3.

Track and Line

Tri-City Railway, Davenport, Iowa, has started a $45,000 double-track improvement project. Construction will be a continuation of the new improvement work begun last year, carrying the improved right of way from the loop to Warren Street.

Indianapolis Street Railway, Indianapolis, Ind., will spend $185,000 on track repair work. This amount is part of the $500,000 additional revenue estimated to accrue from the new fare.

Seattle, Wash. — Paving work between tracks in several districts of the city, involving a cost of more than $200,000, will be started at once, according to an announcement of the utilities committee of the City Council, following assurances from the Seattle Clearing House Association that warrants issued by the Seattle Municipal Railway Department will be accepted. Bills for the paving work will not fall due until next winter. Among the first jobs to be let will be the Fauntleroy Avenue and the Twenty-second Avenue, N. E., contracts, on both of which the street paving is now under way.

Canadian National Railways, Toronto, Ont., which owns and operates the system at Niagara Falls, Ont., has started work on the rehabilitation of the system in that city. The company will spend about $350,000 in relaying the tracks and roadbeds. It is planned to have the work completed by Sept. 1. Early in 1925 the company intends to construct an entirely new line out Lundy's Lane.

Trade Notes

Truscon Steel Company, Youngstown, Ohio, has announced the appointment of Frederick Maples as manager of the newly instituted steel pole department. He was for a number of years power director of the Long Island section of the Pennsylvania Railroad and was until recently connected with Hubbard & Company, Pittsburgh, manufacturers of pole line construction materials. This new steel pole, which the Truscon Steel Company is soon to put in quantity production, is the result of long experimentation and studied development. It is designed primarily to meet the pressing demand for a steel pole that would be strong, rigid, durable and economical in either light or heavy duty service. The construction of this pole is described elsewhere in this issue.

General Electric Company, Schenectady, N. Y., has awarded a contract to the Turner Construction Company of New York for a six-story reinforced concrete building to be erected at West Philadelphia. This building, in connection with two one-story structures now nearing completion, will be the initial development of a plant to be devoted entirely to the manufacture of switchboard devices.

Economy Fuse & Manufacturing Company, Chicago, Ill., announces the appointment of Morgan P. Ellis as general sales manager. Mr. Ellis has been assistant general sales manager for the past eight years.

Max Riebenack, 3d, is now permanently connected with the Philadelphia branch of the Industrial Works, Bay City, Mich., as district sales engineer, Mr. Riebenack was formerly mechanical and research engineer with the National Aniline Chemical Company and the Industrial Separators Company, Philadelphia.

Trico Fuse Manufacturing Company, Milwaukee, Wis., has recently moved its New York office to larger and better quarters at 154 Nassau Street, R. F. Walsh, district manager in charge. The new office of the company in New York is more centrally located than was the old one, and the change makes it possible for the company to insure still better service for Trico powder-packed, time-limit renewable fuse users in the Greater New York district.

New Advertising Literature

Midwest Air Filters, Inc., New York, N. Y., has issued its new data book entitled "Air Filters for Compressors and Internal Combustion Engines."

Southern Pine Association, New Orleans, La., has issued the ninth revised edition of its manual on standard wood construction.

Wagner Electric Corporation, St. Louis, Mo., has published reprints of a paper read before the joint convention of the Southwestern Geographic Division of the National Electric Light Association entitled "Some Recent Comprehensive Tests on the Fynn-Weichsel Motor"; also a reprint from an article in *Iron and Steel Engineer* called "The Motor that Corrects Power Factor," and a third presented before the electric section of the Wisconsin Utilities Association called "Tests on the Fynn-Weichsel Motor."

Refractories Manufacturers' Association, Pittsburgh, Pa., has issued the fifth edition of its "Book of Brands." In addition to a complete list of manufacturers of fire brick in this country and in Canada, the pamphlet gives an alphabetical list of the brands and trademarks used in the industry.

Taylor-Wharton Iron & Steel Company, Highbridge, N. J., has issued a twenty-page pamphlet entitled "Putting the Right Steel on the Job." The pamphlet is issued primarily to emphasize the lasting quality of Tisco steels.

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New York, June 28, 1924

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 63
Number 26

Basic Soundness of the Industry Shown Again

IN RECENT years there has been a tendency among investment bankers to make a wry face whenever electric railway securities were mentioned. This attitude has gone so far that in a number of cases the name of a company operating electric railways has been changed to disguise that fact, and to give added emphasis to the light and power end of the business. It would seem that there is an idea in some quarters that the electric railway is on the way to join the dodo, the mastodon, and other extinct species.

That there is no real foundation for this attitude is shown conclusively by statistics gathered from a large share of the leading electric railways in this country, as presented in this issue in an article by John F. Layng. Although other forms of transportation have come into more or less prominence within the past few years, the basic soundness of the electric railway industry is shown by the steady increase in riding over a considerable period of years. Even though there have been fare increases and transportation difficulties, the demand for such transportation continues to grow. And with increasing congestion on the business streets of all cities, it is likely to climb still faster.

As a result of the improvements and economies being effected by the comprehensive modernization program now getting started in the industry, Mr. Layng points out that there is no reason why the securities of this six-billion-dollar industry should not again be in favor with the investor. Supplying a basic need for transportation, without which our modern large cities could not exist, it is absolutely certain that this will be the case. It is to be hoped, for the good of all concerned, that the recovery will come with all speed. And it is believed it will, for the realization of the basic soundness of the industry is at last taking hold rapidly among bankers and investors and the men of our own industry and the public generally.

Who Is to Blame if the Public Has a Wrong Idea About Railways?

THIS question was asked by a speaker at the meeting of the New York Electric Railway Association on June 21, and then answered by the same man with the assertion that the railway men themselves are at fault if the public has the wrong idea. The speaker said he was of two minds whenever he began to think about electric railways. As a representative of an industry closely allied with the railways, he was sympathetic toward their problems and wished to see them fairly treated. As a plain, every-day citizen who rides in the street cars, he said he was "sore" at the quality of service, the rates of fare, and the incivility of many of the employees, and he did not care whether the companies got a square deal or not. This, the speaker claimed, is the attitude of a large part of the public and is a condition for which the managements are to blame.

At first thought this may seem to be a rather harsh accusation. But if one considers it carefully, one begins to wonder if it isn't pretty nearly right after all. The speaker made no pretense that the attitude of the average citizen is just or reasonable. He himself does not blame the management for all the shortcomings of the service, because as a fellow worker in the field of public utilities, he knows the reason for many of these things and that the companies are not to be blamed. But the general public often blames the railway because the public has not been told, frankly and fully, the railway story.

It must be admitted that there is a good deal of truth in this argument. We all know railways that are working hard day and night under adverse conditions to give the best possible service—and saying nothing about it. That actions speak louder than words is perhaps their motto. So much of this activity, however, is necessarily hidden from the public gaze, that the average man has no conception of what the company is really doing to provide him with transportation. The actions are fine—but why not help them out with words—the right kind of words?

"We can't afford to advertise," the management may say. If the public in a particular locality has the wrong idea about the railway, the management cannot afford not to advertise. This is not a new thought. It merely is to emphasize that many railways have not yet gotten the point.

Another Impetus to Modernization

PRESIDENT BUDD of the American Electric Railway Association has conceived another plan for giving modernization in the industry a further impetus, and the executive committee at its last meeting gave its approval. He has appointed a committee on foreign operation to team up with the committee on city operation and the committee on interurban operation in bringing out before the industry any practices of any company which represent an advance in the art and which will help to point the way toward raising electric railway service generally up to the level it ought to have as of 1924. The committees on city and interurban operation have searched out the advance practices in this country. The committee on foreign operation will leave shortly for a trip to Great Britain, France and other countries, to search out any practices of the foreign companies which seem to the committee, in the light of its broad knowledge of operation here, to be an advance over our practices.

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The new committee is to consist of James W. Welsh, executive secretary American Electric Railway Association; Harley A. Johnson, Chicago Rapid Transit Company and Chicago, North Shore & Milwaukee Railroad and president American Electric Railway Engineering Association, and Harry L. Brown, editor ELECTRIC RAILWAY JOURNAL. The association will pay the way of only Mr. Welsh. Mr. Budd said if the association would pay the way of one man, he would pay the way of one and would ask Mr. McGraw to pay the way of an editor of the JOURNAL. While the earnings of the JOURNAL hardly warrant such an extra expenditure this year, Mr. McGraw's quick response to Mr. Budd's suggestion was typical of him whenever there is an opportunity to do a service to the industry. He said, "Yes, we'll send a man, Mr. President—we'll send him if the JOURNAL has to borrow the money."

The committee, as Mr. Budd suggested to the executive committee, will report back its findings and get them out to the field just as rapidly as possible through the JOURNAL and at the October convention. The Europeans have been doing some things from which it appears that American transportation men can learn better ways. But the first hand impression of these things by men versed in American practice is needed in order to give them an intelligent interpretation for study here. Needless to say, Mr. Budd's latest suggestion should be of great value in rounding out the program of modernization which is to be the main theme of this year's convention and of the Annual Convention Number of this paper.

Paving Charges Translated Directly Into the Rate of Fare

"A NICKEL must come in for every nickel that goes out." This statement, quoted from the decision of the Transit Commission of the State of New York in the case of the New York & Queens County Railroad, printed elsewhere in this issue, marks a new and commendable departure in fare regulation. The decision was written by Commissioner Harkness and it is an outstanding document because of the simplicity, clarity and forcefulness of the analysis presented of this street railway's situation and its reciprocal obligations with the public. It is a fine example of the constructive work that can be done by a commission when it rises above political opposition.

In its decision the commission recognized the basic fact that, regardless of politics and politicians, the public cannot continue indefinitely to get something for nothing. The road, already in receivership, was recently ordered by the Federal court to cease operation unless an increase in fare sufficient to cover operating expenses were granted. Thus a prompt decision of the regulatory body was forced. It is the first definite break from the basic 5-cent fare in the New York City district to be ordered by the Transit Commission.

The order of the commission provides that the basic fare shall be increased from 5 cents to 6 cents to take care of ordinary operating costs, which are not met at the present rate. But the unique feature of the order is that, if the city of New York persists in requiring the company to pay for paving estimated to cost $309,000 this year, the fare is to be increased on a sliding scale of 1 cent additional for each $100,000 assessed on the railway for this purpose.

This new way in which the commission has provided for paving charges should put the matter in a different light. The car rider now can see just what the imposition of this burden means to him. For instance, if the city insists on its original $300,000 paving program, the fare will be 9 cents instead of 6 cents. And since the decision holds that the excess over 6 cents must be applied specifically to the paving fund, there is no way in which the issue may be dodged.

Assuming that the decision holds, it is the duty of the receiver to let the car riding public know the full facts. In the language of the commission, "The imposition of such a paving charge against an impoverished railroad such as this and against its passengers is unreasonable. It is not a sufficient answer that it is required or sanctioned by law. Passing a statute does not of itself make its requirement reasonable, and when it results in situations such as this it properly should be amended."

It is to be hoped that the desired results will be secured. The court has still to accept the proposition, and it remains to be seen whether the revenue will be adequate to pay operating expenses.

Keeping Pace with Changes in the Art

ONE can hardly realize the tremendous strides which have been made in the development of electric railway equipment without comparing the apparatus of the present-day with that in the early part of the electrical era. A particularly valuable contribution on this subject was made in a paper read before the New York Electric Railway Association by E. P. Waller, which appears in this issue.

In addition to its historical aspect, Mr. Waller's paper is most instructive on the subject of valuation of electric railways. The money spent, and necessarily spent, in the development of modern equipment through the purchase of early types is not now represented by any physical property, and the changes came so rapidly at the beginning it would have been difficult to have retired much of this superseded equipment through a depreciation reserve, even if the principles of depreciation had been understood as thoroughly in those early days as at present. Certainly the advance would not have been anywhere near so rapid if each type of equipment had had to earn enough over operating expenses and profit to retire itself. The fact is that in the cases of most roads no attempt was made to follow a plan of this kind. It was not considered by the companies necessary, because they believed that with the growth of population in the cities served by their lines, the values of their franchises were also appreciating to an extent more than sufficient to counterbalance even a rapid rate of depreciation on the equipment used.

Still another question is suggested by Mr. Waller's paper. To what extent can the industry now finance purchases of modern equipment to keep pace with improvements in the art, when there is such a small margin of surplus, and commissions and courts demand a closer relation between the physical valuation of a property and the rate of fare it is permitted to charge.

The answer is that the changes cannot be made so rapidly. Fortunately it is not now apparently necessary, if electricity is to remain the main motive power. In fact, the early times were too hectic for comfort. With a fairly liberal system of depreciation reserve, all ordinary needs can be cared for, and under special conditions requiring considerable changes, the public service commission would probably permit the establishment of the necessary reserve.

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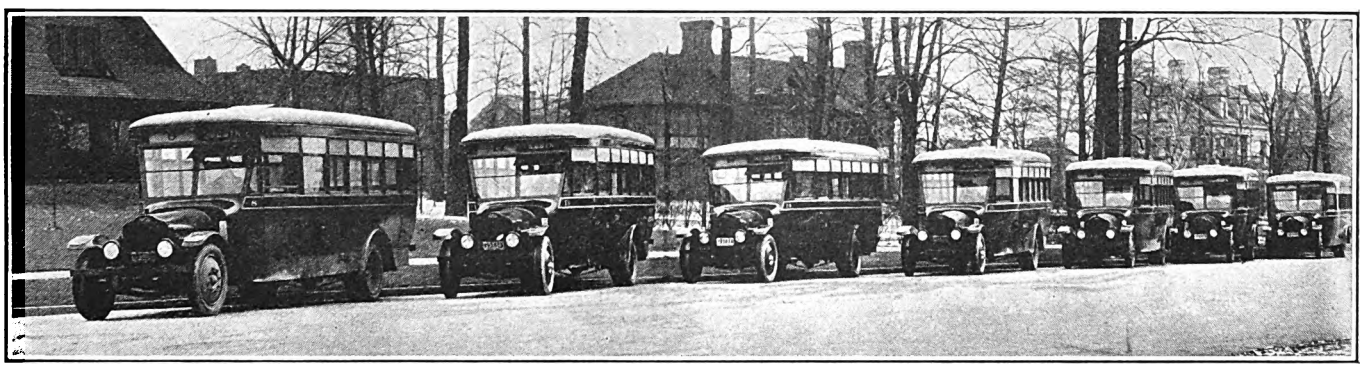
Buses Carry One-Quarter Total Number of Passengers in Youngstown

Bus Service Supplements the City Railway System, Furnishing Transportation Facilities to Recently Developed Sections Unserved by Cars—Tire Contract Relieves Company of Tire Servicing—Garage Facilities Have Been Provided in Business District

ONE-QUARTER of the total number of passengers, both revenue and transfer, transported by public carriers within the city limits of Youngstown, Ohio, are carried in buses which form a part of the Youngstown Municipal Railway system. The buses are operated by the railway and perform a supplementary service over routes which extend to parts of the city unserved by the street railway lines. The bus system does not act as a feeder to the rail, is not extensively in competition with the cars, nor does it offer a de luxe or high-speed express service as an adjunct to the street railway cars. The system is a street railway on rubber tires rendering service such as would be given by extensions or new lines of the rail system, if such rail lines could be established as economically as bus lines. The buses are used in the same manner as trolleys; the fare and transfer privileges are the same. In some places the same street is used for a short distance by both bus and car, but this is done because this street offers the only convenient thoroughfare between the business district and the outlying section served by the bus.



Forty-one Buses Similar to These Furnish Up-to-Date Service, Supplementing Electric Railway Cars in Youngstown, Ohio

Bus Service as a Protective Measure

On Sept. 24, 1922, the Youngstown Municipal Railway entered the bus business as a protective measure to prevent continued inroads on the railway business by jitney competition, and also to procure the new business which bus operation could create. As it was felt that the jitney and unscrupulous owner-driven bus operation could be eliminated only by giving better service in attractive, up-to-date equipment, the company has purchased to date 41 buses with 25-passenger Bender bodies, mounted on White, Republic and Mack chassis. Seven routes totaling 16.7 miles were laid out extending from the business district into the newly developed sections of the city unserved by the street cars.

While the company has at the present time 41 buses in operation the base schedule calls for only 21 buses, and the peak load requires 31 buses. This leaves 10 vehicles for emergency work or replacement duty. The first run leaves the public square at 5 a.m. and the last bus completes its run at 12:40 the following morning. Each of the routes has a terminal within the business section of the city. Four of the routes, namely, Lincoln, Oak, Elm and Ford, terminate at the Public Square, while the other three—Hillman, South and Indianola—have a downtown terminal in front of the railway offices on Boardman Street, one block from the Central Square. Although this latter loading zone is not as convenient as the one on the square, congestion at the square makes the loading of seven buses at a time during the evening rush almost impossible. Two of the routes which load at the square are connected and form a through route from one side of the city to another.

The bus schedules have been so arranged that with an average speed of 9.14 m.p.h., there is very little layover time at either end. In fact, during the rush hours a bus leaves the downtown loading point immediately after it has secured its load. The buses are operated pay as you leave and are handled by one man, who is assisted at the downtown loading point by a supervisor. Standees are allowed.

This transportation service rendered at a headway which varies from 4 minutes during the rush hours to 15 minutes during the day, handles an average of 20,000 passengers per day, while the combined systems handle 90,000 passengers per day. A higher load factor prevails on the buses than on the cars. The buses are usually crowded, while seats are to be had in the trolley cars. This may be accounted for by the fact that people desire to ride in rubber-tired vehicles and also by the fact that the bus offers a little faster transportation than does the car to certain sections of the city.

Operating Organization

Bus operation comes under the supervision of the general superintendent of the railway, and the superintendent of transportation is in charge of both bus and

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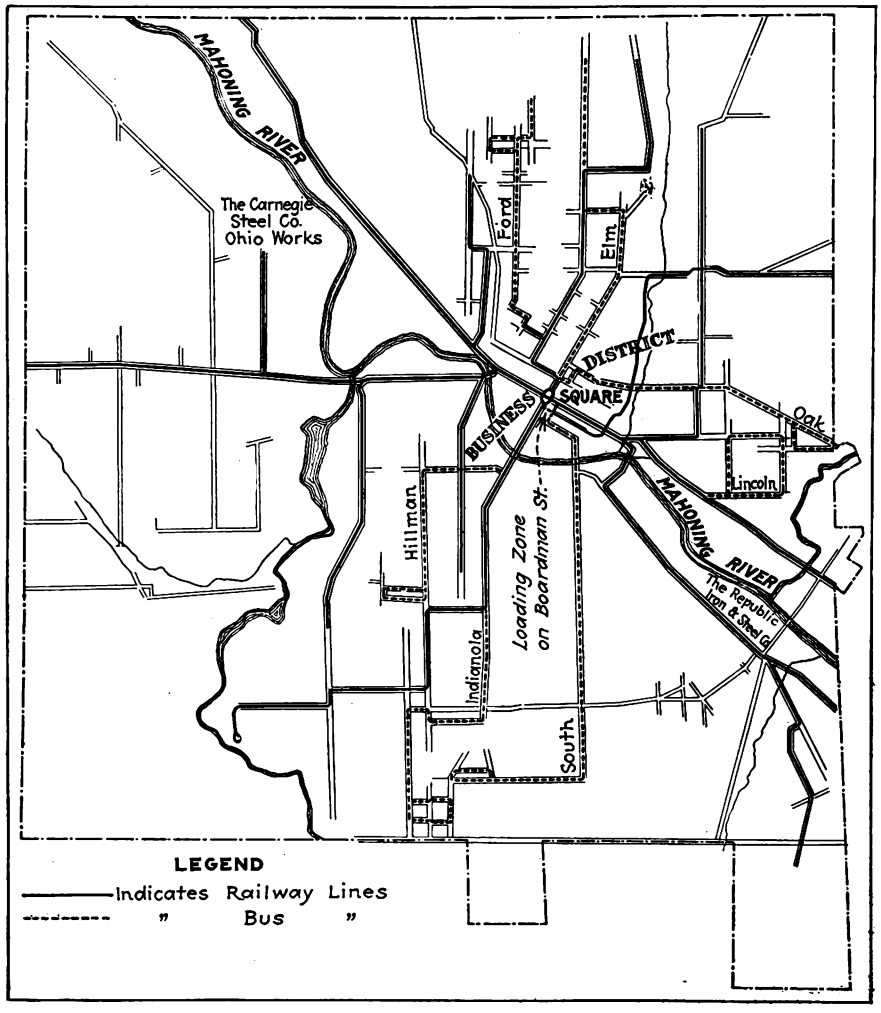
car transportation matters. His office force works jointly for both departments, as do the railway supervisors and the safety supervisor. Below this point in the transportation department there is no joint jurisdiction. Although the railway street supervisors have jurisdiction over both car and bus, since bus operation has assumed large proportions, it has been necessary to appoint two bus supervisors, who work early and late turns. These two men have no jurisdiction over railway operation as they have not had motorman or conductor training.

In the mechanical department, the master mechanic has joint supervision over both car and bus equipment, but the bus and car maintenance work is carried on in different locations by separate forces. The garage is in a central location in the heart of the town, while the car repair shop is on the outskirts of Youngstown. However, heavy bus-body repairs are taken care of in the railway carpenter shop. This is true also of heavy mechanical repair work which may be occasioned by the failure of some parts of the bus equipment. As the garage and car repair shops are separate, the same men cannot work on maintenance and repair of cars and buses except as it becomes necessary to make major repairs as previously stated, which work is performed in the car repair shop. Two foremen are in charge of the bus and car repair work, both of whom, however, report to the master mechanic.

The company is of the opinion that a man should not be interchanged as motorman and bus driver. There are approximately 70 drivers who constitute the personnel of the bus operation, these men being distinct from the railway conductors and motormen. When they are hired, it is understood that they are bus drivers and will not be transferred to the car service. However, a few men have been transferred from the car service to bus service. It has not been the practice of the company, however, to remove trolley runs and substitute bus runs. The bus service has been an addition to the railway service, not a substitute.

From the first day bus operation was attempted by the railway company it has been a success and has netted the company an income of approximately 5 cents per bus-mile. The total expenses of operation have averaged approximately 26 cents per bus-mile, while the revenue has mounted to as high as 32 cents per bus-mile. The expense figures include the cost of maintenance, operation, depreciation, interest and the cost of tires, which are purchased on a tire mileage basis through a tire contract with the General Tire Company.



Routes Have Been Laid Out with a View Toward Serving All Sections of the City Unserved by Cars. The Lincoln and Oak Lines Have Been Routed Through the Business District

At the time the company entered the bus business it was thought that tires and tire troubles would prove an obstacle to successful operation. To relieve to some extent this anticipated trouble, a tire contract was entered into with the General Tire Company. Through this agreement the operating company is relieved of all tire maintenance. The General Tire Company's agent in Youngstown "services" the tires in every sense of the word. The wheel is removed, the tire repaired at the service station and the re-tired wheel delivered to the garage by the tire company. A small service truck is sent out to the bus having a puncture and after the service man replaces the tire, the damaged tire with its wheel is taken to the tire company's service station.

Two procedures are followed in the method of replacing tires. If the puncture is in one of the front tires, an emergency replacement bus is sent out from the garage, the tire company sending a man along with it. This bus goes into service, the spare tire carried by the disabled bus is placed in service by the tire man and the vehicle returned to the garage. The punctured tire is left at the service station. The repaired tire is returned to the garage by the tire company within a few hours. In case one of the dual rear tires is punctured, the bus continues its run and the tire is changed at the end of the line by the tire company's man, who has been previously notified and has driven to the terminal with the necessary tools to place in service the spare tire carried by the bus.

Tires are not changed around on the car unless it has become necessary to remove a tire on account of failure. While it might be advisable to move a tire from one position to another in order to equalize the wear, the company has nothing to do with the tires other than to notify the tire company of a puncture,

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or when a tire becomes badly worn. However, the operating company does give an accurate mileage record of each bus to the tire company. It is from these records that the tire bill is calculated, figured at a flat rate per mile of use. The tire company reserves the right to furnish either 34-in. x 5-in. or 36-in. x 6-in. tires. During the winter months the operating company requires 34-in. x 5-in. tires on the rear in order that the tire chains may be attached to the duals without removing the wheels. The tires are mounted on Budd-Michelin wheels.

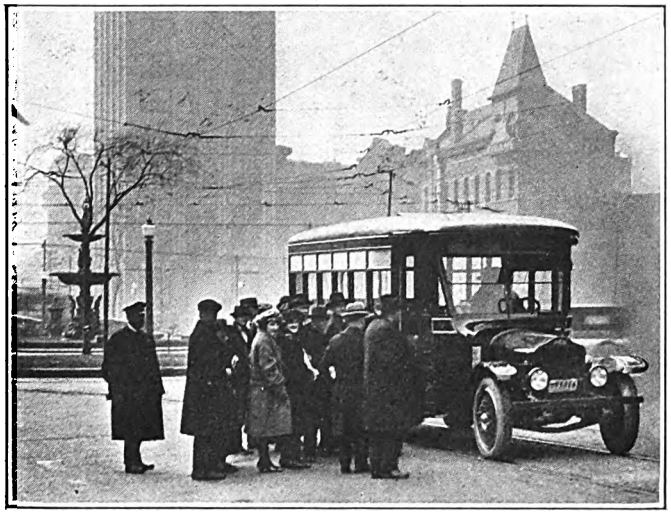
The wages of the drivers vary from 53 cents to 62 cents per hour. There is no base pay, the driver working between nine hours and ten hours per day and being paid for the time he works. Starting at 53 cents, the driver is advanced to 56 cents per hour at the end of three months, while at the end of one year he is given the maximum pay of 62 cents per hour. This maximum rate is the same as that paid to one-man car operators.

The average gasoline consumption of a bus is 0.2 gal. per mile. The oil consumption varies with the condition of the engine. The company maintains an adequate supply of fuel and oil on hand, making purchases of these at wholesale prices. Depreciation is figured at the rate of 25 per cent, but it is felt that with the high degree of maintenance this figure is very conservative.

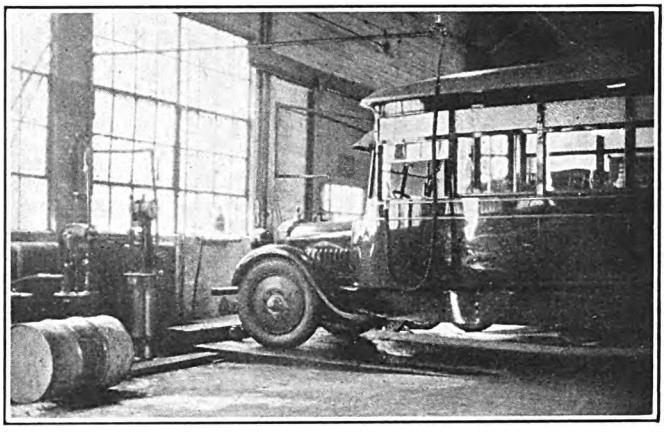
Garage Description and Practice

A rented garage is used as a base for the bus operation. It is located within three blocks of the central square, and is accessible from two streets and an alley. The building is approximately 200 ft. long and 150 ft. deep and has space for all of the 41 buses within this area and the two adjoining store fronts. As all of the floor space is not used during the day, storage facilities are offered to drivers of passenger cars desiring a parking space. This furnishes some revenue which goes to reimburse the garage department for the rental of the building. For this space the company receives an average of $300 per month.

All work connected with the maintenance of the buses is done at this garage, such as supplying oil, gas and water, washing and filling the tires. Each bus is given this attention every day, the majority of the buses being taken care of at night. The nightly



Buses Formerly Were Loaded While on the Car Track, but Now All Buses Pull Up to the Curb for Loading and Unloading of Passengers



Placing the Front Wheels of the Bus on an Incline Levels the Chassis and Makes Possible an Accurate Determination of the Quantity of Oil in the Crankcase

"servicing" of the 31 vehicles must be performed with speed as it is necessary to go over 15 buses every morning between 1:30 and 2:30 a.m. As there are ten extra vehicles, work on these is done during the day. Each bus is inspected every five days, at which time minor repairs or replacement of worn units are made.

An interesting method of selecting the buses for inspection is followed. One day Nos. 1, 11, 21, 31, 41, 6, 16, 26 and 36 are put through the inspection shop. On the next day the 2's and 7's are inspected, the third day the 3's and 8's, etc. This method results in the entire fleet being inspected in five days.

The garage maintenance force consists of 25 men and is divided into a day and a night gang, each in charge of a foreman. During the day, five inspectors, one motor builder, one road man, one general repair man, two brakemen, three washers, one office boy, one janitor and one foreman are on duty. The night gang consists of a foreman, three brake men, two gas men and three washers. To facilitate the work of "servicing," there is a gasoline supply rack at the rear of the garage. This is an incline 6 in. high, at the top of which is a concrete bumper to stop the front wheels of the bus. On each side of the rack is a Wayne gasoline measuring pump with an overhead swivel feed pipe having the usual supply hose attached at its end. It is possible to fill the fuel tanks on a bus from either side. All of the buses have tanks on both sides, which has resulted from the company adding a 20-gal. tank connected with the main 30-gal. tank by a 1-in. diameter brass pipe. While it is possible to fill from one side, it expedites the work to pump into both tanks. The storage tank of 2,000 gal. capacity is located in the ground at the rear of the building.

By driving the bus up the incline, the chassis is made level so that the quantity of oil in the crankcase may be accurately determined and the proper amount added. While the oil and fuel are being added, the radiator is filled with water and the six pneumatic tires brought up to the proper pressure of 100 lb. per square inch. After this work is finished, the buses are moved over to the wash rack, where three washers clean them outside and inside. Supplying the gasoline takes about as long as washing, so that the buses move along quite rapidly. From the wash rack the machine is parked or berthed for the night, in which location it is greased. For this work a "Dot" 30-lb. capacity electrically driven grease pump is used. This is automatically controlled and supplies grease to the chassis bearings at a pres-

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DISTRIBUTION OF EQUIPMENT AND SCHEDULE FOR BUS OPERATION

Total length of bus routes..... 16.7 miles

Run	Number Base Schedule	Round Trip, Miles	Headway Normal	Headway Peak
Ford	2	4.4	15	10
Elm	3	4.7	10	6
Oak, Lincoln	5	7.5	11	8
South	4	6.3	12	9
Indianola	3	6.6	12	10
Hillman	4	3.9	8	4
Totals	21	33.4		

sure of 1,500 lb. per square inch. The use of this machine speeded up the lubrication to such an extent that it was possible to do away with the services of one man.

The quantity of oil added every night varies with the condition of the engine and may amount to 4 qt. or half of the proper amount to carry in the crankcase. Operating 225 miles per day, 4 qt. would mean a mileage of only 56 per quart. When this drops to 50, the engine is replaced by one that has been rebored or reconditioned with new piston rings. While it may happen that as much as one-half the quantity of oil in the crankcase is replaced each day, a complete change is made on inspection days (every fifth day) in order to remove the sediment from the crankcase.

Replacement of worn units is made whenever inspection discloses weak parts. The inspection every five days is complete, every detail of the chassis and body being subject to close scrutiny before it is marked up as O. K. by the inspector responsible for that portion of the work. This is divided into five sections, namely, motor, clutch, transmission, rear axle, brakes, electrical system and miscellaneous details. The details of inspection under each group are as follows:

Brakes

Adjust or reline foot brake.
See that all joints are free.
Remove rear wheels.
Adjust internal brake.
Adjust or reline external brake.
Oil all brake rods and pins.
See that both ratchets hold.
Oil hand brake ratchets.
Try brakes on floor.

Clutch Transmission, Rear Axle

Remove floor boards.
Wash out clutch.
Adjust clutch and pedal.
Oil pedals.
Oil throttle cross shaft.
Oil transmission.
Examine gear shift lever and reverse latch.
Examine all universal joints.
Oil rear axle.
Examine axle housing bolts.
Examine radius rods.
On Republic bus—grease wheel gears.

Motor

Try compression.
Clean spark plugs (set gaps 0.025 in.).
Adjust valve tappets (set 0.010 in.).
Examine for oil and water leaks.
Tighten or repack water pump.
Tighten fan belt.
Oil fan bearing.
Clean carburetor screen.
Clean vacuum.
Examine flexible tubes for leaks.
Examine radiator for leaks.
Oil gas and spark control pins.
Change oil in motor.
Tighten cylinder head nuts.
Examine radiator hose.
Adjust oil pressure regulator (gage should show 10 to 25).

Electrical System

Fill battery with water.
Scrape battery posts and terminals.
Examine cables for shorts.
Examine all connections.
Oil generator.
Clean commutator and brakes.
See that brushes slide freely in holder.
See that brushes are not worn short.
Clean and adjust magneto points.
Oil magneto.
Examine spark plug wire.
Examine ignition switch.
See that all lights burn.
See that lamps and lamp brackets and lenses are in good condition.
Test buzzers.
Test horn.
Inspect windshield cleaners.

Miscellaneous

Examine and oil both doors.
Examine seat brackets and cushions.
Replace any broken or cracked glass.
Examine front and rear bumpers.
Examine all fenders.
Tighten all wheel nuts.
Examine front wheel alignment.
Jack up front end and examine wheel bearings.
Examine both front and rear springs.
Tighten spring clip nuts.
Fire extinguishers.
Examine heaters.

A man is assigned to a bus and made responsible for the details included in one of these groups. After completing the inspection, the man puts his initials on the inspection sheet, which has a list of the cars for inspection that day. No bus leaves the garage until all of the work pertaining to it has been initialed. With a reserve of ten vehicles it is possible to meet emergencies by replacing a disabled bus and starting work on the disabled vehicle immediately after it enters the garage.

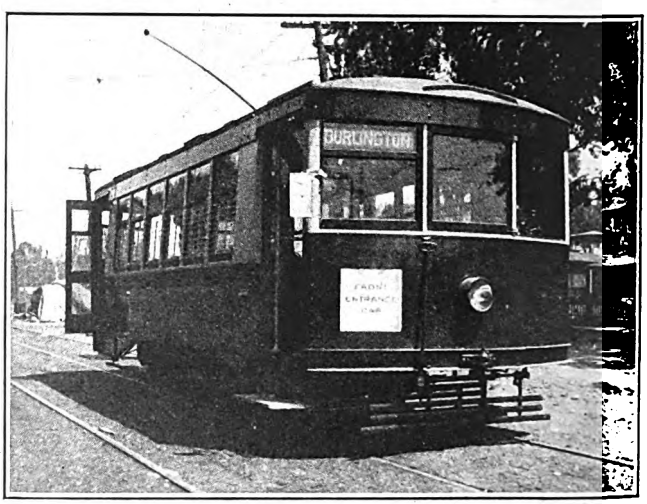
Fare Collection by Means of Cleveland Fare Box

A cash fare of 8 cents and a ticket fare of seven for 50 cents is collected, as the passenger leaves, in a Cleveland fare box which is mounted on a stanchion at the right-hand side of the driver's position. This stanchion serves as a support for the door-operating handle and also supports a small money change tray into which the operator deposits the passenger's change. Transfers are issued between the buses and between the buses and street cars, for which privilege a charge of 1 cent is made. As the collection is made in a locked fare box, the conductor makes no account for the fares collected, he being held responsible only for allowing the passenger to drop his own fare in the box.

On the driver's daily report sheet, notations are made of street conditions, which are reported to the city with a request that repairs be made when needed. The daily report calls attention also to illegal parking of pleasure cars within bus-loading zones and serves as a basis for complaint to the city's police force.

Changeable Indicator for Front-Entrance Car

FRONT-ENTRANCE, rear-exit, one-man safety cars have recently been purchased by the Knoxville Power & Light Company, Knoxville, Tenn. In order that the riders, who are accustomed to rear-entrance cars, might recognize the new vehicle more readily and be prepared to enter by the front doorway, a white sign reading



The Front-Entrance Sign Can Be Concealed by Superimposing a Piece of Sheet Iron Painted the Same as the Dash

"Front-Entrance Car" has been painted on the dash. However, since it may not be desired to operate these cars always as front-entrance cars, each is equipped with a flat piece of sheet iron, painted the same color as the dash, which may be hung over the white sign, concealing it completely. These plain yellow signs are stored in the carhouse when not in use.

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Survey Shows Street Railways Sound

Statistics Collected from 48 Large Systems Show that Passenger Traffic on Street Railways Is Still Increasing in Spite of Tremendous Growth of Other Transportation and that the Street Car Will Continue to Be the Vehicle of Mass Transportation

By John F. Layng
Vice-President Buchanan & Layng Corporation, New York City

MANY times during the past few years predictions have been made that the street railways will be supplanted by other forms of transportation. The gigantic growth of the automobile and the bus have been so apparent to the general public that the situation with respect to the street railway has been lost sight of. Some time ago the writer decided to determine the actual situation with regard to the comparative amounts of traffic carried on urban street car systems now as compared with the past.

Figures collected for the years 1910, 1920 and 1923 from individual companies handling the street railway business in 48 of the largest urban centers of the United States, which include over half the urban population of the country and 28 per cent of the entire population of the United States, show a healthy condition of affairs in the electric railway industry that perhaps is not fully appreciated by those who are looking forward to the rapid decline of the street railway.

These figures, which are presented in the accompanying tables and charts, cover nearly all the cities of more than 100,000 population. The information was in general furnished by officials of the companies and may be regarded as authentic in all cases. Statistics for the New York subway and elevated lines, and also for the Chicago elevated lines, were not included, since it was considered less confusing to confine the survey so far as possible to surface cars.

The detailed results of the survey are given in Table I, which shows by individual cities the population, passengers and car-miles and from which were calculated the rides per capita and the rides per revenue car-mile. A condensed summary of the information for the United States is given in Table II.

Riders Are Increasing Steadily

Reference to Tables I and II shows that there has been a growth in revenue riders from 1910 to 1923 in all of the cities included. This has taken place despite the enormous growth in other forms of transportation, coupled with fare raises in nearly all of the cities. Revenue riders only were considered, since the transfer regulations differ widely throughout the cities studied, and the results might be misleading.

Increases in revenue rides per capita were shown for 60 per cent of the individual companies from 1910 to 1923, although there was a slight decline in revenue rides per capita for the grand total from 1920 to 1923. This is due in part to the development of other forms of transportation, and also to the rapid growth in population in the larger cities, coupled with a sharp recession in business activity, the employment at present not having got back to the boom conditions of 1920.

In order to carry this rapidly increasing army of riders, the companies have been obliged to give more intensive service. This is shown by the revenue car-miles, which have increased 19 per cent in the 14-year period, while the passengers have increased 53 per cent. This is shown graphically in Fig. 1.

The figures collected are in general similar to, although in considerably more detail than, those made public by the United States Census Bureau, which are given in Table III and charted in Fig. 3.

Coincident with this increase in street car riding, there has been an increase in the registration of motor vehicles that is unparalleled in modern history. From a registration of 468,500 vehicles in 1910, the registration figure has gone up to 15,092,000 in 1923. The data are given in Table IV, and are shown graphically in Fig. 2.

Even with this enormous growth in the number of motor vehicles, from the standpoint of passengers carried the year 1923 was the greatest in the history of the electric railway industry. These figures certainly

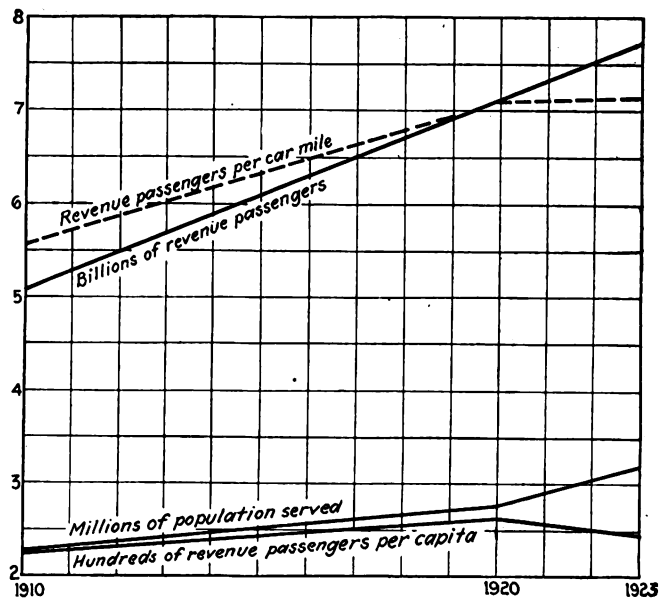

Fig. 1—Fourteen-Year Record of the Trend of Population and Riding on Street Cars, Comprising Approximately 60 per Cent of the Industry

show that the majority of the companies are gaining basic ground, especially as the rides per capita increased in so many of the cities.

This condition indicates that the automobile and the bus are not competing with the electric railways so much as that they are giving a service not rendered before their introduction into the transportation field. The novelty causes temporarily an abnormal use of any new facility. This increased use is caused by curiosity and hope (not based on experience or cost) that the new facility will better meet the needs of a community.

The effort and initiative of many persons in this country have contributed to the development of the automotive industry. When it was realized what it was possible for this transportation tool to accomplish for

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Table I—Traffic Statistics of Street Railways—Cities of the United States

Year	Population	Revenue Passengers	Revenue Car-Miles	Revenue per Capita	Passengers per Car-Mile
New York (Surface traffic only)					
1910...	4,785,190	763,140,739	132,079,737	159.5	5.77
1920...	5,663,980	941,420,788	111,538,195	167.0	8.43
1923...	5,927,617	1,071,736,844	106,894,141	181.0	10.03
Chicago (Surface traffic only)					
1910...	2,185,283	491,088,563	93,152,655	225.0	5.28
1920...	2,701,212	769,025,413	117,436,051	284.0	6.55
1923...	2,886,121	824,850,103	122,088,043	286.0	6.75
Philadelphia (Surface and subway)					
1910...	1,549,008	375,922,814	72,899,072	242.0	5.15
1920...	1,823,779	754,402,512	82,978,302	414.0	9.11
1923...	1,922,788	732,162,843	87,694,521	381.0	8.36
Newark, Jersey City, Camden (Public Service Railway)					
1910...	1,742,807	263,252,577	43,334,492	151.0	6.08
1920...	2,400,028	361,691,558	59,992,805	150.5	6.04
1923...	2,500,000	299,036,855	48,660,540	119.5	6.15
(Strike, Aug. 1 to Sept. 20, 1923)					
Detroit					
1910...	474,697	141,690,525	25,828,703	298.0	5.48
1920...	1,094,148	.....	.....	.....	.....
1923...	1,128,268	357,386,437	49,334,286	317.0	7.25
Cleveland					
1910...	590,000	171,753,896	25,844,634	291.0	6.64
1920...	900,000	328,657,847	38,774,682	365.0	8.48
1923...	1,000,000	300,996,272	36,018,693	300.0	8.34
St. Louis					
1910...	769,000	230,691,532	40,625,757	300.0	5.68
1920...	873,000	287,405,837	45,352,030	329.0	6.34
1923...	900,000	292,671,781	45,716,369	325.0	6.40
Boston (Surface and subway)					
1910...	1,030,044	298,507,787	53,925,578	290.0	5.54
1920...	1,173,820	335,526,561	51,359,855	286.0	6.54
1923...	1,195,552	382,149,697	54,156,064	320.0	7.06
Baltimore					
1910...	558,485	154,928,785	27,911,573	277.0	5.54
1920...	733,826	253,934,199	37,162,202	346.0	6.83
1923...	773,580	238,658,380	35,873,841	308.0	6.66
Pittsburgh					
1910...	993,000	208,609,509	36,916,147	210.0	5.65
1920...	1,165,000	277,214,889	37,295,727	238.0	7.44
1923...	1,215,000	279,478,055	39,194,865	230.0	7.14
Los Angeles					
1910...	319,198	86,851,011	24,120,853	272.0	3.60
1920...	673,000	179,227,041	29,980,055	266.0	5.98
1923...	1,085,000	247,607,235	31,813,926	228.0	7.78
Buffalo					
1910...	423,715	91,437,164	17,235,026	217.0	5.32
1920...	506,775	143,044,078	17,683,347	282.0	8.10
1923...	550,000	116,958,344	17,045,139	212.0	6.76
San Francisco					
1910...	416,912	146,822,685	20,296,698	352.0	7.24
1920...	508,410	234,799,395	32,076,935	462.0	7.32
1923...	687,000	245,525,371	31,926,048	357.0	7.68
Milwaukee					
1910...	380,000	88,073,337	13,812,813	232.0	6.38
1920...	460,000	132,189,830	19,183,522	287.0	6.89
1923...	500,000	130,619,695	18,969,554	261.0	6.89
Washington					
1910...	331,069	103,147,351	16,930,836	311.0	6.10
1920...	437,571	154,731,613	20,619,681	354.0	7.50
1923...	448,619	142,097,231	20,574,254	317.0	6.92
Cincinnati					
1910...	430,000	102,033,956	22,007,627	237.0	4.64
1920...	445,000	118,618,862	21,257,165	267.0	5.54
1923...	454,000	108,625,599	18,643,562	239.0	5.83
New Orleans					
1910...	329,750	80,408,085	19,021,429	244.0	4.23
1920...	376,500	109,927,440	18,756,164	292.0	5.85
1923...	391,000	107,471,356	15,657,379	275.0	6.85
Minneapolis and St. Paul					
1910...	518,279	140,050,007	22,054,680	271.0	6.37
1920...	620,386	227,653,559	27,986,273	365.0	8.14
1923...	651,000	212,573,063	28,525,086	326.0	7.45
Kansas City					
1910...	350,000	115,820,378	23,010,665	332.0	5.02
1920...	455,000	124,350,397	24,308,911	273.0	5.10
1923...	475,000	132,862,353	24,952,740	279.0	5.32
Seattle					
1910...	237,194	72,900,989	12,963,331	307.0	5.12
1920...	402,666	96,628,924	15,839,134	240.0	6.10
1923...	349,525	78,181,048	16,094,373	213.0	4.86
Indianapolis					
1910...	233,650	63,352,688	9,346,183	271.0	6.78
1920...	314,194	96,023,629	12,490,988	306.0	7.70
1923...	342,000	91,864,543	13,485,793	268.0	6.80
Rochester, N. Y.					
1910...	225,000	54,721,030	9,562,815	243.0	5.72
1920...	303,000	76,560,296	8,340,164	252.0	9.18
1923...	325,000	73,477,537	9,375,416	226.0	7.85
Portland, Ore.					
1910...	207,214	53,129,768	9,238,538	256.0	5.76
1920...	258,288	71,175,872	15,012,542	275.0	4.73
1923...	325,000	64,541,298	14,444,168	198.0	4.47
Toledo					
1910...	.....	.....	.....	.....	.....
1920...	285,000	55,614,971	8,260,421	195.0	6.74
1923...	285,000	51,522,008	7,730,727	181.0	6.66
Providence (Including Pawtucket, Woonsocket, Cranston)					
1910...	335,180	85,093,052	13,159,214	254.0	6.47
1920...	374,746	127,482,086	14,138,691	340.0	9.00
1923...	374,746	138,578,286	16,783,773	370.0	8.25
Columbus					
1910...	188,000	50,987,073	7,759,351	271.0	6.53
1920...	237,000	75,112,652	8,747,000	317.0	8.58
1923...	250,000	70,177,236	9,377,377	281.0	7.50
Louisville					
1910...	250,000	57,136,764	11,307,202	228.0	5.05
1920...	275,000	80,089,435	11,307,652	291.0	7.06
1923...	300,000	69,377,682	11,507,383	231.0	6.02
Oakland					
1910...	236,600	60,907,667	11,542,069	257.0	5.28
1920...	338,000	76,165,524	13,596,738	225.0	5.60
1923...	428,000	76,265,053	14,001,634	178.0	5.44
Atlanta					
1910...	154,839	44,908,137	9,538,867	290.0	4.72
1920...	200,616	77,284,154	13,521,623	386.0	5.72
1923...	222,963	75,518,711	13,721,310	341.0	5.50
Omaha					
1910...	155,984	44,062,280	8,541,354	282.0	5.16
1920...	191,601	72,055,229	11,606,066	376.0	6.20
1923...	200,000	56,063,792	9,714,460	280.0	5.78
Birmingham					
1910...	.....	.....	.....	.....	.....
1920...	.....	.....	.....	.....	.....
1923...	227,000	41,676,029	9,734,653	183.0	4.28
Syracuse					
1910...	145,000	29,434,855	5,558,482	203.0	5.30
1920...	175,000	38,516,968	4,988,158	220.0	7.74
1923...	195,000	33,397,922	5,115,735	171.0	6.53
Richmond					
1910...	.....	.....	.....	.....	.....
1920...	171,667	46,611,097	8,011,242	272.0	5.82
1923...	181,044	42,402,172	8,648,160	234.0	4.92
New Haven, Hartford (Connecticut Company Lines)					
1910...	700,000	114,637,728	21,735,270	164.0	5.28
1920...	.....	.....	.....	.....	.....
1923...	875,395	147,095,935	26,042,077	168.0	5.65
Memphis					
1910...	.....	.....	.....	.....	.....
1920...	.....	.....	.....	.....	.....
1923...	185,000	44,364,521	7,615,424	240.0	5.82
San Antonio					
1910...	105,000	17,672,690	3,900,305	168.0	4.53
1920...	161,000	25,817,759	5,965,509	160.0	4.33
1923...	175,000	25,620,300	6,106,189	146.5	4.20
Dallas					
1910...	92,104	22,560,710	3,387,170	245.0	6.65
1920...	165,318	54,039,071	7,541,252	327.0	7.17
1923...	195,000	51,179,356	7,819,530	262.0	6.54
Houston					
1910...	78,000	19,341,738	2,950,567	248.0	6.56
1920...	167,000	35,506,499	5,679,197	213.0	6.26
1923...	175,000	31,454,596	6,388,247	180.0	4.93
Grand Rapids					
1910...	87,500	21,797,159	3,745,529	249.0	5.81
1920...	150,000	27,813,220	4,105,070	185.0	6.78
1923...	153,500	23,103,961	4,008,945	150.0	5.79
Salt Lake City					
1910...	.....	.....	.....	.....	.....
1920...	.....	.....	.....	.....	.....
1923...	153,000	28,201,400	5,401,710	184.0	5.22
Norfolk					
1910...	.....	.....	.....	.....	.....
1920...	115,777	33,686,867	4,837,742	291.0	6.97
1923...	159,089	27,479,653	5,549,964	172.0	4.91
Des Moines					
1910...	86,368	20,838,654	4,294,093	241.0	4.85
1920...	126,468	37,059,271	4,084,950	293.0	9.08
1923...	128,234	31,468,382	5,552,706	245.0	5.65
New Bedford					
1910...	103,963	8,145,072	2,311,426	78.0	3.52
1920...	131,754	24,824,255	2,459,333	185.0	10.10
1923...	150,500	26,722,574	2,574,192	178.0	10.40
Trenton, N. J.					
1910...	105,027	15,815,457	3,259,469	150.0	4.85
1920...	129,223	19,277,044	3,624,857	149.0	5.32
1923...	138,566	20,620,688	3,672,879	149.0	5.62
Nashville					
1910...	100,000	24,399,365	4,813,816	243.0	5.06
1920...	135,000	33,978,322	5,538,284	251.0	6.14
1923...	150,000	31,360,750	5,291,417	209.0	5.94
Albany-Troy					
1910...	247,069	39,705,150	8,600,314	160.5	4.62
1920...	259,668	46,499,820	8,082,938	179.0	5.75
1923...	269,353	44,778,521	6,846,496	166.0	6.54
Spokane					
1910...	104,402	20,700,191	3,621,213	199.0	5.72
1920...	104,437	25,923,261	5,680,608	248.0	4.57
1923...	104,437	23,167,019	5,246,535	222.0	4.42
Tacoma					
1910...	84,000	23,551,966	3,718,349	281.0	6.34
1920...	96,965	24,199,332	4,762,242	250.0	5.08
1923...	108,250	27,728,954	5,194,816	256.0	5.34
Duluth					
1910...	78,466	16,485,822	3,081,810	210.0	5.35
1920...	98,917	29,522,912	3,786,852	299.0	7.80
1923...	110,000	25,014,521	3,739,709	227.0	6.70
Utica					
1910...	77,000	13,755,270	2,804,517	179.0	4.91
1920...	97,000	20,142,301	3,024,441	208.0	6.66
1923...	103,000	17,260,289	3,169,587	168.0	5.48
Erie					
1910...	75,000	7,218,739	1,757,597	96.0	4.11
1920...	110,000	18,077,572	2,733,134	164.0	6.61
1923...	110,000	16,257,922	3,396,743	148.0	4.79
Knoxville					
1910...	.....	.....	.....	.....	.....
1920...	.....	.....	.....	.....	.....
1923...	90,000	15,421,147	2,330,071	171.0	6.56

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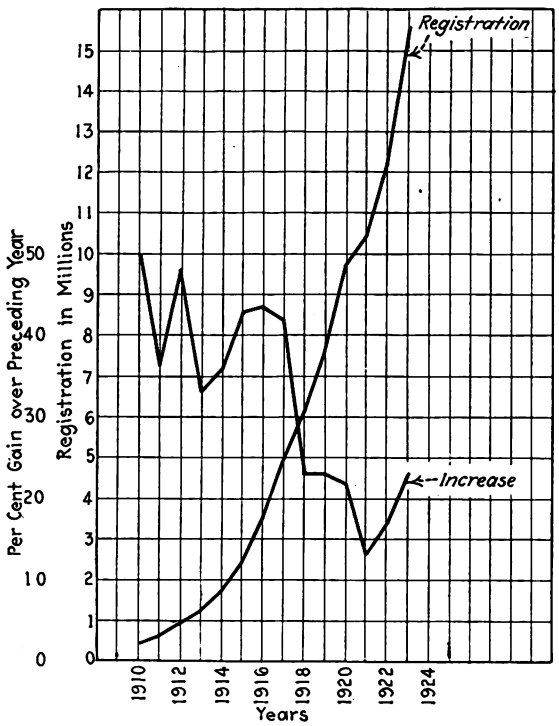

Fig. 2—Motor Vehicle Registration in the United States, Shown in per Cent Increase Over Each Previous Year, and Total

the country, billions of dollars were expended in the developments necessary to secure maximum use.

The nation, states, counties and cities have each gladly contributed toward highway building; and necessity has revolutionized paving methods of our city streets and roads.

Publicity has been so ably handled and presented that the city fathers in each city vie with each other to discover some new improvement in facilitating traffic handling. Individual ownership of automobiles and trucks has enabled auto traffic to secure a preference in traffic guidance over street car traffic that is not enjoyed by the car riders, who constitute the mass of the travelers. However, the railway representatives are making progress toward fairer and more logical traffic regulations.

Effect on Street Railway Securities

In 1910 electric railway securities were held in high favor by bankers and the investing public. The troubles, fancied and real, caused by the war and the increased use of the automobile have resulted in an unfavorable reaction, the net result being that many people have believed electric railway service is being supplanted by the private automobile and the bus. They have honestly felt that universal service can be rendered by these units. This general feeling caused talk among those who, if they stopped to think, should have known what a serious thing it would be to have any good form of transportation put out of business.

The future of each form of transportation will be determined by economic conditions based on the actual service rendered and the cost of that service. The automobile is just beginning to be affected by economic conditions that will be more apparent in the next few years. Even now there is a slackening of the rate of their manufacture. It is hardly to be expected that the actual needs of the country would admit of the absorption of automobiles at the rate at which they were manufactured in 1923. However, with trucks the situation is entirely different. The national good roads program leads many to believe that the truck and bus business is still in its infancy.

TABLE II—SUMMARY OF THE SURVEY OF 48 URBAN ELECTRIC RAILWAYS, 1910-1923

Year	Population Served Total	Population Served Per Cent of U. S.	Revenue Passengers Total	Revenue Passengers Per Capita	Revenue Car-Miles	Passengers per Car-Mile
1910	22,668,997	24	5,057,490,715	223	913,507,826	5.54
1920	27,492,592	26	7,179,510,162	261	1,011,508,730	7.09
1923	31,574,147	28	7,715,148,223	244	1,084,339,392	7.12

TABLE III—PASSENGER STATISTICS FOR UNITED STATES, AS GIVEN BY U. S. CENSUS BUREAU, 1890-1922

Year	Revenue Passengers	Increase in Revenue Passengers Over Preceding Period — Total	Increase in Revenue Passengers Over Preceding Period — Per Cent
1890	2,023,010,202	.....	.....
1902	4,774,211,904	2,751,201,702	136.
1907	7,441,114,508	2,666,902,604	56.
1912	9,545,554,667	2,104,440,159	28.3
1917	11,304,660,462	1,759,105,795	18.4
1922	12,665,300,050	1,360,639,558	12.

TABLE IV—MOTOR VEHICLE REGISTRATION IN UNITED STATES BY YEARS, 1890-1923

Year	Registration	Per Cent Gain Over Preceding Year
1910	468,497	50.0
1911	639,514	36.4
1912	944,000	47.8
1913	1,258,062	33.0
1914	1,711,339	36.0
1915	2,445,666	43.0
1916	3,512,996	43.6
1917	4,983,340	42.0
1918	6,146,617	23.0
1919	7,565,446	23.0
1920	9,231,941	22.0
1921	10,463,295	13.0
1922	12,238,375	17.0
1923	15,092,177	23.0

These conditions cause bankers to look with disfavor on electric railway securities. With the same selling effort they can make much more money handling other classes of securities. They also believe, due to the antagonism the street railway business has faced in the past, that these other securities are in reality a safer investment.

The operating companies have been the object of almost every known form of attack. Managements have been accused of watering their stocks, of mismanaging their properties, of not giving a service comparable with that furnished by the automobile and the bus. They have been accused by the press, by the public and the

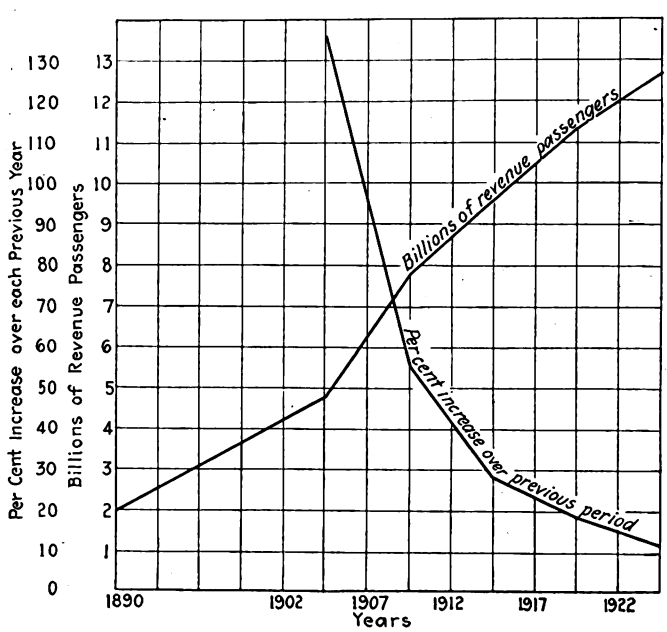

Fig. 3—Revenue Passengers Carried by the Electric Railways of the United States, and per Cent Increase in Number of Rides Over Each Previous Five-Year Period

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politicians of making vast sums and concealing the profits. This unfortunate procedure was advanced by the belief of many people that street railways, being a natural monopoly, were extremely profitable. While in some cases large sums of money were made from stock manipulation, the great majority of the companies never more than earned reasonable return on the actual investment.

Street railways have been taxed all over the United States in every conceivable way. Why they should be made a tax collector is hard to see. Street railway taxation is necessarily a discriminating method that is put on the car rider and not shared by users of other forms of transportation. If not collected in money it is necessarily reflected in the grade of service. It will take time and proper presentation of the railway case to correct this unfavorable discrimination.

At the present time practically all street railway securities are on the bargain counter, but these traffic figures show that many if not all of these companies have a good, safe financial future. Many of them, due to the feeling just described, have not been able to secure capital to put them in the physical condition to make real money.

There are some notable exceptions to this doleful picture, where the vision and courage of the guiding spirits in some of the companies have led to notable financial and operating records.

It will take time for the investor and the banker to realize these facts. The unwillingness to lend influence to obtain investments now in certain selected street railway securities and aid the cause will mean a lost opportunity for many investors.

The seriousness from an investment standpoint is shown by the following approximate tabulation of the capital invested in public utilities. Telephone and telegraph, $2,000,000,000; gas, $4,000,000,000; electric railway, $6,000,000,000; power and light, $6,000,000,000.

There are light and power company combinations which have looked upon their rails apologetically. This feeling, however, is tempered with the fact that every large community must have street railway service to attain its natural community growth and thereby create the largest market for power and light.

Popularity of Securities Goes in Cycles

It is true that first one class of security and then another enjoys popularity at the hands of the investor. Street railway securities enjoyed this favor in 1910, since when they have gradually declined. But since the service rendered is an actual public necessity we can rest assured that time will bring about a more equitable evaluation of these properties; and greater efficiency in conducting the business will again bring prosperity and create a demand for their securities.

As a rule railway men have been too modest and sometimes too pessimistic. They see what is apparently an avalanche of competition in the form of the automobile. Statistics in several large cities show that in downtown districts only 10 to 25 per cent of the people riding use automobiles and the other 75 per cent to 90 per cent use the street cars.

The slackening in the trend of per capita riders, mentioned earlier, seems unlikely to continue, since the other vehicles that are crowding the streets and taking away street car passengers are themselves creating a situation of traffic congestion that cannot continue indefinitely. When this point is reached, and it is coming soon, the riders will come back to the street railway as the cheapest and most efficient form of mass transport known, provided, of course, the managements give the service they must to attract the riders.

One of the most serious problems of the street railway in the past has been to serve these outlying districts, which are necessarily the forerunners of populous centers.

In such instances the automobile and the bus can be a timely help to the street railways, by giving a good reliable form of transportation to sparsely settled communities. When these districts are built up they will need mass transportation, which the rails can then supply at a profit.

Confidence Is Being Re-established

The American Electric Railway Association, guided by its president and others, is sowing the seed of confidence in the electric railway industry, based on the records made by their own properties. The industry has withstood a rough siege of recent economic conditions. Old cars have been operated over old tracks, both needing attention. To do the necessary repair and replacement work capital is needed, which only the investor can supply. It is a safe statement that the records of these companies will in the future receive the attention and help of the investment banker and the public.

The automobile gives the de luxe service of transportation. It is high-class individual service. The street car is on a quantity basis, organized and standardized to meet the needs of the masses rather than those of the individual; and the service is sold at the lowest possible price. It therefore handles the bulk of the transportation business; it is the poor man's automobile; it is the vehicle for the provident business person to use going to and from work.

The bus as we have it today gives an intermediate class of service, which is not within the economic province of either automobile or the street car.

Every community should give each of these three forms of transportation every possible encouragement so that each may fill its true economic place.

In giving the service of the street car and the bus, the outstanding problem to enable them fully to serve the public is to transmit courtesy and leave the feeling with the rider that the entire transportation organization is doing all it can for the comfort of each individual.

In reality, carrying out this idea by the men, the management and the investor is the thing that will put the street railway again in the favored class for investment. When communities realize this they will again popularize the service.

Why do we have so much kicking about street railway service? Why at times do we have such controversies? Why do the qualifications edge in at every opportunity? Why do so many individuals give up their time to attend meetings and public service commission hearings? Why are the newspapers always ready to give front page space to any large or small item that affects the local transportation system? The reason is that these facts and their effects have an almost universal personal interest. These problems constitute real news, because the street car service means so much to the personal comfort of the vast majority of the people. One of the reasons for compiling the data on which this article is based was to secure a standard of rides per capita and rides per car-mile which will form the foundation for investigation and study to increase the

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value of the service which the different street railway companies of the country can render.

It is believed in time electric railway service will be recognized as one of our most essential and popular public utilities and, therefore, that the new capital necessary for improvements will be obtained and the investment protected. The reason for this belief is:

1. Street railways render a service that is necessary for communities to grow. No other form of transportation yet devised supplants it for mass transportation, although it is true that the automobile and the bus supplement the service; and it is believed that in time they will render a form of transportation that will relieve the street car companies of unprofitable commitments. With each unit filling its own economic field, each class of service will be furnished at the lowest possible cost.

2. The results of this survey show that even with the marvelous automotive development and all the facilities that have followed that development, the electric railway is still having an increasing passenger business. These results are substantiated by records of the Census Bureau.

3. The lash of competition is causing the leaders of the electric railway industry to study their business from a basic standpoint. From the sincere way in which they are going after the job it is reasonable to assume that the future will bring about progressive changes, and it further is reasonable to expect that the public will become convinced of this fact.

4. Street railway service fills an actual public necessity. That is why people complain when the service does not suit them. The people need it and take a personal interest in it. That is the reason why they talk about it. Modern busy people do not talk about things that do not interest them.

5. Summing up all sides of the question, it is believed that the electric railways will continue to render a recognized popular service and their securities will again be in favor with the investor.

Detroit Conducts Test Laboratory

Investigations and Analyses Are Conducted of All Supplies Purchased, Including Coal, Overhead Material, Track Material, Oil, Paint, Etc.—Satisfactory Results Are Being Obtained and They Have Suggested Changes in Certain Specifications

THE laboratory of the Department of Street Railways, Detroit, is well equipped for checking the quality of supplies received. During the two-year period since the city has operated the entire railway system in Detroit 2,147 separate pieces of work have been taken care of in this laboratory. Besides these regular analyses and tests, considerable research has been undertaken in developing better methods for checking the quality of supplies received, investigating the possibility of using new materials, the redesigning of old forms of equipment, etc.

Analysis of Coal for Power Stations and Cars

Coal for the power stations is purchased on a specification basis, with penalty clause for fuel falling below a certain established value. During the term of one contract, covering a period of about ten months, approximately $7,000 was recovered by the department from the contractor for coal, because of tests made in the laboratory. This instance is one of the cases where the laboratory can definitely state in concrete terms the amount of savings effected.

Investigations of the matter of coal supply, as well as analyses, have also been conducted by the laboratory. Thus, during the coal strike of two years ago the various coal mines in Michigan were visited in order to see if coal could be obtained from them in sufficient quantities and if it could be used in the power stations. One car load was obtained and burned with fairly satisfactory results.

A large percentage of the older cars are warmed with stoves using coal as a fuel. Investigations were conducted to determine the size and character of the various fuels that could be successfully used in these heaters. The use of Michigan peat and various mixtures of coke and anthracite were tried. Every car load of fuel to be used in the heating of the cars is inspected by the laboratory before being unloaded. The results obtained in the heating of the cars during the past winter amply proved that this method of studying the matter of car heating was worth while.

An instance may be cited to illustrate the statement that all of these investigations are not carried on in the laboratory: On a number of the coldest mornings of the winter members of the laboratory staff inspected the cars before they went on the line in the early morning. This meant that these members of the staff had to be at the carhouses by 4 a.m. Conditions were found by such an inspection that led to certain recommendations which materially bettered the heating of the cars when first going into service, as was proved by later inspections.

All Supplies Are Tested

Owing to a clause in the city charter making it obligatory to advertise for bids on materials exceeding $500, it is necessary to have specifications for the various supplies used, in order that the vendors may intelligently submit bids covering the material in question. By subjecting the material on receipt to rigid tests, the department is safeguarding its own interests and incidentally the interests of all reliable vendors, thus eliminating the "just as good as" seller of questionable goods. It has been the experience of the department that the lowest bidder is not always the cheapest in ultimate cost, due to checking and rejecting and again checking a second or a third shipment.

As a rule it may be said that the method of advertising for bids on a specification basis and then checking up on the shipment has proved satisfactory. That this constant checking has not been without results is shown by the following: During the first six months of city operation 19.2 per cent of all galvanized material was rejected, and for the corresponding period one year later only 5.4 per cent failed to prove acceptable. This is further evidence of the value of systematic checking.

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The subject of trolley wire is one of vital importance to all railways. It is the practice in Detroit to test a sample from each reel of trolley wire received, the specification being one drawn by the department. Its specifications for trolley wire are somewhat similar to the standard A.E.R.E.A. specifications, but a higher tensile strength is specified than by the A.E.R.E.A., and there is also included an upper limit for elongation. The torsion clause remains as in the A.E.R.E.A. specification.

Considerable difficulty was experienced at first in obtaining wire under the new specifications, as some shipments would meet the specifications 100 per cent, while the next shipment from the same wire mill would fall in quality as low as 33 per cent of acceptable wire. This difficulty apparently has now been overcome, as the wire mill found that copper from a certain refiner gave 100 per cent good wire, while that from another refiner gave the low results. Both coppers were pure copper in a commercial sense, the difference in quality of the wire being caused evidently by faulty temperature control in the pouring of the ingot at the refinery.

This indicates that defects in copper wire may originate at a point previous to its receipt at the wire mill, although the wire mill is apt to be accused of supplying low grade wire when the real cause is further back in the production of the copper.

Surprising results were obtained from further tests, made on the amount of current that No. 00 hard-drawn copper trolley wire could carry without annealing. It was found that a piece of No. 00 wire would carry 1,000 amp. for 30 minutes with a loss of only 2 per cent in tensile strength if air from an electric fan was blown across the wire to dissipate the heat. If, however, the fan was not run, there was a loss of 23 per cent in 5 minutes and 38 per cent in 30 minutes. In the case where the fan was on, the elongation was increased about 25 per cent, while in the case where the fan was off the elongation increased 937 per cent. From these tests it is not difficult to visualize what may happen to trolley wire on a hot, still day with heavy cars located close together and all starting at once.

Considerable work has been done, and investigations are still being continued, along the lines of testing high strength trolley wire, the effect of splices on strength, elongation and torsion, etc.

Barn Hangers and Joint Plates Investigated

A few cases occurred in Detroit of the stud holding the trolley ear pulling out of its insulation in mine or barn hangers, caused apparently by the softening of the insulation. An investigation along this line proved that some barn hangers, if heated to 43 deg. C. (110 deg. F.) softened to such an extent that if a load of 100 lb. was applied to the stud it would fall out of the insulating material. At the same time under the same conditions other insulation remained intact at 129 deg. C. (264 deg. F.).

This led to the insertion of a clause in the department specifications covering mine or barn hangers that: "The stud shall remain fixed in the straight line hanger, when a load of not to exceed 100 lb. is applied to the stud, and when the hanger is heated to 65 deg. C. for one hour." This clause is original with the department, as far as is known.

Work has been done in Detroit, in the laboratory and outside, and more is in progress at present, to find out what type of joint plate will weld best to rails and also what its composition and that of the welding wire used should be. A number of combinations of joint plates and rails, using a variety of welding wires in making the test joints, are being fabricated, and when these are complete physical and chemical tests will be made of these test joints as well as photomicrographs of cross-sections. The object of this research is to obtain a better joint if possible.

In its general work in joint welding the department is working toward the general specifications of the American Welding Society as outlined in its bulletins, as follows: (1) Standards for testing welds. (2) Welding wire specifications and folios. (3) Standards for arc welding apparatus. (4) Training course for oxyacetylene welders. (5) Welded pressure vessels. (6) Applications of arc welding to ship construction. (7) Training course for electric arc welders.

Examination of Underground Connections

Along the lines of work for the welding division in Detroit the laboratory has also conducted tests on the carrying capacity of bare feeder when buried in the ground, with especial reference to a soldered joint. A soldered T-splice was made on 750,000-circ.mil bare feeder and a box was built around it to act as an insulator and to keep air currents from cooling the solder. Current was then passed in the leg of the T and taken off from both branches. The initial current was 1,500 amp. for 10 minutes, when no effect on the solder was noticed through the glass top fitted into the box over the joint. The current was then increased to 2,800 amp., when a material warming was immediately noticed, and resulted in the solder melting in 10 minutes more. The solder started to melt on the leg of the T-joint first.

The object of this test was to determine the safe carrying capacity of such joints and how much overload could be applied temporarily on special track work jumpers when laid in the ground.

Weathering Tests for Paint

Paints are analyzed to some extent, but the test upon which chief reliance is placed is an actual weathering test. Steel panels 6 in. x 12 in. are painted with the paint under consideration, and such qualities as ease of mixing, tendency to settle in the can, hiding power, flowing or brushing qualities, etc., are noted and recorded, as is the length of time required for drying. The panel is hung outside, where it comes in contact with fumes and gases such as are given off from the power stations near by, and their effect, the fading effect of sunlight and the action of rain are noticed. This test is continued until a breakdown of the paint film occurs. The test is necessarily long, but it has been the experience in the laboratory that a surprisingly large number of paints break down within one year, thus enabling a weeding out of the poorer paints within a reasonable length of time.

Since November, 1920, the department has kept, in all cases of paint purchases, a record of the vendor, type of paint, cost and where applied. The service given by these paints has also been periodically checked by the laboratory, with the result that certain paints have been eliminated for future use.

Another test given paints is for their covering power, which is found by weighing the sample of paint, painting a steel panel 3 ft. square and then reweighing the remaining paint. From this is calculated the amount of metal surface that 1 gal. of the paint will cover.

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It has been found that some paints will cover as high as 350 per cent more area than others. Obviously, this quality materially alters the original relative costs of paints.

CAR AND TRANSFORMER OIL ANALYZED AND OTHER TESTS

Every shipment of car oil is analyzed, as is the babbitt and bearing metal used in repairing the car journals and motor bearings. A considerable number of different types of car roof ventilators have been tested and show a wide divergence in their ability to "ventilate." Some handle as high as 100 per cent more air than others. It was found with all types of ventilators that the amount of air removed from the car bears a certain relation to the speed of the car; that is, as the speed increases the volume of air removed increases.

The subject of transformer oil has brought to the department the need of a uniform, workable specification for an oil of this character. Samples have been submitted by various vendors and when the contracts were awarded to them the actual shipments have failed to meet the specifications. This might possibly be attributed to the fact that the low bidders were firms that do not specialize in oils of this character. It emphasizes the necessity of checking receipts of goods.

A number of different types of paving brick and concrete have been tested for the track department, thus enabling this department to choose from actual data rather than from claims made by vendors.

The quality of cloth to be used in making overcoats for the motormen and conductors has been thoroughly investigated, as has the possibility of refinishing tarnished uniform buttons. The relative merits of linoleums and the wearing qualities of various types of metal fare tokens have also been successfully investigated to conclusion. Such work requires natural Yankee ingenuity, as there are no prescribed methods or apparatus for this type of work that will give results of definite value.

Fire extinguisher liquid is stored and dispensed for the entire system by the department, as are first aid supplies, there being 65 first aid cabinets distributed over the properties.

Scrap and salvage are also frequently analyzed, thus enabling the department to obtain a better price for this material.

The Laboratory Passes on All Railway Supplies Used in Detroit. Considerable Savings Have Been Made and Specifications Have Been Changed as a Result of the Investigations Made Here

Below is a list of various work performed in the laboratory or by its personnel:

- Coal and ashes for power house
- Coal and ashes for car heating
- Oils and greases
- Feedwater
- Fire brick and fire-clay
- Combustion conditions
- Trolley wire
- Line fittings
- Galvanizing
- Paints
- Insulators
- Hangers
- Tape
- Cement
- Rope
- Soaps and cleansers
- Linoleum
- Welding wire
- Rails
- Joint plates
- Steel ties
- Copper bonds
- Insulating paints and varnishes
- Bus bars
- Distilled water (obtained from department power house)
- Babbitt
- Electrolytes for lightning arresters
- Bearing metals
- Trolley wheels and shoes
- Soils
- Car wheels
- Brake shoes
- Overcoats
- Waste
- Lead-covered cable
- Weatherproof feeder
- Messenger wire
- Paving blocks

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Building brick	Solder and soldering pastes	Grate bars
Gasoline	Boiler compounds	Valves
Lamp cord	Tools	Shellac
Mica	Wood preservatives	Storage battery sludge
Brazing wire		

While the laboratory operates as a branch of the electrical department, it is used by all departments of the railway and has done some work for other city departments.

The laboratory is housed in a brick structure 20 ft. x 40 ft., to which an additional 50 per cent in floor space is being added. This addition is under construction at present and is about 50 per cent complete. It will materially relieve the present cramped quarters.

The major apparatus for physical testing consists of:

One 30,000-lb. capacity Olsen tensile strength testing machine	One rattler or tumbler for abrasion test on paving brick
One Riehle cement tester	One recording portable thermometer (for flue gas)
One Olsen Brinell hardness tester	Orsats
One portable Brinell hardness tester	Anemometers
One Atwater bomb calorimeter	Complete photomicrographic outfit
One Pitot tube	Drill press
One centrifuge	Lathe
One muffle furnace	Grinder

The organization consists of four men, including R. E. Hunt, chief chemist.

Some Definite Evidence of the Bankers' Changing Attitude

Letter Sent Out to Salesmen by Investment Banking House Reveals New Thinking with Respect to Electric Railway Securities

THE following is taken from two recent letters sent out by a prominent investment banking house to its salesmen. It is published herewith as concrete evidence of the things which we have been saying along the line that investment bankers were beginning to look upon electric railway securities with more favor. The antipathy to electric railway securities is certainly diminishing, and rightly so. The letters follow:

Since the first of January there have been three unusual pieces of financing that commanded national attention—in spite of their relatively small size. These include:

$4,000,000 Maryland Electric Railways first and refunding mortgage gold bonds, Series A, 6½ per cent, due Jan. 1, 1957; brought out by Rollins and Alex Brown & Sons; $13,000,000 Market Street Railway first mortgage 7 per cent sinking fund gold bonds, due April 1, 1940, brought out by Dillon, Read & Company and Ladenburg, Thalmann & Company, and $3,200,000 Grand Rapids Railway first mortgage 7 per cent sinking fund gold bonds, due May 1, 1939, brought out by the Federal Securities Corporation, Dillon, Read & Company and Spencer Trask & Company.

Getting back into the street railway financing in the larger centers means three things:

1. That the dead line of the 5-cent fare has been crossed successfully and the increased fare has not seriously affected the number of passengers carried.

It is notable here that the elevated lines in Chicago increased their traffic 12 per cent in 1923 over 1922, and the 1924 results are showing an increase of 8 per cent over 1923. This is in spite of improved conditions in the street railway lines and heavy increases in that traffic.

2. The public, either through the Public Utility Commissions or the local city administrations, have established a policy of "live and let live" and recognize the fact that capital invested in street railways must be compensated in order to attract more capital and improve service.

3. It takes for granted that in spite of other methods of locomotion—such as steam trains, jitneys, bus systems, taxicabs, and privately owned automobiles, the street and elevated railways are essential to the growth, prosperity and general business of any large city.

Obviously, until all of these points had been settled satisfactorily there could be no public financing of street or elevated railways, and yet progress has been made so rapidly that we know of two instances at least where not only has bond financing been possible but preferred stock campaigns for customer and employee-ownership are under way. Very naturally such a campaign successfully concluded would go a long way toward changing the attitude of politicians and the public generally toward the important companies.

It is probable that it will be unpopular to bait corporations where stockholders number many important constituents, whose employees are largely interested in the financial welfare of the company, and where an honest effort is made to serve the public efficiently.

Doubtless the attitude of the street and elevated railway lines themselves has also undergone change during this period of sacrifice and difficulties and the idea that "the public be damned!—especially aldermen" is undoubtedly passing away. This point is largely a question of management anyway. In Chicago, the surface lines have always been at loggerheads with the city but the elevated lines have always been on good terms with city and public.

We believe these questions deserve very careful consideration from the members of our firm, and I commend these and other comments to follow to your careful thought.

There are some interesting figures available for the relative number of passengers carried by the street railways and other methods of carrying people in and around cities.

Judging by the amount of space used and congestion caused by automobiles and buses, it would almost seem that a large proportion of the traffic was being carried by gasoline vehicles. From an actual count, however, in Grand Rapids at a given corner 36½ per cent of the passing traffic was carried by automobiles and 63½ per cent by street cars. This is in spite of the fact that 9½ per cent of the vehicles passing were street cars and 90½ per cent automobiles. In Chicago, the Chicago Surface Lines advertise that more than 70 per cent of the people traveling on the surface—that is, not on the elevated or steam roads—travel on the street cars, while approximately 20 per cent travel by automobile.

Delay in street railway transportation for the greater number, increased congestion and inconvenience in the central part of the cities themselves, and unsatisfactory parking laws, will undoubtedly eventually bring about strict ordinances preventing automobiles from entering certain parts of the city at certain hours of the day. This will tend to get more people into "the street-car-riding habit."

There is no question in the mind of any one who has watched this congestion that jitneys and automobiles cannot take the place of the street railway service. It may be a supplement—and a desirable one—but in growing cities of 50,000 or more population, where the distances from home to work are increasingly greater as time goes on, the street car is again going to come into its own as the only sure, convenient, regular, satisfactory method of transportation for the greatest number.

Street railway securities have been for many years in disrepute. The Tractions, when spoken of by the wise ones in financial centers, usually brought a smile almost as cynical as that produced when we mentioned Timbers and Irrigations a number of years ago. The public memory is very short, however, and in the markets of the next few years it will be remembered and pointed out:

1. That tremendous amounts of uncapitalized earnings have gone back into these properties during these periods when neither bonds nor stocks could be floated. In the year 1923 alone, $282,000,000* was expended on the purchase of materials for maintenance, expansions and improvements.

2. That the Tractions are essential to the life of any great city and, as such, are entitled to a fair return on the investment.

3. In any growing community business must increase, irrespective of jitney bus and automobile competition, thus from 1917 to 1923 automobile passenger car registration increased from 5,191,000 to 12,880,000 and during this period the passengers carried on electric railways increased from 14,500,000,000 to nearly 16,000,000,000.

Investment houses will all again be extolling the merits of traction bonds.

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*See ELECTRIC RAILWAY JOURNAL for Jan. 5, 1924, page 4.

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Association News & Discussions

Psychology Replaces Technology

Forty-second Annual Meeting of the New York Electric Railway Association Discusses Public Relations and Publicity—History of Motor Bus Operation in Baltimore Is Told—Attendance Sets a New Record

THE fact that, as one speaker said, "Psychological problems have now largely replaced technical problems in the electric railway industry" was demonstrated by the number of speakers who discussed public relations and publicity from various angles at the forty-second annual meeting of the New York Electric Railway Association held at Long Beach, L. I., on June 21. The ball was started rolling in this direction by P. L. Thomson, publicity manager Western Electric Company, New York City, and president Association of National Advertisers, who declared that if the public has the wrong idea about the electric railways, it is the fault of the electric railway men themselves. The best way to drive out a bad idea is to replace it by a good idea. Mr. Thomson's talk appears in abstract elsewhere in this issue.

At the banquet in the evening R. B. Woodward, secretary Rochester Chamber of Commerce, Rochester, N. Y., said that there is at the present time a tendency to feel that things are going to the dogs because public opinion has too much influence. Some people believe it would be better if we had less democracy in the world today—that a good executive clothed with ample authority could manage affairs better than is the case when so many questions are submitted to the public for decision. However, we are headed toward more democracy rather than less, in the opinion of Mr. Woodward. That being the case, the public utilities must educate the people to have a more sympathetic attitude based on a better understanding of the utility problem. For that reason engineering problems in the electric railway industry are now secondary in importance to the problem of establishing good public relations.

This same note was sounded by R. S. Binkerd, vice-chairman of the committee on public relations of the Eastern railroads, speaking at the banquet, who said that the fundamental problem today is a psychological one. The object of public relations activity is to educate the people for economic good citizenship. A strong point was made by Mr. Binkerd when he said that if the work which is performed annually by the railways of this country, utilizing energy of millions of horsepower, were actually done by the horses, the public would not try to starve these animals the way it tries to starve the machinery doing this job. The reason that they try to starve the railways is that they have never been taught how completely dependent they are upon the transportation systems. The public must be made to understand that the railways need their fair share of the national income if they are to keep on doing their work properly.

The service that the manufacturer performs for the industry was the theme of a paper presented by E. P. Waller, manager railway department, General Electric Company. An abstract of this paper appears elsewhere in this issue. In the discussion A. J. Manson, manager transportation department, Westinghouse Electric & Manufacturing Company, made the point that the manufacturers, besides carefully studying the problems of their customers and trying to solve them from the technical angle, have also engaged in advertising before the general public, to point out that its interests will be best served by helping the railway industry rather than by attempting to restrict its development. The fact that the employees of the manufacturer occupy the position of disinterested third parties to the controversy increases the effectiveness of the work that they can do. Efforts have been made to educate the stockholders of the manufacturing companies by inclosing constructive messages at frequent intervals with their dividend checks.

The story of how the motor bus is used as an auxiliary to street railway operation in Baltimore was told by L. H. Palmer, vice-president and general manager United Railways & Electric Company. Mr. Palmer's paper will be published in a future issue. In discussing this paper V. E. Keenan, superintendent bus department United Electric Railways, Providence, R. I., said that transportation companies contemplating bus operations should not be misled by the attractive appearance of the body, the performance of the engine and chassis being the primary considerations, rather than the looks of the vehicle. Mr. Keenan said that maintenance costs on buses of different types varied widely, and that the electric railway should not be used by bus manufacturers as an experimental field wherein to try out new types.

Electric arc welding was the subject of a paper by A. M. Candy, general engineer Westinghouse Electric & Manufacturing Company. Mr. Candy made the point that welding operations on electric railways have not been standardized to the extent that they should be. He suggested that a manual on welding should be prepared by the American Electric Railway Association. In this view J. W. Hulme, assistant superintendent car equipment, Interborough Rapid Transit Company, New York City, concurred. In his opinion successful welding depends upon the human element to the extent of 85 per cent, and on the equipment used to the extent of 15 per cent. The necessity of giving proper training to welding operators is therefore apparent. It requires from three to four years for a man to master the blacksmith trade, but when a railway decides to undertake welding operations in many instances a likely man is picked for the job, given a few instructions and is then expected to produce good welds. An even more common practice is simply to hire a man who claims to be a welder and put him in charge of the welding shop. Proper training of the men and careful organization of the work is essential if good results are to be accomplished.

A careful study should be made to compare the cost of repairs by welding and the cost of new material. It is surprising, according to Mr. Hulme, to find how often work which is done by welding shows an apparent saving when, if carefully checked up, it is found that there is really no saving at all over the purchase of new parts. The following items should be taken into consideration when calculating the cost of repairs made by welding: Overhead, cost of handling, life of weld, proportion of breakage, cost of labor, cost of electric current, and cost of welding rods. An example of welding work that is not really worth while, in the opinion of the speaker, is that of salvaging worn steel car wheels.

The meeting was opened by an address by the president, Edwin Duffey. A brief report was read by the secretary and treasurer and then the various committees reported. The paving committee announced that it had been unable to find any suitable sponsor to present to the Legislature its bill for relief from paving obligations. The accounting committee announced that it has devised a uniform system of subaccounts. J. P. Barnes, president Louisville Railway, Louisville, Ky., who was scheduled to present a paper on public relations and publicity, was unable to be present.

At the close of the meeting R. F. Carbutt asked for the co-operation of the members present in the preparation of an electric railway handbook, on which he is now at work. A vote of thanks was given to the entertainment and program committees and to the Hotel Nassau for the contributions they had made toward the success of the meeting.

A larger attendance than at any previous meeting of the New York Electric Railway Association marked this convention. Just prior to the banquet, which was held Saturday evening at Castle's Garden, more than 350 mem-

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bers had registered. A feature of the program was the entertainment for the ladies. This included, through the courtesy of Major-General R. L. Bullard, commanding the Second Corps Area, a visit to Mitchel Field, and an inspection of the hangars and general aviation activities. On Saturday afternoon there were card games for the ladies and golf for the men.

Officers of the association elected for the coming year are: President, C. E. Morgan, vice-president and general manager Brooklyn City Railroad; first vice-president, W. J. Harvie, vice-president and general manager Auburn & Syracuse Electric Railroad, Auburn; second vice-president, W. W. Foster, secretary-treasurer and general manager Rochester, Lockport & Buffalo Railroad, Rochester; secretary-treasurer, W. F. Stanton, assistant to president New York State Railways Rochester.

The executive committee for the ensuing year will consist of these officers and Frank Hedley, president Interborough Rapid Transit Company, New York City; Harry B. Weatherwax, vice-president United Traction Company, Albany; J. F. Hamilton, president New York State Railways, Rochester, and S. W. Huff, president Third Avenue Railway, New York City.

In his speech of acceptance as incoming president Mr. Morgan called attention to the fact that Mr. Hazzard, president Brooklyn City Railroad, was first president of the New York Electric Railway Association, 42 years ago. Since then no official of the Brooklyn City Railroad has been president of the association until the election of Mr. Morgan.

It's Your Own Fault*

By P. L. Thomson
Publicity Manager Western Electric Company and
President Association of National Advertisers

YOU have asked me to come here as a critic. That is not an easy rôle to fill, because I confess at the outset to only a layman's knowledge of the transportation business. But even so, what I have to say may not be without its value to you if it represents what the public generally thinks about the street railway business.

Above all, as a critic, I want to be fair. In the first place I find myself of two minds in relation to street railways as I know them. On the one hand, as a member of the electrical industry, connected as I have been for more than 21 years with a great company which serves the street railway industry in an important way, I recognize that you have rendered a necessary service to your public, that you are entitled to a fair return upon the capital which has been invested in your property, so that you may prosper and go on increasing the measure of your service. On the other hand, as a man on the street, I don't care about any of these things. I don't even know if they are true. I know that when I use your service it makes me sore. I pay 8 or 10 cents where I used to pay a nickel, I have to hang on a strap, jam myself into standing room, and put up with incivility from your employees and the indifference of your management to my personal discomfort. I therefore prefer to ride in the jitneys, which are faster, and when your employees strike I find myself hoping the strikers will win. To some degree this represents, I am afraid, the public's attitude toward street railways.

It isn't fair, you say. Of course it isn't fair. But who is to blame if the public has the wrong idea about your business? Why, nobody but yourselves. The way to drive out a bad idea is to put a good one in its place. We have heard it said over and over again that the public will deal fairly, if they know the facts. There isn't anything new, therefore, in the plea to give them the facts. But I may be able to throw some light on what it is you ought to say, how you ought to say it and when you ought to say it.

First, as to what you ought to say. Well, it seems to me the fundamental message which the street railway industry hasn't put over to its customers is that their welfare and its welfare are closely linked together. Their relationship is not that of foes. They ought to be partners in a great enterprise. I have been going around the country this year talking to some advertising clubs and business organizations on the general topic of "The Business Man and His Public Utilities," and I have been amazed to see the interest stirred up by some of the things I have said, perfectly self-evident things to you and me, bearing upon the dependence of the people in any community on the utilities which serve them.

I told them how we had come to have a monopoly in the rendering of most utility service—electric light and gas and telephone and street railways—and I told them why a monopoly if regulated is the right way to provide this service, right not only from the point of view of the public service organization, but right from the customer's point of view. "Monopoly" is a bad word. You know it has a bad sound and your political agitator likes to roll it over his tongue and tell what he will do to monopoly if the voters elect him to office. Now, as a matter of fact, until you public service organizations clear up the stigma which attaches to that term it will continue to be seized upon by politicians as a basis for attacks upon you. It isn't a difficult story to explain, but it is just one of those bad ideas that has got to be replaced with a good idea.

I have told my audiences how a manufacturer looking for a location in a community inquires at the very outset what facilities the town affords for adequate power and transportation. A man won't locate a factory off in the outskirts of a community where he is dependent upon the trolley system to get his employees to and from the factory if that trolley company is in the hands of receivers or is threatened with financial disruption because the people of the town won't let it earn a fair return on its investment. And many a city has lost a prospective industry because it didn't appreciate that its welfare lay in the direction of helping its utilities to live instead of throttling their earning power, in order to save a few pennies on its monthly light or telephone bill or a few cents on its car rides.

I have told about Toledo and what happened to the retail business there when the street cars quit. You know that story, but have you ever told it to the people who ride on your cars and who vote your franchise? That strike of the street car company, you remember, came to an end when the people of the community petitioned the Council to grant a reasonable franchise and get the cars back on the city streets. And John N. Willys said at the time, "This lack of street cars is costing Toledo $50,000 a day, and it is costing the people and retail storekeepers ten dollars to every one it costs the street car company." I believe the public will listen to facts like these. Are you quite sure you are telling them?

When you trace the evolution of street railway management down to the present system of a regulated monopoly you can point out that government and municipal regulation of utilities came to put an end to the abuses of overcapitalization, cut-throat competition and other ills of the past, that this idea of regulation made a hit with the public because they felt that their interests were going to be safeguarded against the unfair advantage which capital might take of them. They didn't realize at the time that regulation would work both ways, that it would protect the interests of the investor as well as the user of the service. Therein lies the primary selling value of your securities. Given this common interest between the people of a community and the prosperity of the utilities which serve them, what is more logical than that the money to provide for the necessary growth and extensions to the utilities' service should come from the pockets of the citizens of that community who are looking both for service from their utilities and for a good place in which to invest their savings? You have then the argument for customer ownership, a class of securities which are safe because their issues are controlled by a regulating body which will make sure that the street railway gets such a franchise as will enable it to earn continuously a fair return upon its valuation.

The companion picture to that is the movement for employee ownership of securities, and these figures constitute an interesting story for you to tell to your public because it will give them a new respect for your employees who come into contact with them, and it will give those employees a new sense of pride in the character of the institution which they represent.

You have been making some inter-

*Abstract of a paper presented at the meeting of the New York Electric Railway Association, Long Beach, L. I., June 21, 1924.

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esting history in the street railway business the past five or six years. Experiments of public ownership have been tried and have usually failed, competition has been tried and failed, unregulated motor bus interference has been tried and generally has failed. The specific story of what happened in Seattle, in Des Moines, in Toledo, in Akron, in Bridgeport and elsewhere will make interesting reading for your patrons and will help to give them a new regard for the service which you are rendering.

Railways Have Interesting Story

You have an interesting story, too, on the financing of your business, particularly if you reduce your balance sheet to terms which can easily be understood by the average patron. Tell him how the 7 cents or the 8 cents which he pays for his ride is spent by you, what part of it is for labor, how much to generate the current, how much for depreciation on the plant, for maintenance, how much for the use of the money you borrow on your bonds, and then show him what is left as your margin of profit, and put the question squarely: "Is 6 cents a year on the dollar which you have to invest an exorbitant profit? Is it even a fair profit in a business with all the hazards of operating a city transportation system?" Tell your riders what it costs you for your taxes, your paving bill, your street sprinkling and your snow removal. Tell them the story of how your wages have risen in a decade or two, of how your equipment has improved, of how much you pay for a street car now and how big it is compared with the cars you operated when you first got your franchise. Out in Akron they are telling that story in the newspapers now, but they waited until the franchise expired and the City Council declined to renew on a more favorable basis.

Of course, the strategy in this whole matter of better public relations is to tell the story yourself as something of which you are not ashamed. Don't let them get it from the other fellow, who may garble the facts and misrepresent your motives. That franchise in Akron, taken out twenty-five years ago, called for one car on Main Street every 10 minutes up to 10 o'clock at night and one car every 20 minutes after that until 1 o'clock in the morning, with no cars at all between 1 and 5 in the morning. Would the people in Akron have been satisfied with that kind of service? Would the city have grown if the street railway officials had stood on its rights and furnished only that much service? Obviously not. They got bigger cars, they laid heavier rails, they ran cars under a shorter headway, and all of these things cost money. The only thing which didn't go up was the nickel they collected for a fare, and that went down in buying power to somewhere between 3 and 4 cents, and yet the people of Akron were expecting to get twice as much car service for a fraction of the cost. It couldn't be done, of course, and now out of that situation will, I understand, come a new franchise which will recognize that adequate service must be paid a fair price.

Tell some of the problems of operating a great system, of how you buy your coal months in advance and store several months supply so as not to be caught short in the event of a strike. Tell how your load factor varies and what is involved in getting the factory crowd home on Saturday at 1 o'clock or the theater matinée crowd home at 5 o'clock, with all those extra cars and the investment they represent idle during the rest of the day.

And then you have a wonderful story to tell about your personnel, the men in the system, the care which you use to select them and train them, all in the public's interest, so that they may ride safely in cars that are sanitary, and be treated always with courtesy. As I go around the country I can pretty nearly spot the character of the street railway management by the appearance of its motormen and conductors and by their manner toward their passengers. Where there is neatness in appearance and courtesy in address, bespeaking a high morale, there is good service to the community, and that town recognizes its good service and appreciates it. I remember one line in the state which operates one-man trolleys, and I remember that town because I can't get out of my mind the way the motorman kept sliding the door open every few blocks to spit tobacco juice out of the side. When you begin to talk in the newspapers about your employees, what a good crowd they are, and you mention some of them by name who have a long record of faithful service and you set up an ideal, you'll be amazed to see the reaction that kind of publicity has on the whole crew.

Where to Tell the Story

Now as to what mediums of publicity to use. Use them all. Obviously you will use newspapers to tell your story, and, controlling as you do another excellent medium, the street cars, you will have an attractive series of cards on the inside and on the outside of the cars and on the window panes telling from time to time the multitude of interesting things that you are doing in the interest of better transportation for your customers.

But the best public relations job is done by the company that has the greatest number of personal contacts with the public, from the president down. You executives ought to take at least one opportunity a year to talk to your Rotary clubs or your chambers of commerce, your advertising clubs, or Kiwanis, or Elks, or Lions. You ought to have several men on your staff who can talk interestingly of your system before other luncheon clubs, women's clubs, church clubs and the like. Organizations of this character are always on the lookout for speakers with a real story to tell. Why not get a motorman and conductor to put on a talk in behalf of your company? You would be amazed at the oratorical talent which you could uncover. These fellows now do all their oratory in the meetings of the labor union. Why not give them a chance to tell a real story, and if you find they don't know enough about the business to do that, then it is time you taught them.

There are other media too, the most recent of which is the radio. I don't know why that isn't a field which you could use. I have recently been talking about utilities over the radio, they tell me, to millions of listeners, and I don't care if 900,000 of them turned the knob on me, I still have enough letters from all over the United States to prove that there were a lot of them listened in and were interested. Perhaps the secret of this talk on the air is that I tried to put it in terms of self-interest to my audience. I made it apparent that I had no axe to grind, I was talking the gospel of community harmony in order that they as individuals, as business men or as farmers might see that it was to their own advantage to stop quarreling with their utilities and help them grow and prosper in order that they in turn might prosper and find this a more comfortable world to live in.

What kind of relations do you enjoy with your newspapers? Do you know the editors personally? Have you ever called on them in their own offices? Do you yourself or does anybody on your staff make it a point to call them up when something important happens—a new issue of securities, the expected arrival of ten new type street cars, the decision of your board to extend one of the lines, a good record made in restoring service after a break, a human interest story about one of your employees who has completed twenty-five years of service? Editors appreciate attentions of this sort and will invariably meet you more than half way if you indicate that you want to help them get interesting news and get it straight. Editors and reporters are human beings just like you men, and if you treat them fairly they are the best friends you have in the town.

Now the last question is When, and you have already anticipated the answer to that. All the time. That is when. There isn't any such thing as an advertising campaign. I dislike the term. You can no more have an advertising campaign than you can have a breathing campaign. Just try to breathe for an hour and then stop for a couple of hours. That is the trouble with most of you utility people. In the first place, you wait until you are on the defensive, a franchise which has expired, an attack which has been made by some self-seeking politician, and then you start to defend yourselves. When you do your public relations job right you won't be on the defensive. When you sell the people of your community on the integrity of the management of your street railway system, the quality of service, the high grade of men who work for you, and some of these other things which I have been mentioning, then you will have insured yourselves against political agitation. The political agitator is no fool. He keeps his ear to the ground to find out what will be a popular slogan. When either because your service is bad, or not being so bad just because you have no positive standing with your public, he thinks he can get votes by attacking you, then just as long will you be subject to attack. But when you set apart as one of the major objectives of your business the building of sound public relations and you put in charge of that job an executive officer—he ought to be at

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least a vice-president—and give him competent assistance and an adequate appropriation, then you are insuring your future against the agitator's attack.

A few weeks ago I was up in New England talking before an advertising club and the utility people. The city was in the throes of a jitney fight. Eleven thousand people had signed postcards at drug stores petitioning the Council to let the buses run unregulated on the streets paralleling the street cars. In the course of my remarks I told those people that they couldn't eat their cake and have it too. Dealing with the elementary economics of the situation, I pointed out how the street railway couldn't possibly live if the jitneys were allowed to pick off the cream of the business and pay no share of the expense. I told them, as I believe to be true, that street cars are the answer for moving large groups of people in our urban centers, that it is the history of American transportation that the best results are secured when buses are used not to compete with the trolley lines but as feeders for them under the management of the trolley companies themselves. Well, all that seemed to be news up there in that town because the reporters who were present quoted me at some length in the papers, and when I went to the street railway company afterward and asked the officials why they hadn't told that story, their reply was simply that they didn't have any advertising appropriation and couldn't afford to tell the story. Within the past week, however, I learned today from the director of the advertising section of the American Electric Railway Association, the railway company has decided to inaugurate an advertising and publicity department. This is well, but somewhat late.

And right at this point I want to appeal to you to make more use of the association's advertising section, as the company mentioned is now doing. As doubtless all of you know, this section not only supplies a regular advertising service to every electric railway company in the country but its director is available at all times to give advice and suggestion on your specific problems, without charge. This service has been at your disposal for more than three years. You have been urged through the trade magazines, in personal letters and in speeches before your convention to make use of the association's facilities, and if you have not done it certainly the blame lies with none but you.

I also want to say a word about the importance of state committees on public utility information. These committees, performing an excellent service, now operate in about 35 states. There is one in New York, but the electric railway industry is not represented on it. I understand that strenuous efforts have been made both within your industry and within the committee to have electric railway representation on that committee, but that action has been deferred time and again. Let me say that this is a grave mistake. I care not whether your membership associates itself with the present New York committee or starts a new committee to handle electric railway work exclusively—something should be done now.

Now, I haven't mentioned any figures; I don't know how much you ought to spend, but I know that you ought to spend more. I can't attempt to set up a ratio of what your advertising appropriation ought to be to your gross revenue, but you ought to spend enough to do the job. Three hundred street railways spent $2,000,000 last year on public relations activities. It will be more this year. That means that some of you are doing a job that is undoubtedly adequate. But more of you are not, and of course you are the ones who are most in need of public good will.

How the Manufacturer Is Helping the Electric Railway*

By E. P. Waller
Manager Railway Department, General Electric Company

WHEN a manufacturer sells a piece of equipment to an industry he is furnishing to that customer not only a certain amount of materials fabricated into a machine but he is furnishing also the thoughts, ideas and experiences of the designers and builders. In the long run it is this thought and service, and the ability of the manufacturer to give more than so many pounds of machinery to his customer, that govern the volume of sales.

The electric railways have recently passed through a period of stationary receipts and of mounting wages and material costs. This period emphasized the need of service from manufacturers to their hard-pressed customers, and, in general, the manufacturers need not be ashamed of the response. This period saw many economies and methods of increasing the earnings introduced and worked out by the operators. It also saw many valuable results in the same direction worked out by the manufacturers. For instance, the Birney safety car is directly adding some $17,000,000 to $18,000,000 to this year's net earnings of the more than 400 companies using it, and the same principle of one-man operation extended to other city and interurban cars is effecting a further saving of some $4,000,000.

Another important development which occurred during this period was the low-wheel light-weight interurban and city cars which are in use on more than half a hundred city and interurban properties. These cars are directly adding more than $5,000,000 to this year's net earnings of the companies using them.

Developments in Power Supply

Two decades ago each railway had its own power station, equipped with small generators, driven by reciprocating engines. The largest units were not over 5,000 kw. capacity; the majority were much smaller. The minimum fuel consumption of these plants was from 5 to 6 lb. of coal per kilowatt-hour; the average probably 7 or 8 lb.

The development of the steam turbine with large high-speed units has made possible a reduction in the fuel to 2 to 3 lb. per kilowatt-hour. In addition, in many cases, it has been found that a railway by purchasing power cannot only save itself the initial power investment, but actually can obtain a lower rate from the central station.

The development of high-tension oil switches and insulators have made possible an increase in transmission voltages up to a maximum of 200,000 volts. This has resulted in great economies in the transmission of power and also has enabled railway companies to purchase power more reasonably.

A somewhat similar development has occurred in railway substations. Twenty years ago heavy low-speed 25-cycle converters were in universal use. These had a high first cost and took up a great deal of valuable floor space. They could not be tied into the 60-cycle circuits of large central stations. Then the 60-cycle converter was developed and improved. The high-speed circuit breaker helped decrease flashovers resulting from surges or short circuits.

Automatic substation control in connection with reliable converting apparatus today shows a lower record of failures or interruptions than the ordinary station with manual operation. Its use not only saves the wages of station attendants, but also reduces light-load losses, and by reason of its load limiting equipment, prevents interruptions and increases the load factor. It also permits the railway company to distribute its converting machinery to better advantage, as a greater number of substations can be installed, they can be located closer together and with a better regard to the center of gravity of the load and with a large saving in overhead copper. In this way trolley disturbances can be restricted to a comparatively short section of track, and the failure of a complete substation feed no longer cripples service as was the case where a bank of machines fed a network through a single artery or duct. Furthermore the improvement in voltage that results, particularly in outlying districts, makes possible higher-speed schedules, with resultant economies in platform wages.

Improvements in Motors and Car Accessories

Railway motors which were in use 18 or 20 years ago were of the non-ventilated, non-commutating pole type. These motors were brought in for general overhauling three or four times a year, because the armature bearings would not last longer than three or four months. While these or similar motors are still in service on many roads, they have been given the advantage of many developments that have materially helped their performance. They have been provided with heat-treated gears and pinions; bronze

*Abstract of a paper presented at the meeting of the New York Electric Association, Long Beach, L. I., June 21, 1924.

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bearings with tin-base babbitt liners; slotted commutators, and higher grade brushes as well as a better system of oil and waste lubrication. But even so, recent records show that their average maintenance cost is $3.50 to $5 per 1,000 motor-miles, or from $120 to $175 per motor annually.

The modern box-frame ventilated motor with commutating fields, high-grade insulation, improved brush-holders, bearings, and gearing, weighs 30 to 40 per cent less for a given working capacity or for a given car weight to be handled, and so saves in first cost. Moreover, its average cost of maintenance, as shown by records in every part of the country is only 50 cents to $1 per 1,000 motor-miles, or from $18 to $35 per motor annually, directly saving the railway company several hundred dollars on each car it operates. Indirectly they save additional amounts because of their greater reliability.

Two electrical manufacturers during the year 1922 sold 9,090 modern railway motors of 25 to 70 hp. These motors had an approximate weight of 14,820,000 lb. and a cost of approximately $9,400,000. The same number and sizes of the old non-ventilated motors would have weighed 24,850,000 lb., and based on the same material and labor prices would have cost the railways $13,550,000. These figures indicate that the economies obtained in one year due to railway motor development resulted in 10,000,000 lb. less weight to be carried on the rails, and $4,150,000 less investment charges. The annual saving would be about $600,000 in fixed charges, and at least as much more in operating expenses.

Moreover, the development of the low-wheel motor permitted the car builders to make changes in their designs that reduced weights and initial cost in bodies and trucks, and which went a long way toward absorbing the tremendous increases in labor and material costs brought about by the war. In other words, the 16,000-lb. safety car today does not cost very much more than the 24,000-lb. single-truck car of equal capacity did ten years ago; and a 25,000-lb. 44-passenger double-truck car can be bought for about the same as its 44,000-lb. predecessor could then.

Multiple-unit control for train operation has undergone radical changes. It has been simplified and made more positive in action, and is lighter, cheaper and far more reliable.

Air Brakes

Much that has been said of railway motors applies to the air compressor, and similar improvements have been made in its design. Chief among these are better insulation, better lubrication, and better protection for the motor against the admission of oil. The whole design is lighter and more compact.

In the automatic air brake, the trend has been toward quicker and more uniform action on the long trains used in rapid-transit service, and toward the use of an electro-pneumatic valve to obtain simultaneous and immediate application on every car.

One of the really striking applications of air has been in the safety devices which contributed so materially to the success of the one-man safety car. The working out of this apparatus, which automatically opens the power circuit, applies the brakes, sands the rail and unlocks the doors in case of the operator becoming incapacitated, has proved a most effective argument with public service commissions and legislative bodies.

Economies have been effected in many shops by the use of labor-saving tools and machines, but too large a proportion of railways have not yet taken full advantage of the developments in this direction, and are neglecting the savings in cost of repairs, or in the effectiveness of repair work, that they might obtain with better shop equipment. Many devices have been worked out and perfected for railway shop service. These will save many times their cost.

A. R. A. Exhibits Largest Ever Held

Equipment and Supplies for Rolling Stock and Shops Formed a Most Imposing Display at the Recent Convention in Atlantic City—Many Improvements in Machine Tools Shown

THE exhibits held on the Million Dollar Pier, Atlantic City, N. J., by the Mechanical Division of the American Railway Association, June 11-18, surpassed all previous records of the association. There were a total of 375 exhibitors occupying a space of 103,000 sq.ft. The most impressive feature was the extent and variety of the machine tools shown. Fully 40 per cent of the exhibits were shop tools and a large proportion of these were shown in actual operation. Heavy-duty modern machines equipped with high-speed steel cutters and new devices to increase production with decreased effort were performing such operations as turning axles, boring wheels, milling bars, grinding guides, pressing in bushings, forging rods, planing various parts and punching and shearing steel plates.

The exhibits of drilling machines were particularly interesting since such a large amount of the work in electric railway shops consists of drilling operations. Improvements in design included new safty features such as entirely inclosed gearing, foolproof elevating mechanism and simplified lubrication.

There were many exhibits containing lathes and improvements consisted of the use of multiple-tool posts so that different diameters can be turned at the same time and a more substantial and rigid construction of the carriage and beds to prevent chattering. Improvements in oiling and safety features were also in evidence.

A single spindle horizontal boring mill made by the Lucas Machine Tool Company, Cleveland, was of particular interest to electric railway shop men who have the problem of reboring motor shells. With vertical adjustment of the boring bar and both transverse and longitudinal adjustment of the swiveling table and with micrometer dials for all adjustments extreme accuracy is assured.

A type of portable boring bar manufactured by the H. B. Underwood Corporation, Philadelphia, can also be used to advantage for reboring motor shells. Power for driving this equipment is obtained from an air motor driving a spindle which in turn meshes with a gear keyed to the boring bar. After the equipment is applied the tool can be adjusted in the cutter head by tightening a collar screw. A gage provides a simple method of setting the tool to the required position.

Exhibits of shapers and planers showed arrangements of control and adjusting levers on one side of the machines to provide for easier and more rapid setting up of work, increased strength of various parts and provisions for rapid reverse speed. One design of Gould & Eberhardt, Newark, N. J., had a jib crane attachment as a self-contained unit.

A new design of wheel boring mill shown by the Consolidated Machine Tool Corporation of America, Wilmington, Del., was provided with double hoists of the pneumatic type, one located on each side of the machine so that handling can be done from both sides. The motor is operated by a reversible automatic controller with a push button station convenient to the operator. The opening of the chuck jaws as well as the starting and stopping of the table are all accomplished by push button control. Feeds for roughing and finishing are obtained through sliding gears which may be changed while the machine is running. The feed can also be changed from roughing to finishing as soon as the roughing cutter clears the work.

A number of different designs of forcing press were shown. These included hand or screw types, hydraulic and other auxiliary power presses. These machines do a large variety of work and are a convenient accessory for any electric railway shop. Their use includes the pressing in and out of arbors, mandrels, bushings, shafts, pins, compressor cylinder linings and valve seats; the bending or straightening of rods, bars and structural material, as well as broaching and punching operations. One type shown by the Lucas Machine Tool Company, Cleveland. had a pressure holding device for stacking armature laminations, assembling commutators and like operations. This attachment holds the ram in the lowest position to which it is advanced by use of pawls and a ratchet wheel, the latter being keyed to the hand wheel pinion shaft. A pedal throws the pawls out of engagement so the press can be operated without using the attachment.

There were also several exhibits containing grinding machines. The Production Machine Company, Greenfield, Mass., showed a new surface grinding machine of the abrasive belt type. The abrasive belt runs over a cushion leather belt with herringbone corrugations on its face. High and low points are thus provided. The high points are

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used for cutting and the low points immediately adjoining for chip clearance. A pressure platen operating on the back of the cushion belt serves to bring the belts to the work. A table with a power feed roll provides for the use of various fixtures. The rate of feed is regulated by the angle of the feed roll, which is adjustable. The machine is used for the external grinding of cylindrical shapes.

Welding Equipment Shown

There were numerous exhibits of welding equipment, but not as many as are usually shown at the electric railway convention. An exhibit of gas cutting with the torch fastened to one bar of a pantograph device was shown by the Air Reduction Sales Company, New York, and attracted considerable attention. This device assists in cutting plates, forgings or castings accurately to shape. The machine also provides an economical consumption of gas, as the speed of cutting and the gas supply are regulated to the thickness of metal and finish desired.

A portable electric arc welder shown by the General Electric Company, Schenectady, consisting of a motor and a generator, was shown in operation. The generator voltage with this set can be adjusted to the work. Thus high voltage can be used for complete penetration on heavy work and low voltage to prevent burning on light work.

A rather unusual design of tip for oxyacetylene cutting torches was shown by the Alexander Milburn Company, Baltimore. The tip permits supermixing of the gases and preheating of the cutting oxygen. An added velocity and penetration is also given to the preheating and cutting jets.

A new type of welding electrode was of tapered form to prevent undesirable heating. The manufacturer was the Electric Arc Cutting & Welding Company, Newark, N. J., and stated that the gradual increasing diameter allows a corresponding increase in deposition with a constant heat value in the work. The electrodes are tapered by a rolling and swagging process and are coated after being shaped.

Another unusual type of electrode had a central metallic core surrounded by a layer of flux which is inclosed by an outer metallic layer. It was exhibited by the General Electric Company, Schenectady. The sheath prevents the flaking off of the flux in handling and reduces the dissipation of the flux by the arc. Increased stability of the arc is one of the claims made for the use of this type of electrode.

Other Exhibits

An excellent opportunity to study the various types of electric locomotives and improved construction of dump cars was afforded by the track exhibits, which were placed on the Philadelphia & Reading tracks at the Boardwalk and Mississippi Avenue. A Chicago, Milwaukee & St. Paul locomotive which had been in service for four years on the Cascade division illustrated the most modern type of gearless passenger locomotive for operation on 3,000-volt direct current. The Pennsylvania Railroad exhibited two locomotives at North Providence Terrace. The electrical parts for these locomotives were supplied by the Westinghouse Electric & Manufacturing Company. These electric locomotives are the largest type built by the Pennsylvania. One was a freight locomotive and has been in service for several months at Philadelphia, operating from 11,000-volt alternating-current overhead trolley. The second locomotive is a passenger type for use in service at the Pennsylvania terminal, New York, and operates from a 650-volt direct-current third rail. The motors on both types of these locomotives are identical, so that by changing the gear ratio and control apparatus the freight locomotive can be made suitable for passenger service and the passenger locomotive for freight service.

Equipment for serving various machine tools and for handling material was very much in evidence. A new type of pit jack shown by the Watson-Stillman Company, New York, N. Y., was arranged for use in connection with a drop top or transverse table. It is self-contained except for the necessary connections to the shop air line and can be operated by one man. Air is used to operate the hydraulic pump and to traverse the track in the pit. Hydraulic pressure is obtained by a two-plunger pump. All gears and chain drives are protected with sheet-metal guards.

A large variety of industrial trucks was shown, and shop men were impressed by the ease with which heavy units can be handled and placed by the use of such trucks. Types with elevating platforms and with low platform and crane mounting are particularly useful in railway shops. The designs shown were arranged for short turning to meet the conditions of crowded shop areas and narrow aisles.

A portable car hoist was shown by the Whiting Corporation, Harvey, Ill. This consists of a motor-driven screw jack, mounted in a substantial frame. A toggle arrangement raises the jack so that it can be pulled from one location to another on wheels like a small truck. The portable hoist can be used under any type of car and also to hold the car in its raised position, since power is required to lower the load. The hoist will thus support the car without blocking. By the use of two of these jacks one end of the car can be raised at a time, or with four jacks the car body can be raised as a unit.

There were many exhibits of truck and brake rigging parts, but most of these were for freight equipment or steam road service. A new design of truck journal box, exhibited by the National Malleable Castings Company, Cleveland, was provided with ribs inside for retaining the waste in proper position. An exhibit of pressed steel brake shoe heads by the Buffalo Brake Beam Company, New York, showed the advances which are being made in this respect, and an improved forged strut for holding the brake beams accurately spaced and the shoes for wheels on the same axle in proper position was shown by the Bradford Corporation, Chicago.

There were also numerous exhibits of car trimming, seating and miscellaneous car equipment parts. These, however, were arranged with particular reference to steam road service. Im-

American Association News

New Officers Nominated

AT THE executive committee meeting in New York on June 20 L. H. Palmer reported for C. D. Emmons, chairman of the committee on nominations, as follows:

For president, J. N. Shannahan, president Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va.

First vice-president, F. R. Coates, president and general manager Toledo, Ottawa Beach & Northern Railway, Toledo, Ohio.

Second vice-president, W. H. Sawyer, president East St. Louis & Suburban Railway Company, East St. Louis, Ill.

Third vice-president, R. P. Stevens, president Republic Railway & Light Company, New York.

Fourth vice-president, J. P. Barnes, president Louisville Railway.

Treasurer, Barron Collier.

For members of the executive committee: Harry Reid, president Interstate Public Service Company, Indianapolis, and C. E. Morgan, second vice-president and general manager Brooklyn City Railroad, Brooklyn, to represent the railways; E. P. Waller, manager railway department General Electric Company, Schenectady, and B. A. Hegeman, Jr., president National Railway Appliance Company, New York, to represent the manufacturers.

Special Reports Available

THE Bureau of Information and Service of the American Electric Railway Association has prepared the following reports, which are available to member companies in good standing upon request:

Wage Bulletin 128 (Revised Edition)—A new edition of the Wage Bulletin which combines in one compilation the original bulletin issued Oct. 1, 1923, and all of the monthly supplements showing changes to June 1, 1924.

Traffic Ratios, Part I: City Lines—The cities (about 150) have been listed according to their size, beginning with New York, and for each city there is shown the riding habit (revenue rides per inhabitant served), the average speed, revenue passengers and car-miles per mile of track and per car operated, revenue per mile of track, operating ratio, passengers per car-mile, proportion of transfer passengers and operating income per mile of track.

Selected Exhibits Presented by Electric Railways in Wage Arbitration Proceedings—These exhibits were selected from various arbitration cases to illustrate methods actually used in presenting data on such questions as: Wages in relation to cost of living; relation of trainmen's wages to wages in other local industries; nature of trainmen's work and skill required; average wages earned; size of trainmen's families; effect of wage increase, etc.

In addition to the above, supplements to the Fare Bulletin and Cost of Living Studies have been prepared.

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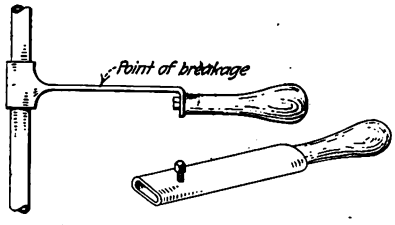
Maintenance of Equipment

Emergency Door Handle Saves Pull-ins

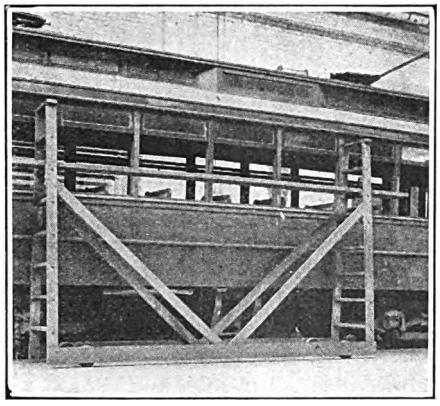
A SPECIAL operating handle for platform doors has been devised by the Nashville Railway & Light Company, Nashville, Tenn., for use in case the regular handle breaks. Platform doors are opened and closed by an arrangement of levers and a vertical rod in front of the motorman. This rod is turned by a wooden handle attached to a casting which encircles the rod. Castings occasionally break through the narrow part, which is between the vertical rod and the handle. When this happens it is still possible for the motorman to operate the doors, but it is rather difficult to use the short stub of the handle and the usual result is that the car is turned in at the carhouse and another car substituted. To prevent this an emergency handle has been designed, made from a piece of pipe slightly larger than the small part of the casting and flattened to an oval shape. It can be slipped over the broken end and fastened in place by a setscrew. As soon as word is received of a broken door handle, one of these emergency handles is rushed to that car and after it has been put in place the car can continue operation all day.



If the Door-Operating Handle Breaks an Emergency Handle Is Fastened to the Broken End

Rolling Platform to Paint Car Roofs

TO FACILITATE the work of painting the roofs of cars, the Georgia Railway & Power Company, Atlanta, has built a rolling platform, as shown in the accompanying illustration. The practice of this company when repainting cars is to spray paint below the belt rail and to use a hand brush above that line. Although there are comparatively large areas of the roof which could be spray painted, the company feels that it is more satisfactory to do this work by hand, particularly in the case of monitor deck cars.



Painters' Platform Which Can Be Rolled Along at the Side of a Car as Progress of Work Demands

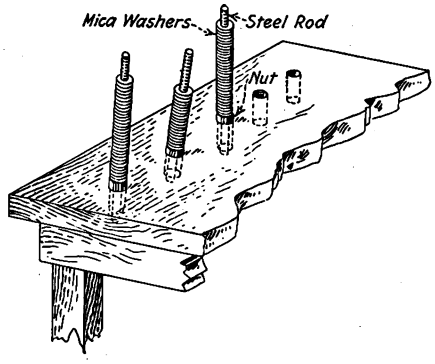
The framework of the platform is of wood and is mounted on four cast-iron wheels. This apparatus is very easily moved and the painter can change its position along the side of the car by grasping the car body with one hand and the framework with the other and pulling the platform to the desired position. This has proved to be much more satisfactory than a stationary platform.

Carrying Water to Small Concreting Jobs

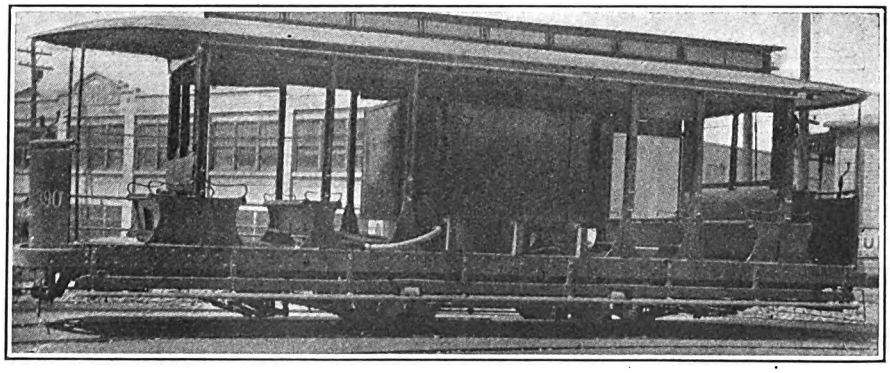
AN OLD open trolley car has been equipped by the Memphis Street Railway, Memphis, Tenn., with a 1,000-gal. steel tank to carry water for small concreting jobs. The method formerly employed for this purpose was to carry on an automobile truck barrels filled with water. On account of the jolting of the truck much of the water was ordinarily lost before it reached the location of the job. This tank car is filled with water before leaving the carhouse and run to the various places where small jobs of concrete work are in process. Barrels standing on the ground at each stop are filled from the tank.

Mica Washers Sized for Workmen's Convenience

IN OVERHAULING and reassembling the various types of resistance grids, a number of different sizes of mica washers are used. In the Kansas City Railways shops a method has been devised for storing this material which not only keeps the various sizes of washers sorted



Mica Washers for Use in Assembling Resistance Grids Made Accessible by Stringing on Steel Rods Set in Holes in Assembly Bench



This Tank Car Has Been Found Superior to a Motor Truck for Carrying Water to Small Concrete Jobs

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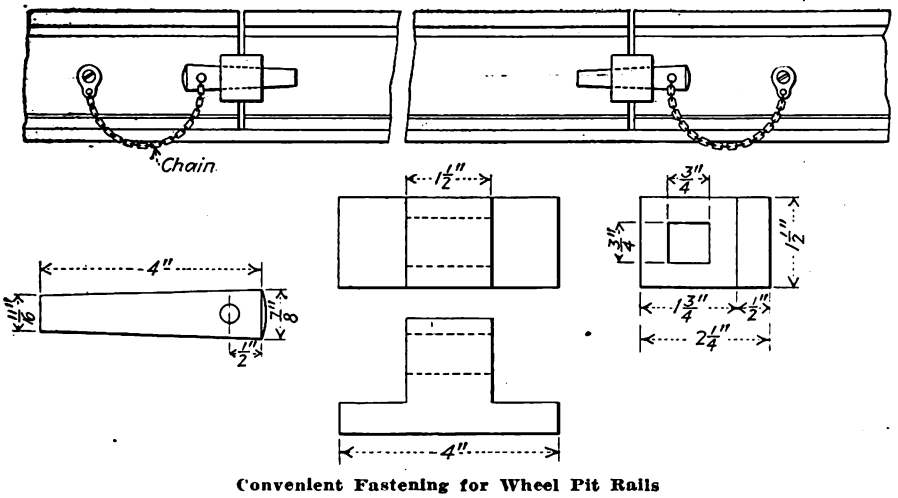
in an orderly fashion, but also makes them quickly accessible for the workmen.

The method consists of stringing a supply of washers of each size on separate steel rods approximately a foot long, threaded on one end and having a nut run up 2 or 3 in. from that end of the rod. When any particular type of resistance grid is to be handled, the rods carrying the proper sizes of washers for use on that type of grid are selected from a storage bin which is convenient to the assembly bench, and these rods are then arranged in convenient fashion by dropping them into holes in the top of the bench as shown in the accompanying illustration. This makes all of the desired sizes of mica washers readily available and saves a considerable amount of hunting for materials. When the type of resistance box under repair is changed, it is a simple matter to make the necessary change in the type of washers for doing the work.

Clamp for Movable Rails Over Wheel Pit

THE usual construction of pits for dropping out wheels from cars includes two short lengths of rail which are removable. A method for fastening these when in position by means of a clamp with a square cotter key is used in the shops of the Eighth Avenue Railroad, New York, N. Y. The clamp is made of steel with one side 4 in. long, which extends along the web of the rail. A projection from the center of this, 1½ in. square, passes through the web of the two rails at the points where they meet. The square part of the clamp which projects beyond the web of the rail has a ¾ in. square hole for the insertion of a square cotter key. The cotter key is fastened to the web of the rail by a light chain so that it will not be lost. To remove the section of the rail, a tap with a hammer on the end of the cotter key and on the clamp loosens this, and when removed the rail can be lifted out of position.

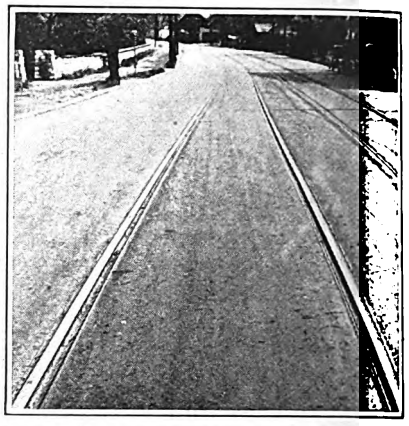


Convenient Fastening for Wheel Pit Rails

Paving Guards Tried in Harrisburg

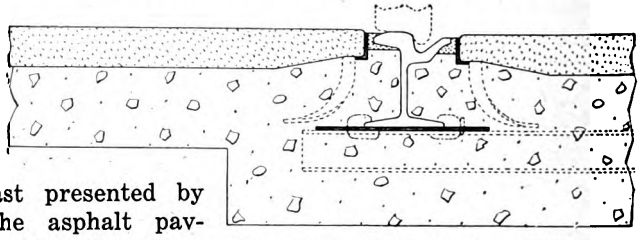
PAVING along the rail presents more of a problem than usual in Harrisburg, because the city, being the capital of the state of Pennsylvania, is largely residential in character, and smoothly paved streets are insisted upon. Asphalt has met with the greatest general favor as paving for the vehicular roadways, and a majority of the streets are now paved with this material. An attempt was made to pave the railway strip with asphalt, using the rails as an edging for the pavement. This proved to be unsatisfactory, however, because the movement of the rail and the consequent seepage of water between the rail and the asphalt destroyed the track foundation. Both brick liners and wood-block liners were tried. The contrast presented by the bricks and the asphalt paving detracted considerably from the neat appearance of the street, it was thought, and they were considered objectionable for that reason. Wood block liners have given from 10 to 12 years satisfactory service. After that the track usually begins to loosen up, causing displacement of the blocks.

Early in 1923 the first steel paving guards were installed. These were the Godwin type, which anchor deep in the paving base and provide a rigid edge for the pavement. Some difficulties were encountered at first in the installation of the guards, but these have now been pretty well overcome.



A Street in Harrisburg Where Steel Paving Guards Are Used Along the Rail

The cost of steel paving guards in Harrisburg is no greater than of wood-block liners. A 6-in. base of concrete is used below the rail, which is 7-in., 122-lb. grooved girder type. The concrete is brought up to within 3 in. of the finished surface and a coat of asphalt laid on top of that. More than 25,000 ft. of these guards are now in service along the tracks of the Harrisburg Railway, and they are being installed in connection with a number of new paving jobs.



Cross-section of Paving Construction Along the Rail

This type of construction proved satisfactory during the exceptionally wet winter just past, but is considered by the railway to be still in the experimental stage.

Welding Armature End Laminations

ON THE General Electric type 69-C motors used by the New York Central Railroad some trouble was experienced with the chafing of armature coils at the ends, due to the vibration of the end laminations. The railroad company is now welding these together at the top by applying an oxy-acetylene flame. This method of welding the end laminations together

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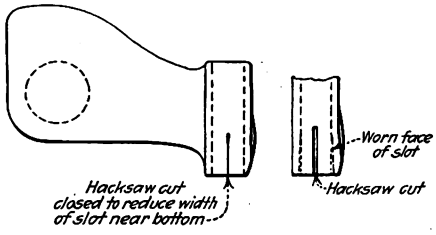
has done away with the trouble from chafed and broken leads and also has proved of assistance in keeping the end laminations from spreading.

Worn Brush-holders Reclaimed at Small Cost

WHEN brush-holders become worn they cause a number of operating difficulties, including brush chatter, poor contact between the brush and the holder, jamming of the brushes, etc. The Kansas City Railways Company has solved the problem of maintaining proper fit of the brushes in the holder by a simple method of reclamation, for which a number of hardened steel test blocks made up in the exact sizes of new carbon brushes of each type were prepared.

The wear on brush-holders occurs very largely near the lower end of



Worn Brush-holder Reclaimed by Making Hacksaw Cut and Clamping Holder Against a Steel Block of Proper Size

the brush slot. To correct this a hacksaw cut is made at each side of the holder, and the holder is then clamped tightly in a vise so as to close up the slot. By inserting the standard steel block in the holder in place of a carbon brush before the holder is clamped, the lower faces of the slot are closed in to give exactly the proper size for a new brush.

Brush-holders reclaimed by this method have been found to operate with a high degree of satisfaction. A large number have been so reclaimed at very small cost, and they would otherwise have been relegated to the scrap heap.

New Equipment Available

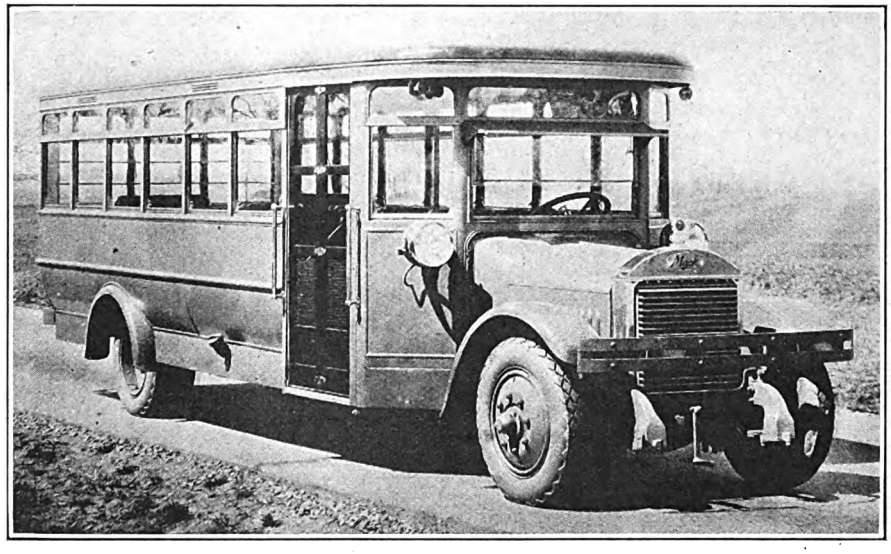
New Punch and Shear

A COMBINED punch and shear that will accommodate plates, bars, angles, beams and channels is being marketed by Henry Pels & Company, Inc., New York, N. Y. The machine has a high and deep punch throat to accommodate wide flanged beams or wide plates. The punching head is of full floating type, and is adapted for a triple gag punching attachment. The head can also be fitted with a coping attachment, that will cope both the flanges or webs of beams or other sections.

The center portion of the machine has a diagonal slide with three openings, one for bars, one for angles and tees, and the third for beams or special shapes. The blades in the first two openings are arranged so that various sizes of material can be sheared without change. In the upper or third opening the blades for beams or special shapes are arranged so that they can be changed readily. The openings are provided with downholders, and the angle and tee shearing opening is equipped with beveling tables and stops which can be set for any angle from a square cut to a 45-deg. cut.

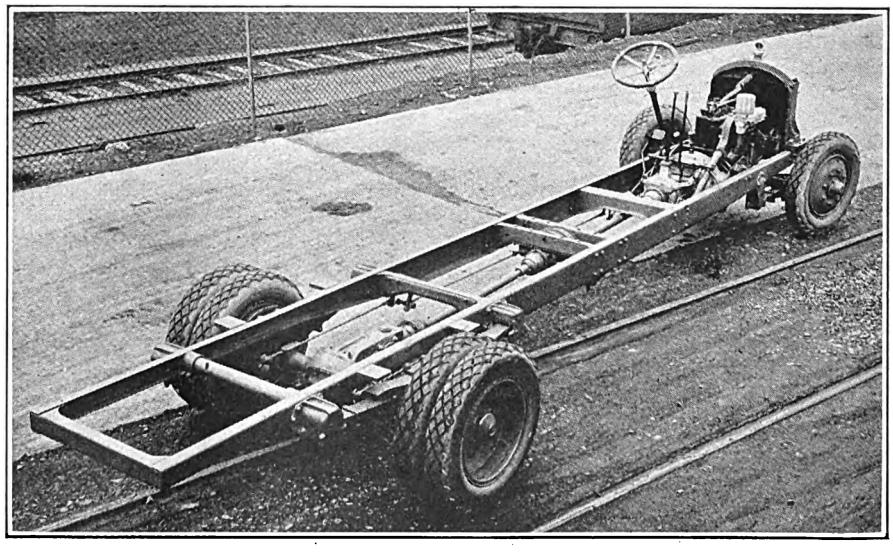
This combination machine is intended to take the place of separate units. The manufacturer states that any or all of the three operating parts of the machine can be used at one time without interfering with any other and but one power unit is required for operating all three parts.

Mack Body on a Mack Chassis



Type of Body Now Being Mounted on Mack Bus Chassis

THE International Motor Company, New York City, is now equipping the latest type Mack bus chassis with a special bus body. This chassis, which is shown in the illustration below, is built for bus purposes only and is equipped with rubber shock insulators. The outstanding features of this chassis are a special bus motor, bus transmission, a rear axle specially designed for this service, and a special bus frame.



Special Bus Chassis Made by the Mack Company

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The News of the Industry

Answer Filed

Providence Company Denies Unreasonable Rates to Complaints of Cities on New Zone Limits

Following complaints by two cities and two towns against zone limits fixed under new rates put into effect by the United Electric Railways, Providence, R. I., the company filed an answer on June 17 in accordance with the order of the commission. The answer denied that zone limits and fare charges were unreasonable or discriminatory and pointed out that the deficit for 1923 was $69,501.

Only brief reference has been made before in the ELECTRIC RAILWAY JOURNAL to this fare change. The matter had its inception in a new fare tariff filed by the United Electric Railways on April 26 with the Public Utilities Commission to become effective May 27.

At the time of the filing of the tariff rates charged were: 6 cents per zone with reduced rate tokens sold nine for 50 cents. Tokens were good in each zone and carried the same privileges as a cash fare. The new tariff called for a raise in the cash rate from 6 cents to 8 cents per zone with tokens to be sold five for 35 cents.

Under the new tariff the first zone limits out of Providence on all lines except one were extended a quarter to one-third of a mile. Three three-zone lines were reduced to two zones. On all suburban lines having four or more zones the number of zones on the line was reduced by one. Extensions of the first zone limits were also made from the center of the cities of Pawtucket and Woonsocket. The average distance of the first zone limit from the center of the cities (track mileage) is 3 miles. Under the old zones the average distance (track mileage) was 2½ miles.

For a period of two years the company has been keeping its patrons in touch not only with its financial problems but many other problems, using the newspapers, pamphlets, dash signs, etc. Since October, 1923, the company has been devoting considerable advertising to its financial condition. After the filing of this new tariff, advertisements were carried in all the local newspapers two days each week, setting forth the reasons for the new tariff.

In Rhode Island the law requires a tariff to be filed at least thirty days before the date that it is scheduled to become effective. The commission has the power to suspend the tariff and conduct an investigation. Up to within a few days of the date the tariff was to become effective, no formal complaints had been made to the Public Utilities Commission.

On May 26 the city of Cranston, through its city solicitor, filed a protest in regard to the locations of zone limits. The town of North Providence took similar action on May 27. On May 26 the town of East Providence, through its town solicitor, filed a protest against the rate, claiming it to be unreasonable, further stating that the income of the company under the former tariff was sufficient. On May 26 the city of Providence, through its city solicitor, protested the locations of zone limits on a few lines.

Prior to the time the company filed this new tariff, the city of Providence had announced that it would not oppose the new fare rate if the first zone limit reached the city line on all routes. The new tariff placed the zone limits at the city line or beyond on all but four routes, and on the four routes in question the distance by air from the center of the city equaled the distance reached on other lines. All complaints, except East Providence, were against the location of zone limits, and not against the higher fare.

The Public Utilities Commission did not suspend the tariff and the rate become effective as scheduled on May 27.

Fare Increase for Queens County Road

New York Commission Holds Fare Advance Only Answer to Road with No Net Receipts Operating at a Five-Cent Fare and Faced with $250,000 Paving Expenses

THE New York Transit Commission on June 25 granted the New York & Queens County Railway, Long Island City, the right to raise its fare to 6 cents, announcing that for each $100,000 paving assessment charged against this company an additional cent was to be added to the carrying fee.

Commissioner Harkness, who wrote the opinion, referred to the matter as a "case of a railroad *in extremis*." As the commissioner sees it, a railroad with total gross receipts of about $700,000 and net receipts of less than nothing is expected to maintain a 5-cent fare, rehabilitate its track and roadbed and take on an additional expenditure of more than $250,000 for paving. He says it cannot be done and the only result of such a levy is that the receiver must either get additional revenue or the railroad go out of business. The answer is to be found in a readjustment of the rate of fare to tide this situation over.

Immediately Mayor Hylan issued a statement declaring the city would fight the increase, taking that fight "to the highest courts of the land." His plan, which was approved by the Board of Estimate, was for the city to take over the operation of these lines, which have been in the hands of a receiver, the profits to be divided between the city and the receiver. This had been urged before the Transit Commission by Corporation Counsel Vincent Victory.

It will be recalled that Mr. Justice Aspinall in the State Supreme Court stated that unless relief were granted on or before June 26 he would direct the receiver to discontinue operation of the railroad.

At the hearing before the commission the Corporation Counsel refused to go further than to say his instructions were to present the various franchise grants affecting this company. In consequence the commission accepted the city's position as not waiving such rights under those franchises as it possesses, but expressly neither favoring nor opposing the application on its merits. On the merits of the case no evidence was presented to controvert the alleged deplorable financial condition of the property. In fact, independent checks made under the direction of the commission confirmed those facts.

The Corporation Counsel, however, did criticise the course of the receiver in presenting an application for a fare increase in the first instance to the Board of Estimate and Apportionment, stating that in his view the proper procedure would have been for the receiver first to have made application to the commission and having exhausted his remedies there to have then applied to the local authorities. With this view Commissioner Harkness disagrees. He regards the course adopted by the receiver as the proper and logical one and that the procedure suggested by the Corporation Counsel would be directly counter to a proper conception of the principles of home rule. The city of New York, as the successor of certain towns and villages, is one party to these franchises and the railroad company is the other. Mr. Harkness says that the powers of the city are contractual, while those finally invoked by the applicant are the extraordinary police powers of the state, intended as a resource only in extreme cases. The commissioner contends that a fair, business-like adjustment of the situation as between the parties having been demonstrated to be impossible of accomplishment, a proper foundation is laid for the exercise of the state's police powers.

On the other hand the Corporation Counsel did suggest that the receiver should turn the property over to the city for municipal operation at a 5-cent fare, the city to divide any profits with him. Justice Aspinall refused to entertain this proposal, stating that it

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was unlawful as being without the city's powers. As for the commission, it cites a recent case arising out of the municipal operation of a line on Staten Island where the law department of the city, in defending a personal injury case involving loss of life, set up as a defense that the city was operating illegally and therefore was not answerable in damages.

As Commissioner Harkness sees it, however, the main difficulty in this case is the question of the power of the commission to act. By the amendments of 1923 to the Public Service Commission law the power of the commission in respect of rate cases is the same as it was prior to the enactment of the rate legislation of 1921. That throws things back on the Quimby case (Matter of Quimby vs. Public Service Commission, 223 N. Y., 244) and the cases following or distinguishing it.

Commission Has Power

The rule as laid down by the Court of Appeals in those cases, succinctly stated, is that the commission has power to act in the case of rates fixed by the Legislature and in the cases of franchises or consents given by the local authorities before 1875 and after 1907. Mr. Harkness says that the various grants and consents by the former towns and villages that affect the New York & Queens County Railway run back as far as 1873. He examined the fare provision in these franchises and consents, and in view of the various granting powers and the lapse of time the result is complete confusion when it is attempted to apply them in the light of the fact that the localities have changed from small scattered villages to an integral part of the city.

In general, so far as the fare provisions are concerned, the franchises fall into three classes: First, a group where there are either no fare limitations at all or the maximum fare is fixed at 10 cents; secondly, a group where there is no fare limitation in terms but reference is made in the grants to Chapter 252 of the Laws of 1884, and, third, a group where there is an explicit restriction to a 5-cent fare. In the last group Mr. Harkness found the greater part of two lines, the Corona line and the Flushing-Jamaica line.

With respect to the second group, he concluded that these franchises are subject to regulation. Chapter 252 of the Laws of 1884 provides for a 5-cent fare, but to the commissioner this is clearly a statutory fixation of a rate, and the fact that villages and towns in granting consents referred to it in the franchise documents does not operate to change its essential character.

From a study of the documents it seems to the commissioner that the confusion is legally relieved by an action taken by the Board of Estimate and Apportionment in 1913. Under date of Feb. 6, 1913, that body granted the railway a franchise for additional trackage on certain streets within the limits of the former villages of College Point and Flushing. This franchise contains the following clause:

> Thirteenth—The rate of fare for any passenger upon said railway shall not exceed five (5) cents, and the company shall not charge any passenger more than five (5) cents for one continuous ride from any point on said railway, or a line or branch operated in connection therewith, to any point thereof, or of any connecting line or branch thereof, within the limits of the city.

According to Mr. Harkness, the actual new grant made by the Board of Estimate covers only certain streets in College Point and Flushing, but the language quoted makes it clear that it was the intention to go beyond this and to compel the company to subject not merely the part covered by its application but its entire line to a 5-cent rate of fare, irrespective of the provisions in the old franchises granted by the towns and villages. Mr. Harkness says:

> There is a limitation of the rate of fare upon "said railway," but in addition and over and beyond that there is a limitation upon "the company" providing that it shall not charge more than 5 cents for a "continuous ride from any point on said railway, or a line or branch operated in connection therewith, to any point thereof, or to any connecting line or branch thereof, within the limits of the city." What is the legal effect of this provision? Under the old town grants, for example, the company was permitted to charge a 5-cent fare within the village of Flushing, a 5-cent fare within the village of Newtown, and so on. It seems to me to be clear that the Board of Estimate and Apportionment intended that the company should, and the company in fact and in law did, surrender its fare rights under the old grants and accepted in lieu thereof a flat 5-cent fare over the entire system.
>
> Legally, therefore, this agreement constituted a new fixation of fare rendering null and of no effect the old provisions in the franchises and consents granted by the villages. If the receiver should now attempt to charge a flat 5-cent fare within the limits of the village of Flushing in accordance with the old grant and an extra fare to points outside it, he would certainly be met by the city with the entirely valid claim that he was bound by the adjustment of 1913. If the company and its receiver are bound by that adjustment, it certainly should follow that the city as the other contracting party as well is bound.
>
> I decide as a matter of law that the rights of the city and the railroad, so far as the matter of the rate of fare is concerned, are fixed by the franchise agreement of 1913. As that agreement was made after the enactment of the Public Service Commission law in 1907, it follows that the rate of fare is subject to the jurisdiction of the commission.

The commissioner says that the merits of this case are clear, and in simple justice and fairness can lead to only one conclusion. The railroad has for years been losing heavily and there is an outstanding funded debt of about $4,000,000 and an unfunded debt of about $7,000,000. The testimony of the receiver indicates this general income situation (using the figures for the period from Jan. 18, 1923, the date of his appointment, to Jan. 31, 1924): Receipts, $708,733; disbursements, $714,722. In round numbers 13,000,000 passengers were carried during the period mentioned.

The item of disbursements does not include interest, on debt, funded or unfunded, except interest on some $200,000 of underlying bonds, the payment of which is necessary to prevent the disruption of the system. There is no provision for any reserves, nor for interest on taxes accrued prior to the receivership. It merely covers what may be termed bare bone operating costs.

According to Mr. Harkness, two main factors have operated to bring the situation to a crisis: (1) The physical condition of track and roadbed, and (2) the imposition of heavy paving charges by the city authorities. The receiver and his general manager testified that unless an additional $100,000 is expended on track and roadbed during the coming year the operation of the railroad will become dangerous. The commissioner says that in this they are borne out by the commission's engineers. The receiver also estimates an additional allowance for equipment maintenance of $8,000. An item of $34,000 is added for damage claims. Approximately $20,000 is estimated for additional wages to train crews. There is also a slight increase in track rentals due to the new connection with the rapid transit line at Junction Avenue. Although pointing out the necessity for adequate reserves and of expenditures for other purposes, the receiver confines himself, in his application, to the foregoing increases for bare costs for operating the railroad.

Paving Charge Discussed

On these points the commissioner says:

> As against this the only savings indicated are possible ones through reductions in power costs and through a continuance of his efficient operation. These possible savings, however, will not offset the imperative items of increase mentioned above, nor would any added gross receipts that might be expected under a normal 5 per cent increase of traffic.
>
> The item of paving runs into larger figures. Under the railroad law street surface railroads are required to pay the cost of paving within their tracks and for two feet outside. This is a statutory provision passed in the days of the horse cars and was based upon the injury caused by the pounding of horses' hoofs and the cars on the then type of pavement. Little or no damage is now done to pavement by electric traction. Certainly nothing comparable to that done by heavy trucking. Nevertheless, the old provision remains, and in the case of a company like the New York & Queens County Railway results in literally back-breaking charges being levied against it. Not only is there involved the greatly increased cost of the paving itself due to better type than in the old days and the greater cost of labor and materials, but a rapidly expanding borough like that of Queens throws into a few years the transformation on a large scale of old country roads into modern, asphalted city streets. If it is a burden for a great city to bear its street improvement costs, what can be said of a broken down, impoverished railroad?

In conclusion the commissioner says:

> To take care of the $259,000 of paving charges listed by the Borough President would require a further increase of 2 or 3 cents, dependent upon what reduction in traffic might be caused by the increased fare. The imposition of such a paving charge against an impoverished railroad such as this and against its passengers is unreasonable. It is not a sufficient answer that it is required or sanctioned by law. Passing a statute does not of itself make its requirement reasonable and when it results in situations such as this it should properly be amended.
>
> It is an easy way for officials to place burdens upon railroad companies upon whose road and facilities the public depends. The unthinking may applaud not realizing that what injuriously affects a railroad likewise affects its patrons. A nickel must come in for every nickel that goes out. Thinking people appreciate that the imposition of such charges in situations like this means either increased fares, or if the fare be not increased then either badly depreciated service or abandonment. The truth of this may come through a fuller realization of the simple truth that railroad baiting, which in some quarters is such a favorite political pastime, must be paid for by the public either through suffering caused by depreciated or lost service or by paying increased fares.
>
> Therefore, the order in this case should provide that the rate of fare shall additionally be increased to correspond with any new paving charges if and when they may be levied against this company or its receiver. For the first $100,000, or any

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part thereof, of paving charges levied the fare shall further be increased 1 cent. It is not practicable to split the cent in fare increases, and if the levy is under $100,000 it will be absorbed by a 1-cent increase all the more quickly. For additional levies the fare shall likewise be increased in the ratio of 1 cent additional fare for every $100,000 of paving charges. Such increased rate of fare is to be used only to pay such paving charges and is to continue only until they are satisfied.

The order should additionally provide that the 1 cent increased fare granted the receiver for rehabilitation and operating costs shall continue for one year unless otherwise hereafter ordered by the commission and that generally this proceeding be kept open so that the commission may promptly from time to time adopt such other order or orders herein as may be just and proper in the premises.

Iowa City Will Have Railway Service

Iowa City's railway war has come to a close. The settlement was accomplished at a joint meeting of the City Councilmen, representatives of the Mississippi Valley Electric Company and of the William Horrabin Contracting Company.

The Council has agreed to absolve the railway from paying for paving between the rails. The cost of this had been estimated at $12,000. Railway officials declared that the burden of this sum if laid upon the railway would result in confiscation if higher fares were not permitted. The Council also promised to draft an ordinance covering this paving permit, and to continue it to include any future paving to be done on Church and Brown Streets.

The railway has promised to relay track which it had torn up and to resume railway service, for which it recently substituted transportation by bus.

The trouble started some weeks ago when the bus began operation. The railway maintained that the paving of Dodge and Church Streets this summer would lay an impossible burden on it if it was required to pave between rails on the long Dodge Street line. Citizens living in the north end objected to the bus service and taxpayers in general declined to assume the burden of additional taxes which would have been imposed upon them by the removal of the railway.

Third Avenue Line, New York, Seeks Bus Rights

Leslie Sutherland, vice-president of the Third Avenue Railway System, New York City, revealed at the Public Service Commission's hearing on June 17 on the Gallo application for a certificate to run a bus line between the Yonkers city line and White Plains that it was part of his company's plan to run a line along the same route.

The railroad official asked Public Service Commissioner Oliver C. Semple, who conducted the hearing, to hold up decision on the Gallo Brothers' application until his company could make application on its own account. The commissioner informed Mr. Sutherland that application could not be made until the company had received the consent of all the communities along which the line would run. This has already been obtained by the North Street Transportation Company, owned by the Gallo Brothers.

Commissioner Semple allowed two weeks for the submission of briefs in the case, and his decision on the application will be made after these have been submitted.

Poughkeepsie Company Petition Heard

A hearing was had before the Public Service Commission on June 18 on the application of the Poughkeepsie & Wappingers Falls Railway for permission to increase its cash fare within the city of Poughkeepsie and the village of Wappingers Falls and the fare zones between these places from 8 to 10 cents. The application was referred to in the ELECTRIC RAILWAY JOURNAL, issue of June 21. The company completed its case, except as to certain information on the additional retirement of property which was directed to be furnished, and the hearing was adjourned to July 2. Charles W. Gillespie, valuation engineer, testified for the company that the cost of reproducing the property new would be $1,900,000 and after deducting for depreciation would be $1,600,000. E. J. Cheney, another valuation engineer, testified the approximate reproduction cost would be $1,750,000. He was not allowed to testify as to the present day value because it appeared he had not made sufficient detailed examination.

Extension and Rerouting Orders Issued in Chicago

The Illinois Commerce Commission handed down two orders during the week ended June 28 affecting the extensions and rerouting of cars of the Chicago Surface Lines. Both orders have been the result of agreement with the city officials following conferences looking toward the relief of traffic congestion in the loop and better transportation for certain sections of the city. The extensions ordered are:

A double-track extension in South Woodrow Wilson Road from West Seventy-first Street to West Seventy-fifth Street.

A double-track extension in West Seventy-first Street from South Woodrow Wilson Road to South California Avenue.

A double-track extension on West Fifty-ninth Street from South Kedzie Avenue to South Central Park Avenue.

A single-track extension on East 103d Street from the present terminus of the present track just west of the Illinois Central Railroad to Cottage Grove Avenue.

A double-track extension on North Kedzie Avenue from Foster Avenue to Bryn Mawr Avenue.

A double-track extension on Fullerton Avenue from a point near Lotus Avenue to North Central Avenue.

A double-track extension on Belmont Avenue from North Central Avenue to North Cicero Avenue.

A double-track extension on Lawrence Avenue from Broadway to a point near Sheridan Road.

An additional single-track extension with relocation and reconstruction of the present single track on Milwaukee Avenue from Carmen Avenue to the terminus of the existing track near the city limits.

The order which will bring about the rerouting of loop cars, on which both the city and the company have been earnestly working for months, must first go to the City Council to be formulated as an ordinance, and then construction work will proceed as rapidly as possible.

"We hope to have these improvements available to the riding public quickly," said Guy A. Richardson, vice-president of the Chicago Surface Lines, "but it probably will be near the middle of October before they will be completed. Construction work amounting to $100,000 is involved."

The rerouting order will also involve much work revising the schedules of all lines to bring them into complete harmony with the loop changes. Briefly, the advantages anticipated will be brought about through:

1. Clearing the car tracks of State, Clark and Wells Street for through traffic.
2. The elimination of twenty left turns and twelve right turns.
3. The looping of cars on Dearborn Street instead of State Street as at present.
4. The elimination of the stub terminal at Van Buren and Adams Streets.

Ottawa Railway Starts Bus Line at Five-Cent Rate

The Ottawa Electric Railway, Ottawa, Canada, recently announced that it would start a bus line to run from the easterly limit of its service, a short distance from the city limits, out through the town of Eastview to Notre Dame Cemetery, charging a 5-cent cash fare with eight tickets for 25 cents. This area serves a town of some 5,000 people, suburban and rural.

Four bus lines had been running from the Post Office at Ottawa to the eastern end of the city, about 1 mile, then easterly on the Montreal Road through the town of Eastview for 1½ miles to Notre Dame Cemetery. Up to a short time ago, the fare was 10 cents or twelve tickets for $1. Upon entry of the railway bus the fare of the independents dropped to 5 cents each way.

Kewanee Utilities Under New Management

A resumption of railway service in Kewanee, Ill., is expected following the sale of the Kewanee municipal electric plant to B. F. Lyons, vice-president and general manager of the Beloit Water, Gas & Electric Company. By a vote of 5,800 to 2,117, the citizens of Kewanee, Ill., on June 14 approved the sale. Mr. Lyons' improvement plans for the Kewanee properties include the consolidation of the municipal and privately owned electric plants, the extension and development of both the electric and gas service and equipment, the resumption of railway service, which was discontinued several months ago, and the rehabilitation of the interurban system connecting Galva and Kewanee.

The special election on the sale of the municipal electric plant was part of a plan prepared by Mr. Lyons to purchase along with it the privately owned electric and gas plants, the Kewanee street railway system and the interurban railway connecting Kewanee and Galva, Ill. The whole transaction will involve a sum upward of $2,000,000. Mr. Lyons will form the Kewanee Public Service Company and the Kewanee & Galva Interurban Company to operate the properties.

The so-called "Lyons plan" of consolidation and purchase has been before the voters of Kewanee for more than six months and the special election took place after an intense compaign both for and against the proposition.

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Bus Line in Rensselaer, Trackless Trolleys in Cohoes

The ordinance giving consent for the operation of a bus line in and along Washington Avenue in Rensselaer, N. Y., to the Capitol District Transportation Company, Inc., a subsidiary of the United Traction Company, was recently adopted by the Common Council of the city of Rensselaer. The bus line ordinance required that the company operate the line in compliance with all the requirements imposed by the provisions of the city charter. Consent is granted upon the express condition that the provisions of the public service commission law and transportion corporation law of the state are complied with. Transfers with the United Traction Company and a stipulation that the rate of fare to be charged shall always be the same as exacted by the United Traction Company are also provided.

In the city of Cohoes the Common Council has passed an ordinance granting permission to the same corporation, under practically the same conditions, to operate trackless trolleys over a route known as the "Belt Line" with some modifications for a period of ten years. In Cohoes four trackless trolleys will be operated at the start, in Rensselaer city two buses.

Both ordinances are expected to be signed shortly. The next step will be a formal application to the Public Service Commission for permission to operate subject to the terms of local franchise conditions. A public hearing must be held on this application.

Reduction in Number of Women Conductors

Conductorettes are passing from the street cars of St. Louis, returning to the domestic pursuits they deserted during the war period to "woman" the platforms of the street cars of the city. Of the original squad of some fifty-two women fare collectors a band of ten remains. No others will be employed. The conductorettes did their work well, in the opinion of Superintendent of Transportation Butler, and it was only necessary to discharge one. The others, except the ten still on duty, have either married or found other employment. The women were subject to the same working conditions as the men. They are members of the carmen's union and receive equal pay with the men for the same work.

Interurban to Run Buses

Officials of the Kansas City, Clay County & St. Joseph Railway have incorporated a new company to operate bus lines connecting Kansas City, Liberty and Excelsior Springs. The new concern will operate under the name of the Kansas City, Clay County & St. Joseph Auto Transit Company. The plan is to co-ordinate the bus line with the present railway service connecting these cities. Ultimately it is intended to extend the bus service to St. Joseph.

"Our purpose is to give the public the transportation it wants and the best of the kind," said Robert P. Woods, vice-president of the interurban, shortly after the organization. The other officials of the two companies are: Charles W. Ford, vice-president; W. S. Tuley, secretary-treasurer; Ross S. Mahan, general passenger agent; and James A. Weimer, superintendent of transportation.

Electric cars now leave the city every hour throughout the day. The present plan is to run buses every two hours. "As the bus business increases there will probably be decreased electric service," said Mr. Woods. "Circumstances will determine this."

$5,000,000 Suburban Improvement Plan Approved

The Massachusetts Department of Public Utilities has issued an order approving the plan submitted by the trustees of the Boston Elevated Railway providing for the operation of rapid transit passenger trains on the Shawmut Branch section of the New York, New Haven & Hartford Railroad from Welles Avenue, Dorchester, to Mattapan, without interference with the transportation of freight over the railroad.

The plan is part of the establishment of a new rapid transit extension of the Elevated, which will carry the trains operating through the Harvard Square subway, over the tracks of the New Haven road in Dorchester and Milton. The entire project will cost approximately $5,000,000, it is understood.

Under the law, which was enacted last year, it is provided that the city of Boston can make no taking or purchase of land or property from the railroad companies until a satisfactory plan providing for the carrying of passengers, without interference with freight carrying, between Welles Avenue and Ashmont station, Milton, is submitted by the Elevated and approved by the commission.

Power Shortage in Southern California Hits Railways

Large consumers of power in southern California, especially public utilities, including city railways and interurbans, have been ordered by the Railroad Commission to curtail power consumption 25 per cent. Among the railways hardest hit are the lines at Los Angeles. Service will be cut all along the line, but the owl service, in particular, will be reduced. The Southern California Edison Company sets forth in its order that violation of the order for the reduced use of power will result in power being switched off when the consumer exceeds his allowance.

During the past winter the rainfall in certain sections of California was the lightest in more than fifty years. The district particularly affected was the locality where hydro-electric power is produced and transmitted to southern California consumers.

Meanwhile the Southern California Edison Company has applied to the Railroad Commission for permission to increase its rates 20 per cent during the period of the power shortage, effective July 1. At a hearing before the commission in Los Angeles on June 17 protests were lodged by counsel representing practically all consumers of power furnished by the Edison company. The commission will continue the hearing on July 14.

The Edison Company states it has at an expense of $75,000 overhauled an old plant operated by steam and owned by Pacific Electric Railway in Los Angeles, which had not been in service for fifteen years. The Edison Company is also overhauling another plant of the Pacific Electric Lines that also had been idle for fifteen years. These emergency steps were taken to furnish further relief.

It is estimated that the additional operation cost to the Edison company on account of the existing power crisis will be from $3,000,000 to $5,000,000.

Detroit Men Negotiate With Municipal Railway Officials

The twenty-seven members recently elected by the platform employees of the Detroit Department of Street Railways met on June 17 to organize and make definite plans in regard to matters to be taken up with the officials in rectifying the grievances of the motormen and conductors on the municipal lines. Donald B. Thurman was elected chairman of the committee. Raymond Jackson of the Clairmount East line was elected secretary.

Four sub-committees were chosen, each assigned a specific purpose. The committee on schedules is to work with the management in revising schedules. The pension committee will go into the question of obtaining pensions for retired car employees. The committee on by-laws will draw up a set of by-laws for the organization. The fourth sub-committee, on grievances, will hear the individual complaints of the employees.

The schedule committee, consisting of seven members, will meet with Louis Behnke of the schedule department of the D. S. R. every day until a system has been worked out for revising schedules to conform as much as possible to the demands of the men. A tentative schedule arrangement is to be submitted to the main committee at the next meeting. In the case of a number of complaints, the suggestions offered were ordered put into effect immediately, but action on the men's main grievance, that of schedule of runs, was deferred to permit the necessary study and co-operation between the men and the schedule department.

The demands to be submitted by the schedule committee will ask that 50 per cent of all runs in each carhouse be completed in consecutive hours; that all three swing runs, schedules which call for a man to divide his day's work into three separate shifts be abolished; that all two swing runs be completed within twelve consecutive hours, and that each platform man's schedule be so arranged that he draws pay for as near nine hours as possible.

No steps will be taken toward making a demand for increased wages until the schedules are complete. A request for one day vacation with pay out of every fifteen was presented to the management and this matter will be acted upon when the result of arranging schedules is known.

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South Side Celebrates

Jacksonville Traction Extends Service to South Jacksonville Following Two Years' Efforts

South Jacksonville, Fla., celebrated the merriest day of the year on May 15, when floats, parades and pretty girls took part in the mammoth celebration in honor of the opening of the municipal railway system. The line, owned by the city of South Jacksonville and operated by the Jacksonville Traction Company, was placed in regular service to the public following the parade.. The celebration was pronounced by all a huge success from the moment that the twelve street cars and 100 automobiles and floats moved across the St. John's River bridge to the south side until the very last speaker was heard at the ceremonies.

The connecting link between Jacksonville and South Jacksonville has been talked about now for years. With the rapid expansion of the city and the intermittent bus service, the matter of municipal railway transportation was broached at meetings of the Chamber of Commerce and the City Council. The new construction was made possible when on April 10, 1923, the voters of South Jacksonville authorized the issuance of $100,000 of municipal bonds for a city-owned railway. This was an important step as it had been felt that the lack of adequate transportation facilities has been a detriment to the development and growth of South Jacksonville. Following the announcement of the intended construction of the line new homes rapidly grew up on vacant lots, and much purchasing of property on the south side followed.

Before the decision was made as to the construction of the lines careful investigation was made of the advantages of both a railway line and a bus line. Figures on the cost and maintenance of both types of transportation were prepared and turned over to the people at mass meetings. Compilation of the installation cost of each kind of service resulted in the election to decide whether the citizens wanted a $30,000 bus line or a $100,000 trolley system. Although only about half of the registered voters turned out to participate in the bond election, the bulk of the votes was registered for street cars. After the passage of the bond issue, city officials of South Jacksonville conferred with officials of Stone & Webster and the Jacksonville Traction Company and contracts with those concerns were finally signed for the construction of the line in South Jacksonville and its operation as part of the Jacksonville Traction Company.

The contract called for city supervision over all of the work. The operating contract with the Jacksonville Traction Company specifies a fifty-fifty split of earnings of the line between the city and the traction company. The cost of operation will be on a split car-mile basis, with the city paying for the mileage on the south side and the traction concern on the north side of the bridge. The south side city agreed to construct the track at an estimated cost of $7,000 and take the payment out in bridge tolls which were set by the county at $240 a month. This arrangement allows the cars to use the bridge for about two years and a half without remitting toll after constructing the tracks on the southern approach. At the end of this period the payment of toll will begin.

The fare charged is the same as on the Jacksonville lines, which since June 2 has been 10 cents cash and a 7-cent token rate. The $1.25 weekly pass is also in effect in Jacksonville.

News Notes

Men on Strike in Atlantic City.—Trainmen of the Atlantic City & Shore Railroad, Atlantic City, N. J., went out on strike on June 21, crippling the service. The men are demanding an increase of 10 cents an hour and "the closed shop," which were both refused.

Transit Commission Employees to Join City Staff.—In the creation of the new city Board of Transportation, which starts operating on July 1, the New York Transit Commission recently stated that about 775 of its employees will be assigned to the new organization, while approximately 300 will remain on the staff of the Transit Commission. In the transfer the construction engineering staff, headed by Robert Ridgway, chief engineer, will virtually go intact to Commissioner John Delaney's Board of Transportation. Daniel L. Turner, consulting engineer, on the other hand, will remain with the Transit Commission. John H. Madden will be chief engineer of the Transit Commission. Frederick W. Lindars, chief accountant of the commission, who has been associated with Mr. Madden in the valuation bureau, will continue under the Transit Commission. James Blaine Walker, secretary of the Transit Commission, will continue in the same capacity.

Bus Service Stopped.—The Birmingham Electric Company, Birmingham, Ala., has discontinued the operation of its Milner Heights bus in connection with the Highland Avenue electric line. The bus was operated for some time from Arlington Avenue to Key Circle. J. S. Pevear, vice-president of the company, said the bus was started to see if there was a demand for the service.

Stop-Over Privilege Denied. — The Public Utilities Commission has dismissed the petition of citizens of South Portland, Maine, to force the Cumberland County Power & Light Company to establish stop-over privileges at Knightville, in the city of South Portland. The commission said that it was apparent that the purpose of the stop-over was to save the passenger payment of an extra fare which he would now be compelled to pay if he interrupted his passage at Knightville. The commission said that the company had to earn its operating and other fixed charges and that it had been operating at a deficit for the past few years. As a consequence stop-over privileges at South Portland, with the resulting decrease in income, would necessitate the amount of money so lost to the company to be made up from other sources, either by an increase in fare charges throughout the system or by a decrease of the expenditures for operation.

Authorized to Cancel Commutation Rates.—The Glendale & Montrose Railway has been authorized by the California Railroad Commission to cancel the thirty-ride commutation fare of $1 between Glendale and Eagle Rock, Los Angeles County.

New Schedule of Rates.—The Illinois Power & Light Corporation, which owns the railway system of Decatur, and recently purchased the Borden Motor Bus Line of that city, has filed a schedule of rates with the Illinois Commerce Commission. The schedule provides for a 1-cent charge for transfers from the buses to the cars, but when transfers are issued from the trolley cars to the buses, no charge is made. The company has placed five new Mack buses in operation, each seating twenty-five passengers. The fare on the buses will be 5 cents, the same as on the cars. The new combination of trolley and bus will be tried thoroughly and the proposed franchise for the railway will be held in abeyance until the new order of things is tested out. If there is no opposition after several months, it is expected that a new franchise will be adopted.

Refuses to Interfere in Traction Suit.—Judge Julius Mayer, in the Federal Court at New York, has refused to interfere in a suit now pending in the Supreme Court of New York County brought by one of the minority stockholders for an accounting and to enjoin the company from modifying the lease of the Forty-second Street Line. Job E. Hedges, receiver of the New York Railways, and the Guaranty Trust Company, as trustee, were represented before Judge Mayer and asked him to stay the Supreme Court action. The Judge advised the attorneys to confer with the Supreme Court, so that the court would not interfere with the work of the receiver in the reorganization of the property. A similar action is pending in the Federal Courts.

Economies to Be Introduced.—One-man car service on ten additional lines of the Springfield Street Railway, Springfield, Mass., has been announced as effective June 28. On several of the busier of these lines two-man service will obtain during the rush hours. A tariff providing for 10-cent fares with three tickets for 25 cents is being prepared for submission to the Public Utilities Commission. An increase of freight rates is also under consideration. All these departures are in the nature of efforts to cut costs to meet the wage increases and eight-hour day recently awarded by the arbitration board.

Interurban Increase Allowed.—The Maine Public Utilities Commission has authorized the Androscoggin Company, which operates between Portland and Lewiston, Me., to increase its through fare between Lewiston and Portland from 93 cents to $1. This change will necessitate a readjustment of intermediate fares, making slight advances and reductions for the intermediate zone sides. In its statement the commission said that the situation is the outcome of the extended use of automobiles.

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Foreign News

Another London Strike Collapses

The strike of shopmen and others employed on the London underground electric railways collapsed on June 13 and the following day the full train services were resumed.

The strike was called on June 5 and included the shopmen employed by the underground group of companies and by the Great Western Railway. There had been very little notice of it, so that it came on the public as a surprise. Had it been confined to the shopmen the public would have been little inconvenienced, unless indeed the strike proved of long duration. Unfortunately, however, the strikers succeeded in getting a large proportion of the men employed in the Chelsea power station, and later in the Shepherd's Bush power station to join them. Many of the uniformed staff also joined. The result was that some sections of the underground railways were shut down and only a limited train service could be run on the other sections. Other consequences were the closing of numerous stations and great trouble to the masses of people who use the railways daily to get to and from their work.

Tramcars and buses were taxed far beyond their capacity. The Great Western Railway (steam) was little affected.

The strike was quite an unofficial affair. The executive of the leading railway trade union, the National Union of Railway men, repudiated it and made efforts to get the strikers to resume work. The latter appointed a strike committee and defied the union. No negotiations for a settlement could at first go on, as neither the railway companies nor the N. U. R. would recognize the irresponsible leaders of the strike.

The demands put forward by the insurgents were 10s. a week increase of wages, with an immediate minimum of £3 a week; the remaining 16s. 6d. of the war bonus to be merged in the basic wage; a week's holiday with pay each year; a guaranteed day and a guaranteed week.

The position of the N. U. R. was emphasized by its secretary, C. T. Cramp, who issued on June 11 a statement taking up the challenge given by the revoting members of the union. The substance was that the union would fight the unofficial strike committee, realizing that the union's existence depended on the victory of constitutional methods in collective bargaining. Mr. Cramp said that this was a fight between order and mob law and was only one manifestation of an underground movement which had been going on for some time. The organized labor movement should realize that attempts to placate or temporize with the forces of anarchy must lead to worse disasters. The strikers should at once go back to work and understand that they were being used as tools in the hands of unscrupulous men.

This outspoken denunciation of Communistic influences was accompanied on the same day by an ultimatum to the strikers from the London underground railway companies, warning those who were on strike that unless they reported for their regular hours of duty not later than June 13 it would be assumed that they had left the railway service, and steps would be taken against them for their strike action without proper notice. The Great Western Railway on the following day posted a similar notice. Crushed thus between their trade union and the railway companies, the devotees of the "unofficial" strike trooped back to work.

Before the strike ended four craft trade unions which had officially put forward demands of their own for increased wages had threatened to call out their men and so to paralyze the power stations, but when they saw how matters were moving in connection with the "unofficial" strike they promptly capitulated.

Underground Line Proposed Along the Seine

Among the various projects under consideration for the extension of the Metropolitan Underground Electric Railway in Paris is one which will encircle the center of the right bank of the Seine—the heart of Paris—where the traffic has become so very intense that the service of today is entirely inadequate. The construction proposed is by the cut-and-cover method, rather than the deep tube, the street or roadway being sustained by steel pillars sustained by concrete foundations. It is believed that the new line can be built in small sections opened without interruption to street traffic save between the hours of midnight and 7 a.m. The chief difficulties to be encountered will be the rearrangements of water and gas mains, electric light and power and telephone and telegraph cables. These are particularly encumbering in this district, which follows closely the route of the grand boulevards. As a rider to the proposition it is stated that "the practice so common in the United States will be followed by placing all such in a separate tunnel."

Paris Metropolitan Gross Up 4 per Cent

Net profits of the Paris Metropolitan Underground railway system for 1923 were 12,176,498 francs, of which 548,819 francs was carried to the reserve fund and 8,785,725 francs to dividend account, the balance being distributed by the agreement with the city of Paris.

There were commercially exploited 91.96 km. of line, as compared with 84.4 km. at the beginning of the year. Trains increased from 197 per day in 1922 to 208 per day in 1923, while car-kilometers increased from 80.864.688 in 1922 to 83,440,441 last year.

Electrical power, which because of the fall in the price of coal in 1922 was but 31,600,000 francs, amounted in 1923 to 41,300,000 francs. A new contract made recently should considerably diminish this charge the present year. Other operating expenses varied but little, being 124,183,713 francs in 1923 as compared with 108,245,764 francs the previous year.

Operating receipts were 164,135,236 francs, compared with 157,345,964 francs in 1922.

There remain to be constructed 39 km. of line already planned. During the past year various short connecting links have been opened. These Metropolitan lines are not to be confounded with the Nord-Sud trunk running from the northern to the southern fortifications which are a distinct company though operated in unison under the Transports en Commun, which holds itself responsible for the financing and construction of new lines or additions.

The Paris-Orleans Makes Headway in Electrification. — After considerable difficulty in getting its electrification projects under way the Paris-Orleans Railway, by means of a governmental decree, has been able to surmount many of the material handicaps referring to expropriation and permission to run its transmission lines. The work of equipping and transformation of the substations of the Paris-Orleans and Bretigny-Dourdan lines is at last being undertaken. This is the first and most important project for giving suburban Paris an electrified interurban service.

Loss on London Tramways. — The balance sheet of the London County Council tramways for the year ended March 31, 1924, indicated a loss of £160,000 instead of the anticipated surplus of £78,000, it was intimated at a recent meeting of the Council. The recent tramway strike occurred during the financial year, being settled just as it closed. The deficit is to be met out of balances brought forward. For the current financial year a deficiency of £316,000 is anticipated, this including £164,000 for increased wages obtained as the result of the strike.

Glasgow Buys British Trackwork.— Glasgow Town Council on May 15 rejected the lowest tender for tramway special work, submitted by the United States Steel Products Company. The bid was £6,398. The lowest British offer was that of Edgar Allen & Company, Sheffield. It was £6,908. It was agreed to accept the tender of the latter, by thirty-nine votes to fourteen. On several previous occasions the Council has accepted the offers of the United States Steel Products Company because they were the lowest.

Paris Public Service Transportation Profits.—The Paris Transports en Commun announce a net profit on operations for 1923 of 6,504,715 francs, compared with 5,976,612 francs for 1922. A portion of this profit goes to the Department of the Seine, leaving a final sum to be distributed of 6,016,100 francs, against 5,688,188 francs in 1922. Dividends which will be proposed for distribution at the general meeting to be held on June 10 will be 30 francs, the 500-franc share plus a bonus of 14.25 francs.

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Financial and Corporate

Small Balance Reported in Indianapolis

Company Operating Local Lines There Convinces Commission of Inadequacy of Five-Cent Fare

The annual report of the Indianapolis Street Railway, Indianapolis, Ind., for the year ended Dec. 31, 1923, was presented at the annual meeting of the stockholders held on June 11. The balance for the year after allowing for all deductions was $4,116. The directors of the company, through Robert I. Todd, president, review the affairs of the company for the year at considerable length, particularly the improvements to track and roadway. They also discussed the subjects of fares, dividends, power, freight terminals and bus competition.

It is pointed out that the inadequacy of a 5-cent fare to provide funds for many needed improvements was again brought to the attention of public officials and that on Jan. 21, 1924, and Jan. 22, 1924, the matter was informally discussed before the Board of Public Works and the Indianapolis City Council, respectively. On March 18, 1924, the company presented its petition for higher fares to the Public Service Commission and on April 18 the commission issued an order granting a cash fare of 7 cents, with the privilege of purchasing four tickets for 25 cents, and a charge of 1 cent for each transfer instead of 2 cents as formerly. Double transfers over certain routes at 1 cent each were also authorized. The fare of 10 cents on owl cars was continued, all these changes to go into effect on May 20. The revenue from increased fares over and above the passenger receipts for the corresponding month of 1923 are to be set aside each month in a special depreciation fund and used solely for repairs to tracks, cars and the improvement of the service generally.

Four quarterly back dividends of 1½ per cent on the preferred stock of the company were paid during 1923. Quarterly dividends were also paid on March 1 and June 1, 1924. The dividends on this preferred stock are cumulative and are still eighteen months in arrears.

The contemplated development and enlargement of the West Tenth Street power plant of the Terre Haute, Indianapolis & Eastern Traction Company has been delayed by injunction proceedings. This seriously affects the Indianapolis Street Railway and prevents it from purchasing all its power from the Terre Haute, Indianapolis & Eastern Traction Company, so that it may shut down its West Washington Street power plant, where the cost of generating power is excessive. The case is now before the Supreme Court of Indiana and it is hoped that a favorable decision will be reached in the near future.

The recent completion of the largest electric railway freight terminals in the country on a tract of 11 acres at Kentucky Avenue and Morris Street by the Terminal Realty Corporation, the common stock of which is owned jointly by the four interurban companies entering Indianapolis, entirely relieves the Indianapolis Street Railway from the past obligation of providing freight terminals. The property heretofore used for freight business will be utilized for other purposes.

Ten Peter Witt type cars with center doors have recently been purchased and will be placed in service within the next few weeks.

In conclusion it is said that the earnings of the company from Jan. 1 to May 20, 1924, show a decrease of nearly 3 per cent, but it is hoped the increased fares which went into effect on May 21, 1924, will result in considerably increased earnings and thus enable the company to make many necessary improvements.

INCOME ACCOUNT OF THE INDIANAPOLIS STREET RAILWAY FOR YEAR ENDED DEC. 31, 1923

Gross Earnings from Operation:	
Passenger receipts—city lines	$4,602,549
Transfer receipts—city lines	379,871
Track rentals interurban passenger cars	158,432
Track rentals interurban freight cars	49,417
Chartered cars	847
Advertising	31,467
Dog permits, etc.	1,865
Rent of land and buildings, miscellaneous	25,600
Rent of terminal building and stations	253,420
Sale of power	4,879
Rent of equipment	6,420
Miscellaneous income	29
Interest, discount, etc.	12,335
Total gross earnings	$5,527,131
Operating expenses:	
Maintenance of way and structures	$643,950
Maintenance of equipment	516,798
Operation of power plant	850,844
Operation of cars	1,594,879
General expense	427,889
Total operating expense	$4,034,360
Total net earnings	$1,492,771
Less taxes	419,868
Total net earnings, less taxes	$1,072,903
Deductions:—Bond Interest	
Interest on $4,000,000 Citizens Street R.R. 5's	$200,000
Interest on $4,987,000 Indianapolis St. Ry. 4's	197,497
Interest on $3,833,000 Indianapolis Trac. & Term. Co.'s 5's	188,479
Interest on $200,000 Broad Ripple Traction Co.'s 5's	10,000
Interest on trust equipment notes	2,742
Interest on Indianapolis Car Equipment Co. pref. stock	7,850
Interest on notes, etc.	32,219
Total deductions	$638,787
Surplus (exclusive of accrued depreciation)	$434,116
Deduction from Surplus:	
Indianapolis Street Railway Company sinking fund	$70,000
Indianapolis Traction & Terminal Co. sinking fund	60,000
Dividends due on $5,000,000 preferred stock	300,000
Total deduction	$430,000
Balance	$4,116

$1,581,000 Refunding Issue Authorized

The Boston Elevated Railway, Boston, Mass., has been authorized by the Department of Public Utilities to issue coupons or registered bonds for $1,581,000, payable in thirty years and to bear interest at not more than 6 per cent. The proceeds of the issue are to be used in refunding a like amount of bonds of the West End Street Railway which will become due on Aug. 1, 1924.

These bonds of the West End Street Railway were approved by the Public Service Commission in 1918, but under the acts of the Legislature of 1911 the merger of the West End with the Boston Elevated was authorized. This merger has since taken place and the Elevated assumes the indebtedness of the West End. If any surplus is obtained through premiums in the sale of the new bonds they will be applied to the cost of permanent additions or improvements in the Elevated property, as approved by the Department of Public Utilities.

$9,000,000 of Detroit United Bonds Offered

Dillon, Read & Company, New York, offered for subscription on June 23 $9,000,000 of first mortgage and collateral trust sinking fund five-year 6 per cent bonds of the Detroit United Railway. The offering price was 99 and interest, to yield more than 6.20 per cent. The total authorized issue is $10,000,000.

The bonds are being issued to provide for the redemption of the company's twenty-year first mortgage collateral 8 per cent sinking fund gold bonds and divisional bonds now outstnding on the property directly owned, to acquire $3,000,000 first consolidated 4½ per cent bonds or underlying bonds on the city lines in anticipation of the payments by the city of Detroit, for capital requirements, and for other corporate purposes.

The bonds will be secured by direct first mortgage lien on 226 miles of electric railroad, including the lines from Detroit to Flint and from Detroit to Pontiac, and will be further secured by the pledge of the entire stocks of subsidiary companies owning 357 additional miles, subject to $9,900,000 divisional bonds which cannot be increased in amount. The bankers explain that the Michigan Public Utilities Commission has placed a present value of $16,064,473 for rate-making purposes on the property on which these bonds will be a direct first mortgage and a value of $17,048,546 on the property by which the bonds will be collaterally secured.

The mortgage securing the bonds provides for an annual sinking fund of $1,500,000 for the first three years of the life of the issue and an annual sinking fund of $500,000 for the remaining two years, payable semi-annually, to be applied to the purchase of bonds of this issue if obtainable at or below the call price, or if not so obtainable, to the redemption of bonds at the call price. To meet in part these sinking fund payments the company

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will be required to deposit with the trustee $3,000,000 Detroit United Railway first consolidated 4½ per cent bonds due 1932 or underlying bonds on the city lines.

These bonds are made deliverable $500,000 semi-annually at their face value to the city of Detroit, against which the city has agreed under the contract of March 10, 1922, to pay $500,000 cash semi-annually toward the deferred purchase price of the lines within the city of Detroit which were taken over by the city in 1922. These payments by the city of Detroit assure the provision of more than half of the total cash requirements for the sinking fund.

It is calculated that this issue of bonds having a direct first mortgage lien on property now valued at $16,064,473, in addition to the property on which they will be collaterally secured, will be reduced by the sinking fund to $3,500,000 by maturity.

The company has called all twenty-year first mortgage 8 per cent sinking fund gold bonds for redemption on July 25 at 107½ and accrued interest.

Further Abandonments Sought in New Jersey

The Pennsylvania & New Jersey Railway has petitioned the Public Service Commission of Pennsylvania for authority to abandon service from Trenton, N. J., to Newtown, Pa., and from Trenton, N. J., to Lambertville, N. J. Neither line, the company insists, is able to meet operating expenses and provide interest on the bonded debt. The company also asks permission to suspend the Mill Street line of the Morrisville-Trenton division, although it asks for the privilege of continuing service between Trenton and Morrisville, with the Mill Street line excluded. There will be a public hearing on the application on June 27.

The company is anxious to establish a bus line between Washington's Crossing and Trenton via Yardley and Morrisville, but says that passenger traffic is so small on the Newtown line it cannot justify service by railway or bus. Last October the corporation abandoned its Bristol-Doylestown line. A bus line is now being operated between these towns by an independent concern.

$2,886,619 Net for West Penn Railways

Separate statements of the earnings of subsidiaries are contained in the report of the West Penn Company for the year ended Dec. 31, 1923. These subsidiaries are the West Penn Railways, the West Penn Power Company and the Monongahela-West Penn Public Service Company. The consolidated income account shows gross earnings of $23,230,740 compared with $17,323,089 for the previous year, but the report for 1922 included the returns of the Monongahela-West Penn Public Service Company only from July 1, 1922. The net income for the year ended Dec. 31, 1923, was $2,972,957 compared with $1,743,086 for the previous year.

The gross earnings of the West Penn Railways and subsidiaries for the year were $18,059,445 and the net income available for dividends on the capital stock of the West Penn Railways was $2,886,619. The consolidated income account of the railway is shown in the accompanying statement. During the year twenty-five new cars were acquired for the railway properties and placed in operation—six interurban cars with a seating capacity of seventy-four each for the lines in Pennsylvania, two interurban cars having a seating capacity of seventy-two each for the Wheeling district, and seventeen city-type, one-man, steel cars for the lines of the Monongahela-West Penn Public Service Company. The plant, property and investment account of the West Penn Company and subsidiaries shows a net increase during the year of $17,076,464.

CONSOLIDATED INCOME ACCOUNT OF WEST PENN RAILWAYS AND SUBSIDIARIES
YEAR ENDED DEC. 31, 1923

Gross operating earnings			$18,059,445
Operating expenses and maintenance (including $1,409,717.49 for depreciation)		$11,568,438	
Taxes (including federal)		1,053,262	
			12,621,700
			5,437,745
Miscellaneous income			1,052,438
			6,490,183
Interest on funded debt	$2,809,076		
Interest on floating debt	203,420		
Amortization of discount	148,371		
	3,160,867		
Less interest charged to improvement accounts	353,932		
		2,806,935	
Dividend accrued on preferred stock of West Penn Power Company in possession of public		517,746	
Income applicable to common stock of West Penn Power Company owned by the West Penn Company		278,882	
			3,603,564
Net income available for dividends on capital stock of West Penn Railways			$2,886,619
Miles of railway owned (single track mileage)		519.50	520.47
Cars — passenger and express		429	456
Cars — service and miscellaneous		84	92
Car-miles (passenger and express)		†14,339,120	†13,858,245
Car-hours (passenger and express)		†1,380,651	†1,322,486

† Total for twelve months.

Preferred Stock of Holding Company to Be Offered

A banking syndicate including Pynchon & Company and West & Company, New York, is offering an issue of 10,000 shares of participating and non-callable cumulative Class A preferred stock of the General Gas & Electric Corporation. The price of the stock is $104 per share and accrued dividend to yield about 7.70 per cent.

The General Gas & Electric Company controls through stock ownership eleven public utility companies, which, in turn, control thirty-five additional public utility companies, serving communities in the Eastern section of the company with electric light and power, gas and interurban and city railway service. The properties include the Metropolitan Edison Company, Pennsylvania Edison Company, New Jersey Power & Light Company, Binghamton Light, Heat & Power Company and Reading Transit & Light Company.

Conspectus of Indexes for June, 1924

Compiled for Publication in this Paper by

Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Street Railway Fares* 1913 = 4.84	June 1924 **6.97**	May 1924 **6.95**	June 1923 **6.92**	May 1921 **7.24**	May 1923 **6.88**
Street Railway Materials* 1913 = 100	May 1924 **161**	Apr. 1924 **163**	May 1923 **173**	Sept. 1920 **247**	Sept. 1921 **156**
Street Railway Wages* 1913 = 100	June 1924 **220**	May 1924 **219**	June 1923 **210**	Sept. 1920 **232**	Apr. 1923 **207**
Steel—Unfilled Orders (Million Tons) 1913 = 5.91	May 31 1924 **3.63**	Apr. 30 1924 **4.21**	May 31 1923 **6.98**	July 31 1920 **11.12**	May 31 1924 **3.63**
U.S. Bank Clearings Outside N. Y. City (Billions)	May 1924 **15.83**	Apr. 1924 **15.96**	May 1923 **16.36**	Mar. 1920 **18.54**	Feb. 1922 **10.65**
Business Failures Number	May 1924 **1,744**	Apr. 1924 **1,730**	May 1923 **1,470**	Jan. 1924 **2,258**	Sept. 1923 **1,280**
Liabilities (millions)	**70.04**	**72.97**	**30.91**	**109.1**	**27.50**

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Eng. News-Record Construction costs 1913 = 100	June 1924 **216.8**	May 1924 **222.4**	June 1923 **220.7**	June 1920 **273.8**	Mar. 1922 **162.0**
U.S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	May 1924 **147**	Apr. 1924 **148**	May 1923 **156**	May 1920 **247**	Jan. 1922 **138**
Bradstreet's Wholesale Commodities 1913=9.21	June 1 1924 **12.29**	May 1 1924 **12.56**	June 1 1923 **13.38**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
Dun's Wholesale Commodities 1913 = 120.9	June 1 1924 **183.8**	May 1 1924 **184.7**	June 1 1923 **191.4**	May 1 1920 **263.3**	July 1 1921 **159.8**
U.S. Bur. Lab. Stat. Retail food 1913 = 100	May 1924 **141**	Apr. 1924 **141**	May 1923 **143**	June 1920 **219**	Mar. 1922 **139**
Nat. Ind. Conf. Bd. Cost of living 1914 = 100	May 1924 **161.4**	Apr. 1924 **161.8**	May 1923 **160.3**	July 1920 **204.5**	Aug. 1922 **154.5**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials.

Wages index is relative average maximum hourly wage of motormen and conductors on 105 street and interurban railways in the United States, operating more than 100 passenger cars each, and weighted according to number of cars.

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Car Line in Brunswick, Ga., to Be Dismantled

The required number of votes were not polled in Brunswick, Ga., at the recent special election and as a result the Brunswick & Interurban Railway has discontinued operations. If the vote had carried it would have authorized the city to enter into a contract with the Brunswick & Interurban Railway for a lease of the property under which the city was to take over and operate the line for a period of years with the privilege of buying the railway. It is said that the owners will proceed as soon as possible to dismantle and junk the property.

The present railway has been in operation since 1909, and for the first few years the line was operated at a good profit. With the growing use of the auto receipts began to decrease, but picked up again during the war, when the company again made money. A few years ago a receiver was appointed and the line was about to be discontinued, but the Young Men's Club jumped into the fight and through its efforts the present company was organized and has since operated the line. It has been a losing proposition during the entire time that the present company has operated it.

Fifth Avenue Bus Property Sale Reported

Control of the Fifth Avenue Bus Securities Corporation and the New York Transportation Company, New York, operating the Fifth Avenue buses, will pass to the Chicago Motor Coach Company.

Details of the plan will be submitted to stockholders of the Fifth Avenue company at once. They include an exchange of present securities of the corporation for those of the Omnibus Company of America, a new company to be organized, or as an alternative a cash offer for the New York stock.

It is announced that the Interborough Rapid Transit Company will relinquish its holdings in the bus line. The company originally deposited 51 per cent of the voting stock with the company and this was resold to the public, although the Interborough retained a voting control. In the new transfer the Interborough will lose this voting control and withdraw entirely from operation of the buses.

Suburban Lines at Chicago to Vote to Consolidate

Consolidation of two traction lines under the direction of Samuel Insull of the Chicago Rapid Transit lines will be voted upon by stockholders of the two properties on Aug. 19.

The lines involved in the projected reorganization are the Chicago, North Shore & Milwaukee and the Chicago, North Shore & Northern. The latter was formed to construct the new Niles Center extension of the Chicago Rapid Transit Company, a line ultimately destined for Waukegan, along the right-of-way of the high-tension electric line north from Dempster Street at Niles Center.

The consolidation, officials said, does not mean that the Dempster Street-Waukegan extension will be constructed in the immediate future, but that preparations are being made for such an extension within a period ranging from two years to five years distant. No immediate extension of the lines from Dempster Street is contemplated.

The Chicago, North Shore & Northern, which secured the right of way both for the Howard Street-Dempster Street and the Dempster Street-Waukegan lines, is headed by Samuel Insull, and the majority stockholders are stockholders of the Chicago, North Shore & Milwaukee, so that the consolidation means merely a fusion of two interests under one company. Under the consolidation the Milwaukee line will have a $4,000,000 first mortgage bond issue outstanding. The authorized bond issue is $10,000,000.

Railway Service Abandoned. — Railway service has been abandoned by the Wisconsin Power & Light Company, formerly known as the Eastern Wisconsin Electric Company, on its 11-mile line connecting the cities of Oshkosh and Omro. Just recently this company received permission from Common Council to install and operate bus service between these two cities in addition to its interurban service.

One-Year Interurban Issue Offered. —The National City Company, New York, offered for subscription on June 19 $3,500,000 of Chicago, North Shore & Milwaukee Railroad one-year 6 per cent gold notes dated June 16, 1924, and due June 15, 1925. The notes were sold privately at 99¾. They have all been subscribed.

Collateral Notes for Indiana Line.— The Union Traction Company of Indiana, Anderson, Ind., has filed a petition with the Indiana Public Service Commission asking authority to issue $222,000 of collateral notes. This money is to be used for miscellaneous betterments.

$4,770,000 Paid on Detroit Purchase. —Approximately 25 per cent of the Detroit street railway purchase price has been paid to the Detroit United Railway according to announcement by I. N. Merritt, accountant for the municipal railway. The semi-annual payment of $500,000 and interest on the purchase were deposited on June 2. The sum of $4,770,000 has been paid by the Municipal Street Railway Department on the original price of $19,850,000 executed two years ago and interest payments totaling $1,979,288. Principal in the amount of $15,080,000 remains to be paid.

Receiver Takes Charge. — Dexter S. Kimball, dean of the college of engineering, Cornell University, was appointed receiver of the Ithaca Traction Company, Ithaca, N. Y., on June 23 in compliance with an order by Supreme Court Justice Leon Rhodes of Binghamton, N. Y.

Syndicate Seeks Columbus Stock.— Common stockholders of the Columbus, Railway, Power & Light Company, Columbus, Ohio, have received a circular from Fuller & Rounsevel, Columbus, offering $115 a share and accrued dividend for a minimum of 31,000 shares and a maximum of 46,000 shares out of approximately 60,000 shares outstanding. It is understood the stock is sought for the Continental Gas & Electric Corporation, which recently purchased 75 per cent of the common stock of the Kansas City Power & Light Company.

$947,000 Value Fixed for Jackson Plant.—Preliminary to the negotiations between the Electric Bond & Share Company and the Jackson Railway & Light Company, Jackson, Tenn., for the purchase of the Jackson plant the State Utilities Commission has fixed the value of the property on which a fair and reasonable return may be made at $947,000. The company charges a 5-cent fare. A rate base has never before been fixed for it by public authority.

Railway Included in Electric Merger. — The recent incorporation of the Bangor Hydro-Electric Company means an immense hydro-electric merger in eastern Maine. The company plans to acquire, with the consent of the State Public Utilities Commission, the Bangor Railway & Electric Company and several light and power companies. The new company is capitalized at $10,000,000, $5,000,000 preferred and $5,000,000 common stock. The officers are Edward M. Freese, president; Howard Corning, treasurer and clerk. Edward M. Graham, Albert E. Bass, Charles D. Stanford, J. Norman Towle, A. Langdon Freese, Howard Corning and Frank Silliman, all of Bangor, are directors.

City Votes Funds for Railway Purchase.—The City Council of Toronto has authorized an issue of general consolidated loan debentures to the amount of $2,000,000, part of this sum to be applied to acquire the Toronto & York Radial Railway.

Carhouse Site Bought for Amusement Palace.—George L. (Tex) Rickard, boxing promoter and president of the New Madison Square Garden Corporation, has announced the purchase of the carhouse of the Eighth Avenue Railroad, New York, on Eighth Avenue from Forty-ninth to Fiftieth Streets, where the corporation plans to erect a building devoted exclusively to amusements. The transaction involved the payment of $2,000,000 to the Eighth Avenue Railroad, present occupants of the site.

Northern Ohio Bonds Offered.—The National City Company, New York, is offering $1,250,000 general and refunding mortgage 6 per cent gold bonds of the Northern Ohio Traction & Light Company, Akron, Ohio, series due 1926, at 99 and interest, yielding more than 6.54 per cent.

Abandonment Routes Stated. — Declaration of abandonment of route has been filed in the office of the Secretary of State at Albany by the Dry Dock, East Broadway & Battery Railroad, operating on First Avenue from Fourteenth to Thirty-fourth Street; the St. Nicholas Avenue Railway, on First Avenue from Forty-second to Thirty-fourth Street, and by the Belt Line Railway Corporation, on First Avenue from Twenty-third to Fifty-ninth Street, on Twenty-third Street from First Avenue to Avenue A, on Avenue A from Twenty-third Street to Seventeenth Street, New York City.

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Personal Items

Charles W. Ford Heads Mid-West Association

Charles W. Ford, superintendent of the Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., since 1914, was elected president of the Mid-West Electric Railway Association, at its recent meeting in Omaha. Mr. Ford has been associated with many railway properties, beginning his railway career very early in life with the old New Orleans Traction Company, which was at that time engaged in the electrification of the horse car lines. He remained with this company in the mechanical department for two years and left to enter the mechanical department of the Galveston City Railway, later going into transportation work with this property. Following

C. W. Ford

the rehabilitation of this property he served as head of the transportation department.

His next position was general superintendent of the company now known as the Oklahoma Railway, which had been known as the Metropolitan Railway of Oklahoma City. With this property he was in charge of construction and operation, completing the first 5 miles of city lines, which were placed in operation in 1903. He remained with the Oklahoma property through the development of its city and interurban lines until 1910. In that year he became identified with the Grand Junction & Grand River Valley Railway, with headquarters at Grand Junction, Col. For two years he served this company as general superintendent, having in charge its city and interurban lines, as well as the property of the Grand Junction Light & Power Company.

But his already wide experiences were not to stop there. He returned south again. In 1912 he left the Colorado properties to serve as general superintendent of the utilities controlled by a Canadian company consisting of the New Orleans Southern & Grand Isle Railway (a steam line) and the Algiers Railway & Light Company, operating railway, light and power properties on the Algiers side of New Orleans. Two years later he went with the Kansas City, Clay County & St. Joseph Railway and now holds the offices of general superintendent and purchasing agent of that property.

Major Burpee Vice-President at Ottawa—Other Changes Made

Appointments have been made to the offices held by the late Warren Y. Soper in the various associated Ottawa companies that are connected with the names of Ahearn & Soper.

Major F. D. Burpee, formerly manager, is placed on the board of directors of the Ottawa Electric Railway and is elected vice-president. Major Burpee is also made vice-president of the Ottawa Traction Company, Ltd., of which he was already a director.

Kenyon Fellowes, inspector of federal taxation for the district of Ottawa, is elected to the board of the Ottawa Car Company, Ltd.

The vacancy on the board of the Ottawa Traction Company is filled by the election of Otis Whelen.

Frederic Bronson becomes vice-president of the Ottawa Light, Heat & Power Company, the holding company and owner of the stock of the Ottawa Electric and the Ottawa Gas Companies, of both of which Mr. Bronson also is elected vice-president. He succeeds Mr. Soper in these offices, which were held for twenty-five years previous to Mr. Soper's régime by Mr. Bronson's father, E. H. Bronson.

Thomas Ahearn becomes president of Ahearn & Soper, Ltd., succeeding the late Mr. Soper. Seymour A. Rathbone, formerly secretary-treasurer, has been elected vice-president and Donald A. Fraser, formerly accountant, succeeds Mr. Rathbone as secretary-treasurer. Mr. Ahearn is president of all of the companies.

Personnel Changes on Illinois Properties

More changes in the managerial personnel of Illinois properties of the Illinois Power & Light Corporation, effective June 15, were announced recently by William A. Baehr, vice-president and general manager of the company.

Emil A. Roehry, for the last six years manager of the Cairo Railway & Light Company, Cairo, Ill., has been promoted to division manager of the company's properties at Champaign, Ill., to succeed Frank W. Bedard, promoted to a wider field of endeavor created by the company.

The position of manager of the Cairo property will be filled by Harry J. Vance, Chicago. Mr. Vance has been purchasing agent for the Illinois Traction System, a subsidiary of the Illinois Power & Light Corporation, since 1912. The duties of the interurban railway's purchasing agent have been taken over and will, from now on, be handled in the office of W. P. Hendricks, purchasing agent for the Illinois Power & Light Corporation.

Carl H. Allen Installs Safety Cars

When the Illinois Traction System decided to install the safety interurban cars, commonly known as the "one-man" interurban car, on the Illinois Valley division of the system the company selected Carl H. Allen, one of the best posted men in the country on this style of car, as an expert skilled in the handling of equipment of this type. It then created a new office for him—that of superintendent of the Illinois Valley division of the Illinois Traction System. This appointment, which became effective May 15, was referred to in the ELECTRIC RAILWAY JOURNAL, issue of May 17. The division he oversees extends from Ottawa to Joliet and Streator, Ill. The new cars will begin operating in July.

Mr. Allen began his railway career

C. H. Allen

at Indianapolis with the Indianapolis Traction & Terminal Company. For the last eighteen years he has been associated with various railways, among them the Michigan Railway, Jackson, Mich.; the Rockford Interurban Company, Rockford, Ill., and the Wisconsin Public Service Corporation, Green Bay, Wis. It was while in the service of the last-mentioned company that the one-man interurban car was put in operation and proved a big success.

R. C. Rogers has succeeded the late William Vincent Brumby as editor of the United Railways "Bulletin," published monthly for the employees of the United Railways, St. Louis, Mo. Mr. Rogers was at one time a New York and Louisville newspaper man. More recently he has been in charge of the northwestern department of the William Burns National Detective Agency.

Donald Finkbeiner, who has been connected with the law firm of Tracy, Chapman & Welles at Toledo ever since he was graduated in law from the University of Michigan in 1920, has

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been appointed claims attorney of the Community Traction Company, Toledo, Ohio, to succeed the late V. J. Waltz. He has been associated with a number of electric railway cases while with the Tracy, Chapman & Welles firm. He was an attorney for the receivers of the Toledo & Western line before its sale to Frank R. Coates, representing the Doherty interests.

C. E. Morgan Heads New York Association

Brooklyn City Railroad Official Elected President of New York Body for Coming Year—Career in Middle West and in Brooklyn Reviewed

CLINTON E. MORGAN, vice-president and general manager Brooklyn City Railroad, was elected president of the New York Electric Railway Association at the meeting at Long Beach, N. Y., on June 21. With respect to the recital of the career of Mr. Morgan there is no desire here to out-Henty Henty by proving that virtue is its own reward. On the other hand, there is no use trying to apply the yardstick of conventional criterion to a career such as that of Mr. Morgan. The achievements of the man cannot be measured that way.

Some cynics tell the truth about men at the expense of love. On the other hand, the greatest biographer of them all, Plutarch, discovered virtues in those about whom he wrote that never would have been revealed to a scandalmonger such as Suetonius. Thus digging back into the career of Mr. Morgan for early manifestations of virtue, it is discovered that as long ago as 1899 he was auditor of the Greenfield & Indianapolis Street Railway. Auditors may be inclined to chuckle in glee at this. Like other mortals they are more interested in the rising than the setting sun. From among auditors, however, only those rise who, like Mr. Morgan, make figures their slave rather than become themselves the slave of figures.

Figures have been Mr. Morgan's slave ever since 1899. The record of his connection with the Brooklyn railroad is outstanding proof of that. Largely out of the figures of that property he got his facts when he went there in October, 1919, as assistant general manager under H. H. Porter, and then, applying them to management and men, he was able to restore to a dividend-paying basis a surface street railway system of 525 miles of line that just before Mr. Morgan became connected with it had been returned to the owners following a default by the lessee in the installment of rent due Oct. 1, 1919.

But ardor over the act of recording accomplishment has destroyed the sequence of the story. To go back to the beginning, Mr. Morgan's railway career really began when he entered the construction department of the Indianapolis & Greenfield Rapid Transit Company. All his subsequent railway work up to the time of his appointment to the Brooklyn post was done in the Central West. His Greenfield & Indianapolis association was followed by his becoming assistant general manager of the Indianapolis & Eastern Traction Company. In 1905 he was named superintendent of the Indianapolis & Martinsville Rapid Transit Company, the Indianapolis Coal Traction Company and the Indianapolis & Western Traction Company. Subsequently he was chosen superintendent of the Terre Haute, Indianapolis & Eastern Traction Company.

Mr. Morgan resigned from the Terre Haute, Indianapolis & Eastern on Feb. 1, 1909, to accept the position of general manager of the Indianapolis, Crawsfordsville & Danville Electric Railway, Crawfordsville, Ind. He continued in this capacity until April 1, 1912, when he resigned to assume the general superintendency of the Michigan United Traction Company, the Michigan Railway and the Michigan Railroad, with headquarters in Grand Rapids. From Michigan he went to Brooklyn.

C. E. Morgan

One of the first things Mr. Morgan did in Brooklyn was to conduct a thorough traffic survey of all the surface lines. As a result of this study schedules were revamped more nearly to meet traffic needs and economies were introduced, both direct and indirect, that quickly began to manifest themselves in the operating statements. Mr. Morgan himself described the fundamentals of the methods followed in this survey in an article which he contributed to the ELECTRIC RAILWAY JOURNAL for Sept. 24, 1921. Other innovations of the man introduced in Brooklyn have been described from time to time in these pages.

Engineering talent was not the only endowment Mr. Morgan had to exercise in Brooklyn. The present official personnel of the Brooklyn company is largely of Mr. Morgan's making. Thus there came to Brooklyn after him in due course E. H. Reed, as auditor; J. L. Davis, as engineering assistant; G. W. Jones, as treasurer, and A. Le Roy Hodges, as assistant secretary and treasurer—all from the Middle West. With the principal surface lines cast adrift from the rest of the Brooklyn Rapid Transit System only a skeleton organization existed when Mr. Morgan took up his work there. The changes in personnel and the readjustment of duties that followed were all put into effect without friction. Under the circumstances this in itself was a big achievement. It certified—if certification were necessary—to the ability of Mr. Morgan to manage men and to induce them to play the game with him.

Mr. Morgan was a charter member of the Central Electric Railway Association and has long been active in the work of the American Electric Railway Association. He has in the past served on many committees, particularly committees of the Traffic and Transportation Association. At present he is a member of the committee on company and associate membership of the American Association, chairman of the community section, company section and individual membership committees, a member of the committee on co-operation with state and sectional associations, committee on education and committee on insurance. Mr. Morgan's activities in the committee work of the association are truly indicative of the range of interest of the man and reflect the esteem for his opinions held by the rank and file of the industry.

Frank T. Singleton, Martinsville, Ind., has been appointed a member of the Public Service Commission of Indiana, effective July 1. Mr. Singleton was secretary to the Governor and succeeds Oscar Ratts, whose term expired recently.

E. S. Meyers has been appointed superintendent of roadway of the New Orleans Public Service, Inc. Mr. Meyers succeeds G. C. Estill, former superintendent of way and structures. The office of superintendent of structures has been abolished. Mr. Meyers was formerly vice-president and general manager of the Vicksburg Power & Light Company, Vicksburg, Miss. He is a graduate of the course in electrical engineering at Purdue University. As noted previously Mr. Estill has become vice-president and general manager of the Miami Beach Electric Company, Miami, Fla.

Obituary

Chauncey Eldridge, president of the Motor Lubricants Corporation, died suddenly on June 22 in the corporation offices, 17 East Forty-second Street, New York City.

Dr. Thomas J. Brennan died at his home, in Flushing, N. Y., recently. He was private secretary to Secretary of the Treasury Manning from 1885 to 1887, was editor of the *Sunday Leader* in Philadelphia in 1877, and in 1881 was traveling correspondent for the Cincinnati *Enquirer*. He was born in Montreal in 1853. In 1896 Dr. Brennan was made assistant secretary of the Metropolitan Street Railway, New York, in which capacity he served for some time.

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Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Convention Exhibit Space Going Fast

With the forty-third annual convention of the American Electric Railway Association still more than three months away, the sale of exhibit space is exceeding all records. As an indication of what may be expected the number of applications received through June 25 was 111, compared with 73 on the same date a year ago and 45 two years ago. Requests have been received by the association for 54,861 sq.ft. of floor space as against 37,432 in 1923, and 21,800 in 1922. It is expected by the director of exhibits that by the time of the convention every foot of floor space available for exhibit purposes will have been sold.

The exhibit committee will hold a meeting on July 2 for the allotment of space. After the allotment has been completed notification of the booths tentatively awarded will be sent to all exhibitors. Prompt payment is essential because the association cannot undertake to reserve any space not paid for when it could be sold to other exhibitors. In such circumstances the tentative award of space may be canceled at the option of the officials of the association.

The list of the companies who have already filed application for space at the convention appears below. After the tentative assignment of space has been made a list will be published in the JOURNAL showing the allotments of the various companies.

Air Reduction Sales Company
Alan Wood Iron & Steel Company
Alumino-Thermic Corporation
Aluminum Company of America
American Abrasive Metals Company
American Brake Shoe & Foundry Company
American Car & Foundry Company
American Steel & Wire Company
Anaconda Copper Mining Company
Anderson, A. & J. M., Company
Association of Manufacturers of Chilled Car Wheels

Baldwin Locomotive Works
Beck Duplicator Company
Bethlehem Steel Company
Bridgeport Brass Company
Brill, J. G., Company
Brown-Lipe Gear Company
Buda Company

Caldwell, E. R., & Son Brass Company
Carey, Philip, Company
Carnegie Steel Company
Chicago Pneumatic Tool Company
Chillingworth Manufacturing Company
Chilton Company
Clark-Williams Engineering Company
Cleveland Fare Box Company
Cleveland Pneumatic Tool Company
Consolidated Car Fender Company
Consolidated Car Heating Company

Duff Manufacturing Company
Drew Electric & Manufacturing Company

Eberhard Manufacturing Company
Economy Electric Devices Company
Electric Railway Improvement Company
ELECTRIC RAILWAY JOURNAL
Electric Service Supplies Company
Electric Traction

Galena Signal Oil Company
Garford Motor Truck Company
Globe Ticket Company
Gold Car Heating & Lighting Company
Godwin, W. S., Company
Griffin Wheel Company
Gustave Schaefer Wagon Company

Hale-Kilburn Company
Haskelite Manufacturing Company
Hoywood-Wakefield Company
Hyatt Roller Bearing Company

Illinois Steel Company
Ingersoll Rand Company
International Motor Company
International Steel Tie Company
Irvington Varnish & Insulator Company

Johnson, R. F., Paint Company

Keystone Lubricating Company

Lang Body Company
Lorain Steel Company

Metal Safety Railway Tie Company
More Jones Brass & Metal Company

National Brake Company, Inc.
National Carbon Company, Inc.
National Pneumatic Company
National Railway Appliance Company
National Tube Company
North East Electric Company
Nuttall, R. D., Company

Ohio Brass Company
Ohmer Fare Register Company
Okonite Company

Pantasote Company
Paterson Vehicle Company
Perey Manufacturing Company
Peter Smith Heater Company
Petry, N. A., Company, Inc.
Pierce-Arrow Motor Car Company
Portland Cement Association
Powers Accounting Machine Company

Rail Joint Company
Railway Improvement Company
Railway Safety Equipment Company
Railway Track Work Company
Railway Utility Company
Rail Welding & Bonding Company
Reade Manufacturing Company
Reo Motor Car Company
Rooke Automatic Register Company

St. Louis Car Company
Saums, George W., Company
Shanklin Equipment Company
Sherwin-Williams Company
Simmons Boardman Publishing Company
Six Wheel Company
Stafford Roller Bearing Car Truck Company
Standard-Johnson Company
Standard Steel Works
Standard Underground Cable Company
Stucki, A., Company

Templeton Kenly & Company
Texas Company
Timken-Detroit Axle Company
Tool Steel Gear & Pinion Company
Transit Equipment Company

Union Switch & Signal Company
United States Change Making Company
Universal Lubricating Company

Walter Motor Truck Company
Western Electric Company
Wharton, Wm., Jr., & Company, Inc.
Wheel Truing Brake Shoe Company
Wheeler Corrugating Company
White Company

Yellow Coach Manufacturing Company

Westinghouse Receives Largest Insulator Order

The largest individual order for insulators ever received by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., was placed by Gibbs & Hill for the Virginia Railway.

The order calls for 70,400 standard suspension insulators and 6,100 high strength insulators at a cost of about $200,000. Insulators are part of the equipment being purchased for the electrification of the railway, which will cost altogether $15,000,000.

Birney Bus Bodies for Houston

The railway buses proposed for use in Houston, Tex., by the Houston Electric Company, mentioned on page 864 of the May 31 issue of the ELECTRIC RAILWAY JOURNAL, have been purchased. They will consist of ten "Birney" all-steel bus bodies mounted on Fageol chassis. They are now under construction at the plant of the American Car Company in St. Louis.

These new buses will generally conform to the bus exhibited by the builder in St. Louis during the Midyear Meeting of the A. E. R. A. last March and described in the issue of the ELECTRIC RAILWAY JOURNAL for April 5, page 553. Some few changes have been made from the sample bus. Thus transverse seats will be used over the wheel housing instead of seats of the longitudinal type, and a steel built-up type cowl will be used instead of cast aluminum.

These buses, in addition to their light but durable steel bodies, have many qualities attractive to the bus-riding public. The interiors are luxuriously finished in mahogany and are equipped with Brill type bus seats upholstered in leather. Each bus will seat twenty-nine passengers.

Pullman Company's Manufacturing Department Separated

A new company known as the Pullman Car & Manufacturing Company, Chicago, with capital stock of $50,000,000, is in operation following the taking over of the manufacturing properties of the Pullman Company. The new company has acquired all the manufacturing business and properties of the manufacturing department of the Pullman Company. This means the segregation of the manufacturing department from the rest of the Pullman Company. The stock of the subsidiary will be held in the treasury of the Pullman Company and there will be no distribution of stock or assets in connection with the separation. Officers of the new company include D. A. Crawford, president and treasurer, formerly vice-president and assistant to the president of the Pullman Company; Clive Runnells and C. A. Liddle, vice-presidents, formerly vice-presidents of the Pullman Company, and S. W. Gehr, secretary. All these men, with the exception of Mr. Gehr, will also be directors, as well as W. N. Oehm, manager of the works, and Ralph M. Shaw.

Metal, Coal and Material Prices

Metals—New York	June 24, 1924
Copper, electrolytic, cents per lb.	12.437
Copper wire base, cents per lb.	14.875
Lead, cents per lb.	7.00
Zinc, cents per lb.	6.08
Tin, Straits, cents per lb.	43.125
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.325
Somerset mine run, Boston, net tons	2.175
Pittsburgh mine run, Pittsburgh, net tons	1.875
Franklin, Ill., screenings, Chicago, net tons	1.825
Central, Ill., screenings, Chicago, net tons	1.575
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.25
Weatherproof wire base, N.Y., cents per lb.	17.25
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-lb. lots), N.Y., per gal.	$0.97
White lead, in oil (100-lb. keg), N. Y., cents per lb., carload lots	11.625
Turpentine (bbl. lots), N. Y., per gal.	$0.82

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Rolling Stock

Pacific Electric Railway, Los Angeles, Cal., began receiving on June 13 the initial consignment of an order of fifty all-steel electric interurban passenger cars. The outlay of equipment cost $1,850,000, making the cost of each car $37,000. This additional equipment will be used to augment equipment throughout the company's interurban system, operated in southern California. These cars are somewhat lighter in weight than the company's present 1,200 class all-steel interurban car, weighing approximately 94,000 lb. dead load as compared with dead load of 107,000 lb. to 108,000 lb. for the 1,200 class equipment. The new cars do not carry the so-called California open section but they are entirely inclosed, including the smoking compartment. The interior finish is of mahogany with seats upholstered in Spanish leather. The detailed specifications follow:

Date of delivery	June and July, 1924
Builder of car body,	Standard Steel Car Company
Type of car	All-steel motor passenger
Seating capacity	60
Weight:	
Car body	40,000 lb.
Trucks, each	12,000 lb.
Equipment, approximately	26,000 lb.
Total	90,000 lb.
Bolster centers, length	32 ft. 0 in.
Length over all	57 ft. 4 in.
Truck wheelbase	6 ft. 8 in.
Width over all	9 ft. 6¼ in.
Height, rail to trolley base	13 ft. 4¾ in.
Body	All steel
Interior trim	Mahogany
Headlining	Agasote
Roof	Arch
Air brakes	Westinghouse automatic
Axles	A.E.R.A. 6-in.
Bumpers	Hedley anti-climbers
Car signal system	Faraday
Car trimmings	Adams & Westlake
Center and side bearings	Friction
Conduits and junction boxes	Crouse-Hinds
Control	G. E. type P. C.
Couplers,	Westinghouse automatic, air and electric
Curtain fixtures	Curtain Supply Company
Curtain material	Pantasote
Destination signs	Hunter Illuminated
Fenders	Eclipse
Gears and pinions	G. E. grade M spur
Hand brakes	Miner Ideal
Heater equipment	Consolidated
Headlights	Crouse-Hinds type LAA
Journal bearings	Friction, 5-in. x 9-in.
Journal boxes	Symington
Lighting arresters	G. E. Co.
Motors	G. E. 240-A, 4 per car
Motors	Inside hung
Registers	Ohmer No. 3
Sash fixtures	Adams & Westlake
Seats	Hale & Kilburn
Seating material,	Pantasote railroad car seat MaH.
Slack adjuster	Westinghouse type J-1
Springs	Railway Steel Spring Company
Step treads	Feralun
Trolley retrievers	Ideal
Trolley base	Pacific Electric pneumatic
Trolley wheels	5-in. Kalamazoo
Trucks	Commonwealth cast steel
Ventilators	Consolidated automatic
Wheels	34-in. rolled steel

Union Traction Company, Anderson, Ind., is to purchase rolling stock valued at $600,000, including fifteen steel passenger cars, twenty-five freight cars and six city safety cars. A petition has been filed with the Indiana Public Service Commission asking authority to issue $222,000 of collateral notes. This money is to be used for miscellaneous betterments.

Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., it is reported, has purchased three buses for use in interurban service.

Track and Line

Birmingham Electric Company, Birmingham, Ala., will extend its car line from Fairfield, a suburb of Birmingham, to Rutledge Springs. This line now operates from the business section of Fairfield to the Fairfield works of the Tennessee Coal, Iron & Railway Company, a distance of several miles. The extension will be made down the old right-of-way of the Tidewater line, which was projected to Bessemer in the early days of that line.

San Francisco, Cal.—The Board of Public Works recently approved the plans and specifications for the proposed Eureka Valley-Mission-Sunset tunnel as submitted by City Engineer O'Shaughnessy. The cost is estimated at $1,572,654.

Grand Rapids Railway, Grand Rapids, Mich., is putting in new tracks on main streets of the city and near the construction work has posted information to the pedestrian regarding the size of the undertaking. The work will require 9,500 ft., board measure, of white oak ties under special steel work, switches, frogs and rails at the intersection of Lyon Street and Ottawa Avenue. The steel work will cost $12,680 and the total cost is estimated at $20,000.

Texas Electric Railway, Dallas, Tex., plans to extend the East Waco Street line to the Bellmeade shops of the Missouri, Kansas & Texas Railroad at a cost of $50,000.

Power Houses, Shops and Buildings

Westchester Electric Railroad, White Plains, N. Y., was recently granted a writ of mandamus against the city of Mount Vernon to permit the construction of a carhouse on Garden Avenue, at a cost of $1,250,000.

Public Service Corporation, Newark, N. J., has arranged to acquire one of the most valuable single property holdings that has changed hands in the center of Newark in a long time. By obtaining three parcels from the several owners the corporation rounds out purchase of the block bounded by Mulberry, North Canal, Pine and Boudinot Streets. The property adjoins the Public Service Railway Terminal and has great potential value, in view of the proposed use of the Morris Canal, which it fronts, for highway and transportation purposes. It will be held for development.

Trade Notes

Mitchell Spring Works, Johnstown, Pa., manufacturer of coil and elliptic springs for electrical railway equipment, has been taken over by a recently organized concern, to be known as the Mitchell Spring & Manufacturing Company, which is a subsidiary of the Fort Pitt Spring & Manufacturing Company, Pittsburgh. Fred A. Meckert is president of the new company.

General Electric Company, Schenectady, N. Y., is arranging for a conference of college professors to be held at Schenectady from July 7 to Aug. 9. It is expected that each visiting professor will have an opportunity further to acquaint himself with subjects in which he is particularly interested. Twice a week visits of inspection will be made throughout the plant, followed by round-table conferences with the engineers. A one-day trip to the Pittsfield plant is also planned for the purpose of studying the principles of transformer manufacture.

Wagner Electric Corporation, St. Louis, Mo., announces the removal of its Philadelphia office and service station to 1720-26 Callowhill Street.

Mitchell-Rand Manufacturing Company, New York, N. Y., has taken into its organization Edward J. Watson, with residence at Philadelphia. Mr. Watson will call regularly on customers and prospects in Pennsylvania and the Southeastern states with a view to discussing their problems and suggesting service that the company can render as manufacturers and distributors of "Everything in Insulation."

Perey Manufacturing Company, New York, N. Y., has extended an invitation to all its customers to inspect the improved facilities of its new sales office in the Architects Building, 101 Park Avenue, New York City.

New Advertising Literature

Crouse-Hinds Company, Syracuse, N. Y., has issued a twelve-page folder on Arkite-Circuit-Breaking Plugs and Receptacles.

Heine Boiler Company, St. Louis, Mo., has issued a pamphlet on "Building for the Approval of Coming Generations."

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has published a thirty-six-page, two-color publication, entitled "Westinghouse Fittings for Pipe Structures," in which is announced a new and complete line of interchangeable pipe fittings for structural work. The publication describes these fittings and gives their application to such work as the erection of outdoor substations, switching equipment, switchboard frames, racks, railings and fences. It contains an unusually large number of photographic illustrations. An adjustable insert for fastening machinery or other equipment to concrete floors, walls or ceilings, another new Westinghouse product, is also described.

Walter A. Zelnicker Supply Company, St. Louis, Mo., has issued Bulletin No. 322, on "Ballast Cars."

Roller-Smith Company, New York City, N. Y., has published Bulletin 110 describing Type HD direct-current portable measuring instruments, and Bulletin 150 describing Type HA alternating-current portable instruments. Each line includes voltmeters, ammeters, milliammeters and wattmeters.

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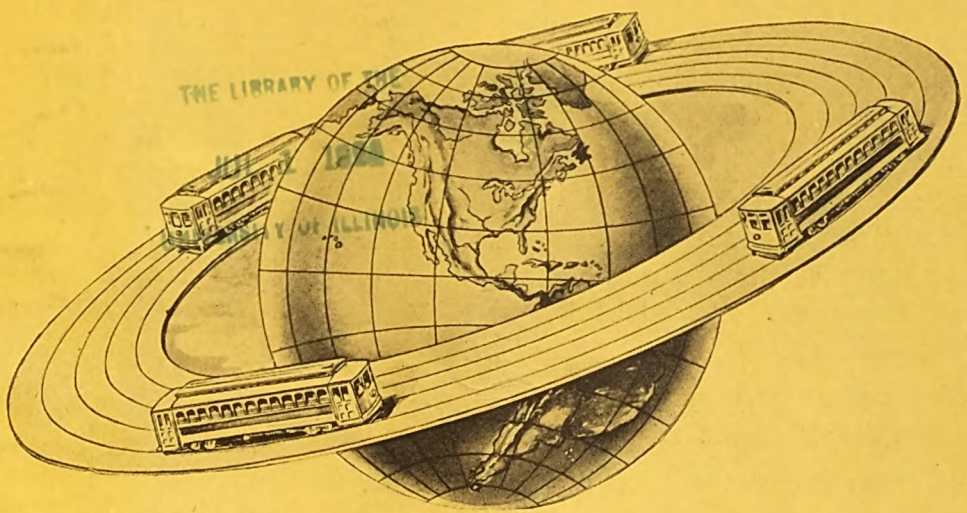
SR Engineering

This issue contains the Index for Vol. 63, the first half of 1924

ELECTRIC RAILWAY JOURNAL

McGraw-Hill Company, Inc. June 28, 1924 Twenty Cents per Copy



Collier Service
Car Card
Advertising

BARRON G. COLLIER, Inc., Candler Building, New York City

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LOGICAL REASONING

Babbitts vary in quality and to secure the highest efficiency from each is chiefly a matter of proper pouring temperature.

The Westinghouse Automatic Melting Pot, electrically operated, quickly melts and automatically maintains any babbitt at its most efficient pouring temperature. Bearings thus made are assured of longer life and better wearing qualities.

Better bearings reduce the number of "pull-ins," reduce the possibilities of traffic tie-ups.

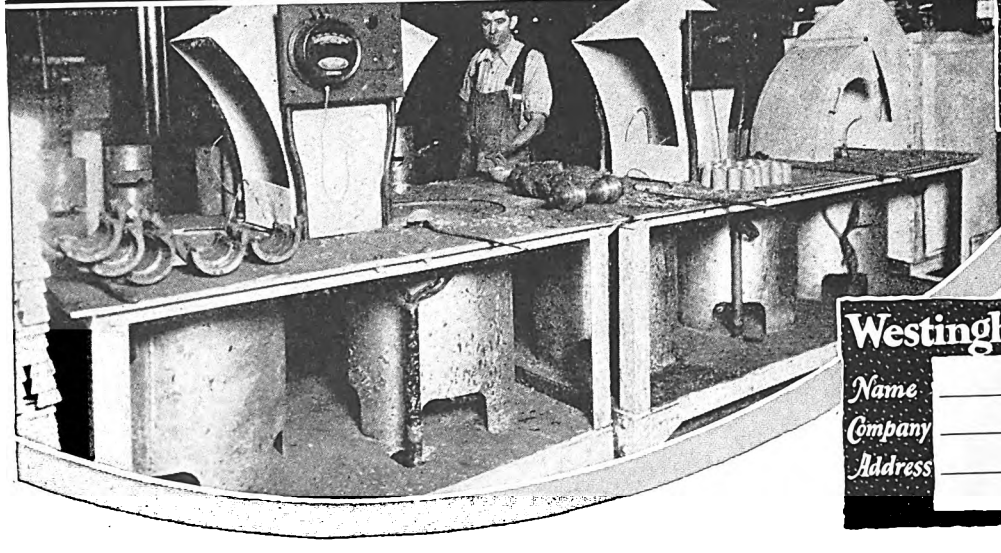
The automatic melting pot will help you to reduce your babbitting costs.

Get the whole story in Leaflet 1868. Sent free. Use the coupon.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of the
United States and Foreign Countries

Westinghouse

Westinghouse *Automatic* Melting Pots *used for* Babbitting



The Westinghouse *Automatic* Melting Pot *is heated by*

Electric Heat

which permits

Accurate Control *of the* Temperature

this maintains

The Proper Pouring Temperature

and thus

Lengthens Life *of* Bearings

resulting in

Fewer Interruptions *to* Service

Further information is given in leaflet 1868. Send for it

Westinghouse Electric & Mfg. Co.

Name _____
Company _____
Address _____

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Vol. 63, No. 26 New York, June 28, 1924 Pages 1005-1040

ELECTRIC RAILWAY JOURNAL

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Associate Editor

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Changeable Indicator for Front-Entrance Car 1010

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BY JOHN F. LAYNG.

The author shows by means of statistics collected from 48 large systems that passenger traffic is still increasing and that the street car will continue to be the vehicle of mass transportation.

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Investigations and analyses are conducted into all supplies purchased, including coal, overhead material, track material, oil, paint, etc. Satisfactory results are being obtained and they have suggested changes in certain specifications.

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BY P. L. THOMSON.

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Equipment and supplies for rolling stock and shops formed a most imposing display at the recent convention in Atlantic City. Many improvements in machine tools shown.

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1924

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The Index

THIS week the index to Vol. 63, which covers the first six months of 1924, is published as an integral part of the issue. Unlike many magazines, which defer publication of the index for anywhere from a week to a month, the index to ELECTRIC RAILWAY JOURNAL is complete, including the articles appearing in this, the last issue of the volume.

Being bound in as an integral part of the publication, it is not liable to become lost or misplaced as so frequently happens when the index is issued as a supplement. Every subscriber receives a copy. This frequently is not the case where the index is sent separately on request only.

The index is far more than a mere table of contents. Articles are listed under all main subjects to which they have reference, as well as by cities and under the names of cities by the railway companies to which they relate. Then, too, there is a separate index by authors. Thus an article may be listed in several places, making it easy to find not only a particular article, but also every article that deals with any particular subject.

Number of Copies Printed, 6,115

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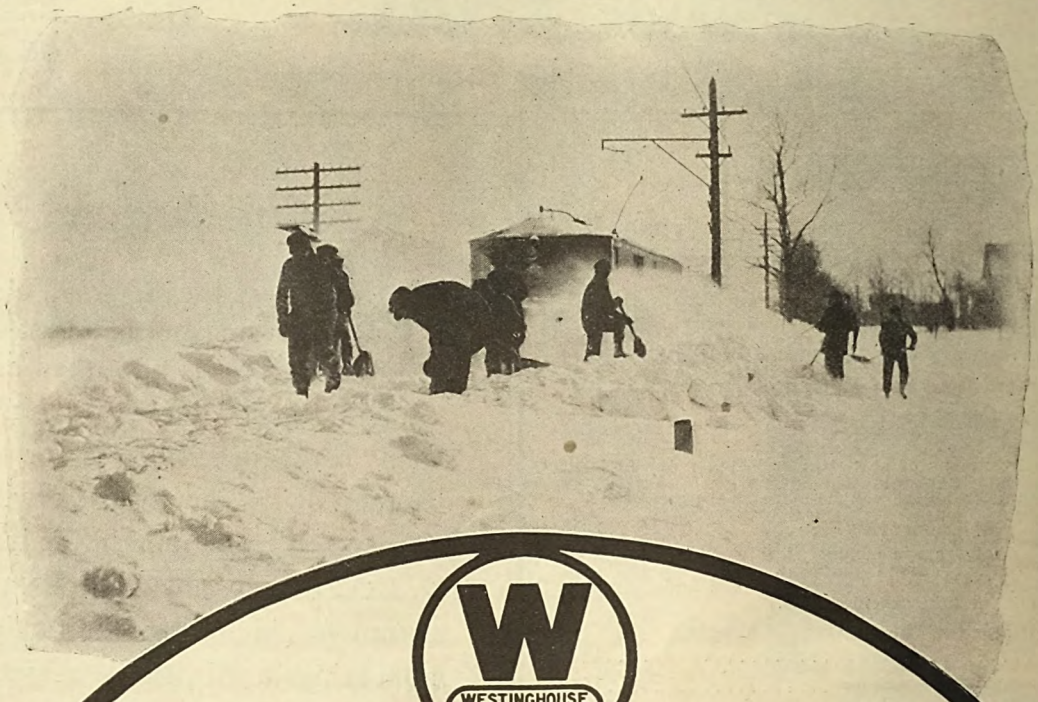
Now's The Time



W
WESTINGHOUSE ELECTRIC

Memorandum

1. Put snow-fighting equipment in first-class condition.
2. Consider installing new motors on plows 1 to 5 inclusive.
3. Install HL Control on plows 9 and 11.
4. Make all other possible provisions to avoid the delays and the high maintenance that occurred last winter.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in all Principal Cities of the
United States and Foreign Countries.

Westinghouse

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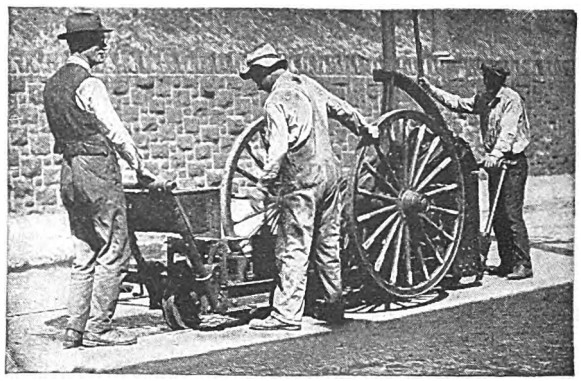
Take a new look at "Old Reliable"



The "Reciprocating" Track Grinder

Most of you know this machine. Maybe you know it so thoroughly that you haven't thought much about it. It has a way of doing its job so well that its owners forget it. We don't think much about the effectiveness with which ordinary breathing-air keeps down the mortality rate. Just so with the "Reciprocating" Grinder and track-mortality. And yet—for removing track corrugations, for grinding new or slightly cupped joints and special work, the Reciprocating Grinder produces a quality of work that has never been equalled.

Through the reciprocating method of grinding, the minimum of metal is removed from the rail head is attaining a smooth tractive surface.

Moreover, it accomplishes this result at the least cost of operation and with least interruption to traffic. Off-again, on-again, grind-again in forty seconds.

Finally, the rugged construction fits this machine for use even where renewal parts are expensive and hard to get.

By all means, know the full value of the Reciprocating Grinder. If your road has never used one, let us mail you the bulletin which describes it fully.

Railway Track-work Co.

3132-48 East Thompson Street, Philadelphia

AGENTS:
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Chas. N. Wood Co., Boston
Electrical Engineering & Mfg. Co., Pittsburgh
Atlas Railway Supply Co., Chicago
Equipment & Engineering Co., London

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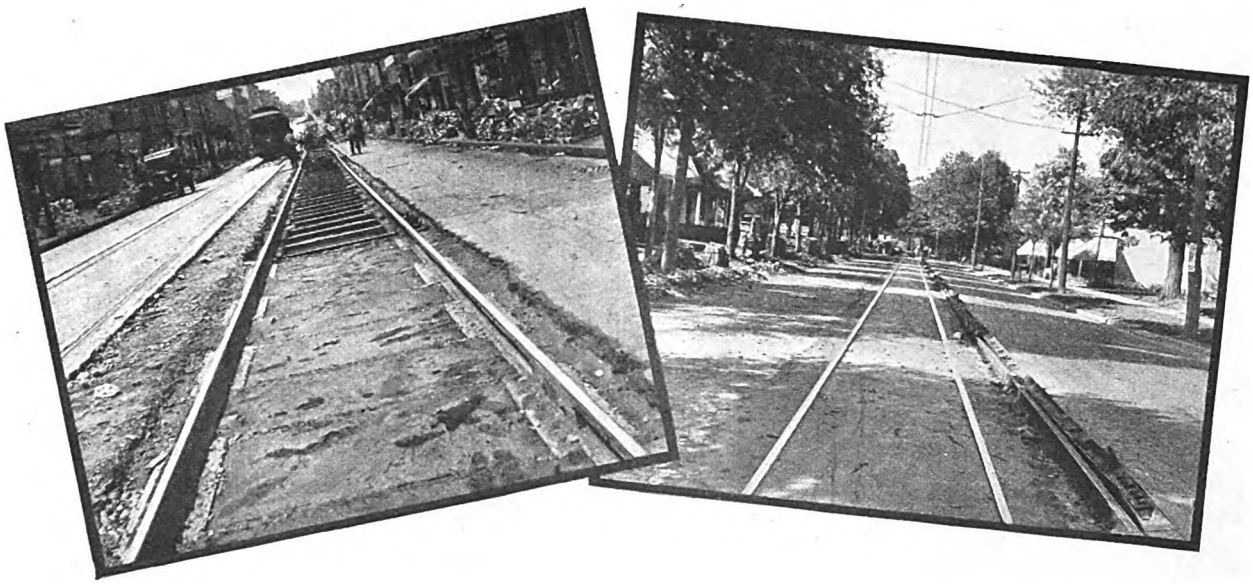

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Night Letter	

Patrons should mark an X opposite the class of service desired; OTHERWISE THE MESSAGE WILL BE TRANSMITTED AS A FULL-RATE TELEGRAM

Form 1206A

WESTERN UNION TELEGRAM

NEWCOMB CARLTON, PRESIDENT GEORGE W. E. ATKINS, FIRST VICE-PRESIDENT

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Check	
Time Filed	10:44 A. M.

Send the following message, subject to the terms on back hereof, which are hereby agreed to

CLEVELAND, OHIO, MARCH 22ND, 1924.

TO ANY GENERAL MANAGER, OR CHIEF ENGINEER,
WHO HAS PAVED TRACK WITH CONCRETE UNDER TIES TO REPAIR.

IF YOU HAVE PAVED TRACK WITH CONCRETE UNDER TIES TO REPAIR, OR RECONSTRUCT, ALLOW US TO PRESENT COMPLETE METHOD OF SAVING PRESENT CONCRETE FOUNDATION. USED IN CLEVELAND, BALTIMORE, AKRON, DES MOINES, ASHTABULA AND TOLEDO AT SAVING FROM TWO (2) TO SIX (6) DOLLARS PER FOOT TRACK. WIRE ANSWER COLLECT.

THE INTERNATIONAL STEEL TIE COMPANY.

TJL-JLH.

Steel Twin Tie Track

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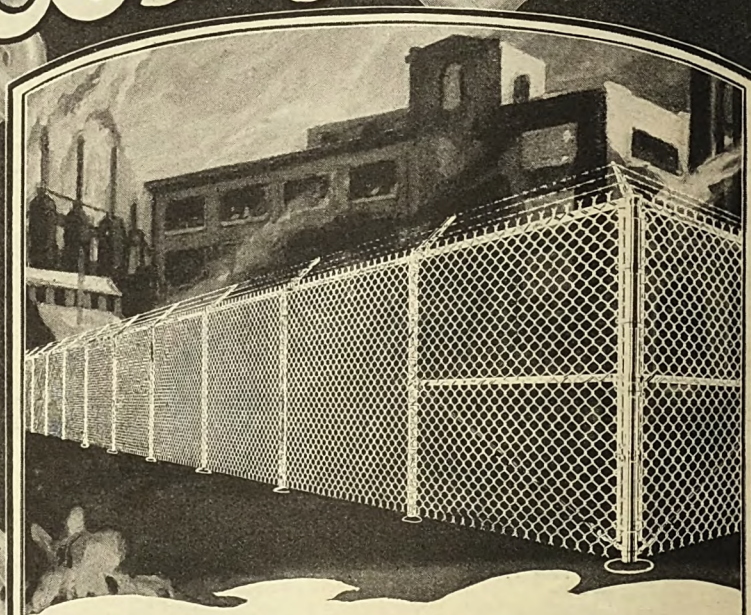
The Standard of Comparison



COMPARE Cyclone "Galv-After" Chain Link Fence Fabric with any other chain link fabric. There is a big difference.

Cyclone is the perfect "Galv-After" Chain Link Fence Fabric, Heavily Zinc-Coated (or Hot-Galvanized) by Hot-Dipping Process AFTER Weaving. No frozen or soldered links. No lumps. A beautiful, uniform zinc coating.

Cyclone is the standard by which fence durability and fence serviceability are measured. Write nearest offices for complete information about this better chain link fence fabric and Cyclone Service which solves any fencing problem.—We also manufacture Iron Fence and Gates for every purpose—intertrack fencing, etc. Address Dept. 38.

CYCLONE FENCE COMPANY

Factories and Offices:

Waukegan, Ill.; Cleveland, Ohio; Newark, N. J.; Fort Worth, Texas; Oakland, Calif. (Standard Fence Co.); Portland, Ore. (Northwest Fence & Wire Works).

CYCLONE "Galv-After" Chain Link FENCE FABRIC

PROPERTY PROTECTION PAYS

The Mark of Quality

Cyclone "Red Tag" FENCE AND PRODUCTS

Fence and Service.

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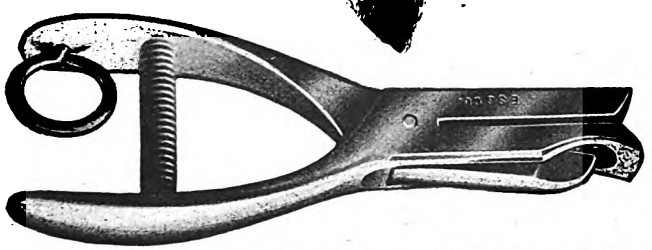
KEYSTONE

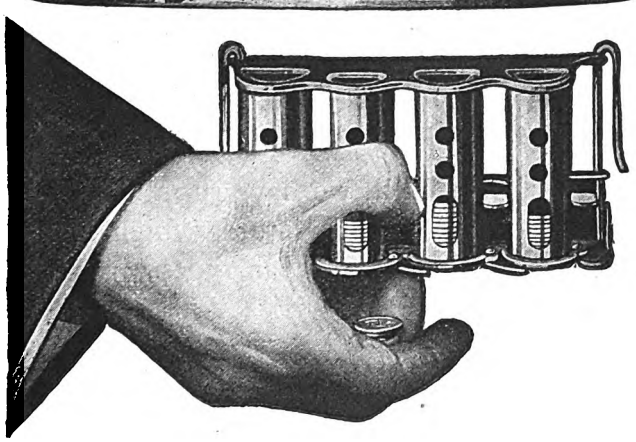
Equipment for Employees

Uniform Caps
Badges
Punches
Change Carriers
Uniform Buttons
Insignia
Whistles
Signal Lanterns



High-grade punches, with widest choice of die shapes where distinctive characters are desired. The well-known "Utility" type punch and also the "Standard" line.

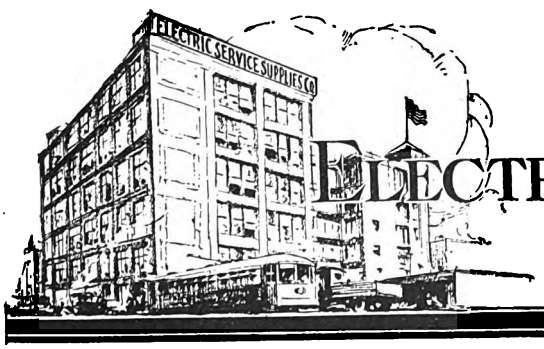
Enameled badges for employees' caps and coats furnished in a wide variety of styles. Well-made and neat, with lettering of utmost legibility.



Change carriers have become more and more a necessity for efficient work, since the advent of the one-man car. Speeds up operation appreciably.

See Catalog No. 7

for full details and numerous illustrations of employee equipment. Shown in various styles and types which will help you in choosing the right equipment for your requirements.



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17th and Cambria Sts.
PITTSBURGH
629 Oliver Building
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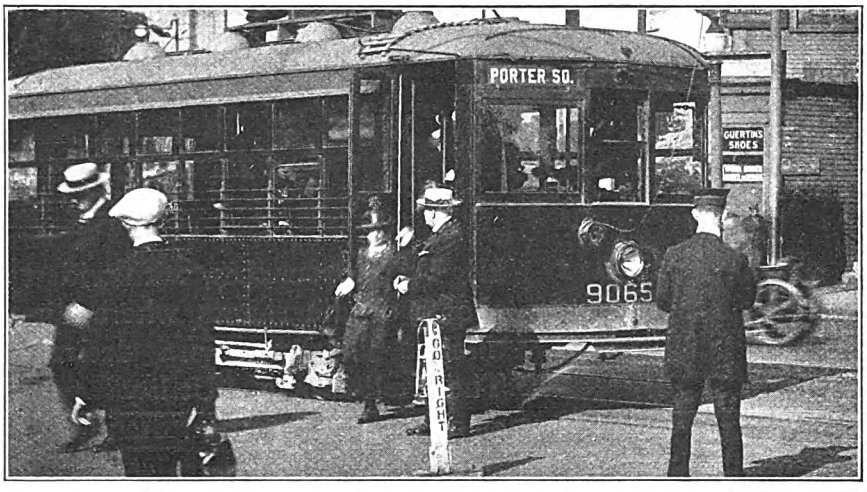
DEFINITION OF A SAFETY CAR

"Any type of car equipped with *adequate* safety devices for one-man operation."

A.E.R.A. Committee on Safety Car Operation, 1921



Earn More With SAFETY CARS

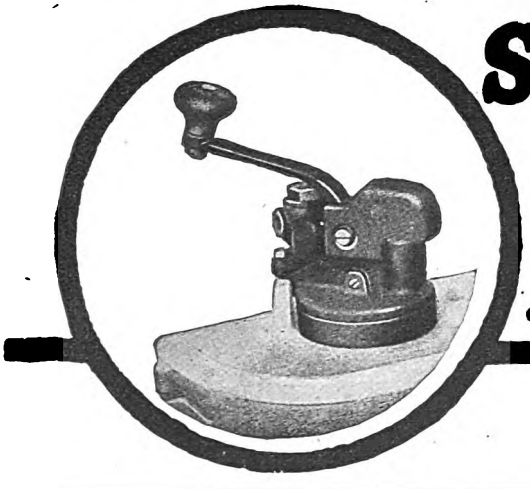
THE saving in operating expense is responsible for the great success of the Safety Car.

This is a *definite* saving which can be estimated almost to the penny before the Safety Cars are placed in service.

And it is a *substantial* saving, a large portion of the daily revenue of each car, which is immediately lifted from the expense column and moved over to swell net earnings.

Is it any wonder that 10,000 Safety Cars are now in service on more than 400 properties?

Since the first Safety Car was built, we have supplied the special Air Brake and Safety Control Features which distinguish Safety Cars from ordinary two-man types.



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OF ST. LOUIS, MO.

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WILMERDING, PA.

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80%

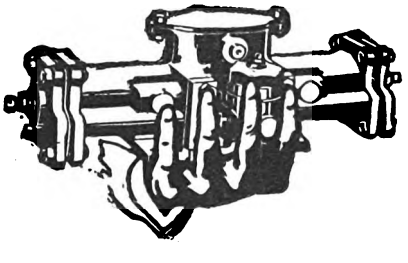
of all the electric railways

Are partially or wholly equipped with

NATIONAL PNEUMATIC DOOR ENGINES

National Pneumatic experts can give the service. Their experience on pneumatic door engine problems includes every type of car, and every class of service. The reputation and standing of National Pneumatic Door Engine is known from Coast to Coast.

For this reason nearly every installation is a National Pneumatic one. Over 65,000 cars are so equipped.



National Pneumatic Co., Inc.

50 Church Street, New York
Colonial Trust Bldg., Philadelphia
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Works: Rahway, N. J.

Manufactured in Canada by Dominion Wheel & Foundries, Ltd., Toronto, Ont.

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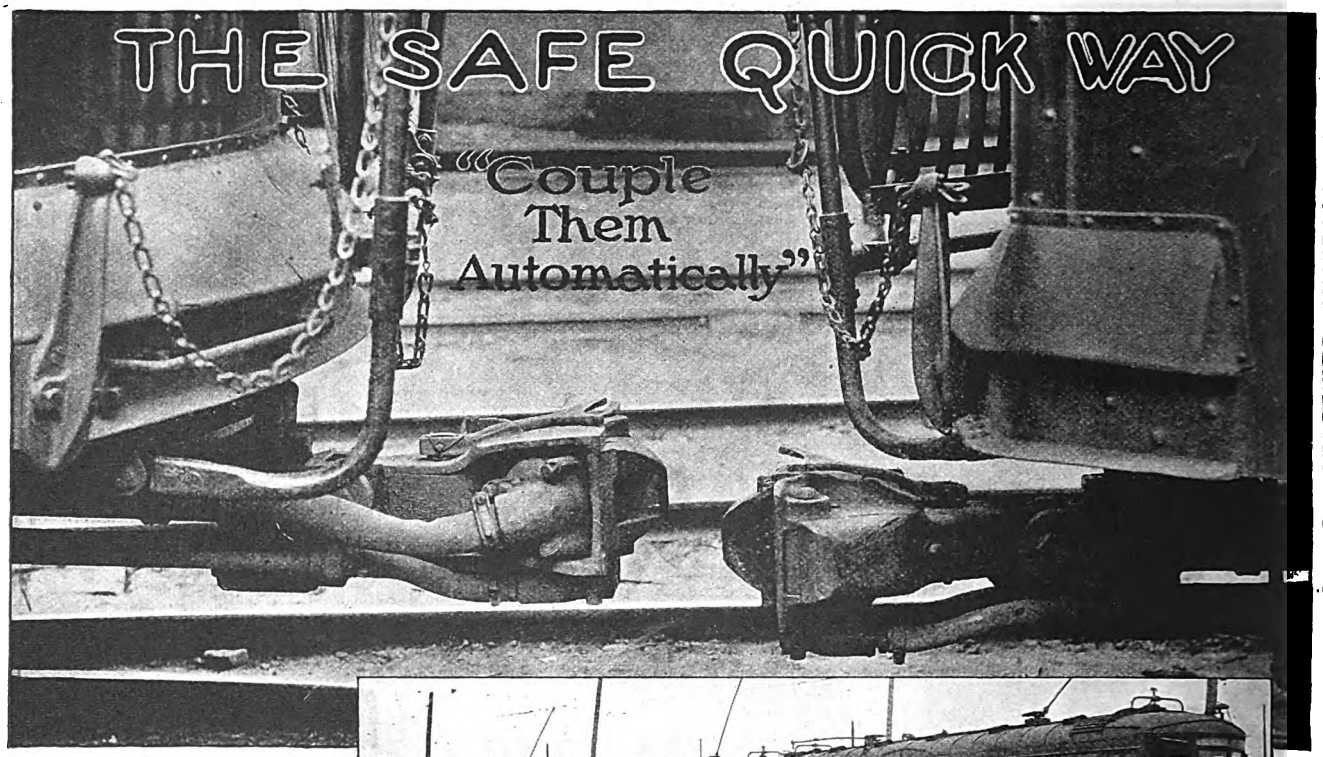
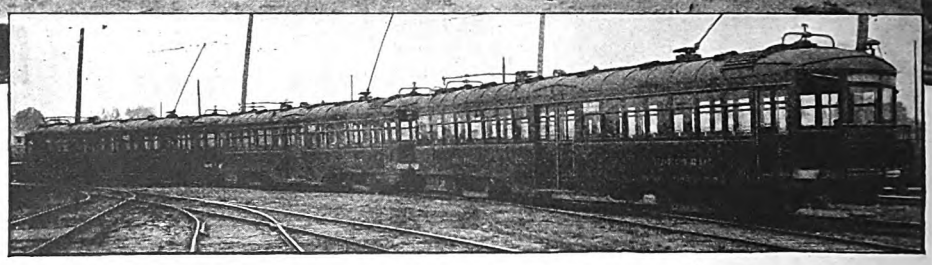


"Tight Lock"



Westinghouse Automatic Couplers in Train Service

Electric train service reaches the highest degree of economy and efficiency when Westinghouse Automatic "Tight-Lock" Car, Air and Electric Couplers are used.

Time is saved in coupling cars together during train makeup, and the elimination of any manual operation assures maximum safety for employees called upon to do such work.

3 Sizes

Westinghouse Automatic Couplers are furnished in three separate sizes to meet the requirements of all classes of service—the "H" type for heavy, high-speed cars, the "K-1-A" for light and medium-weight cars and the "C-3-A" for light cars in cases where the electric feature is not required.

Write for further information

Westinghouse Traction Brake Company
General Offices and Works: Wilmerding, Pa.

WESTINGHOUSE TRACTION BRAKES

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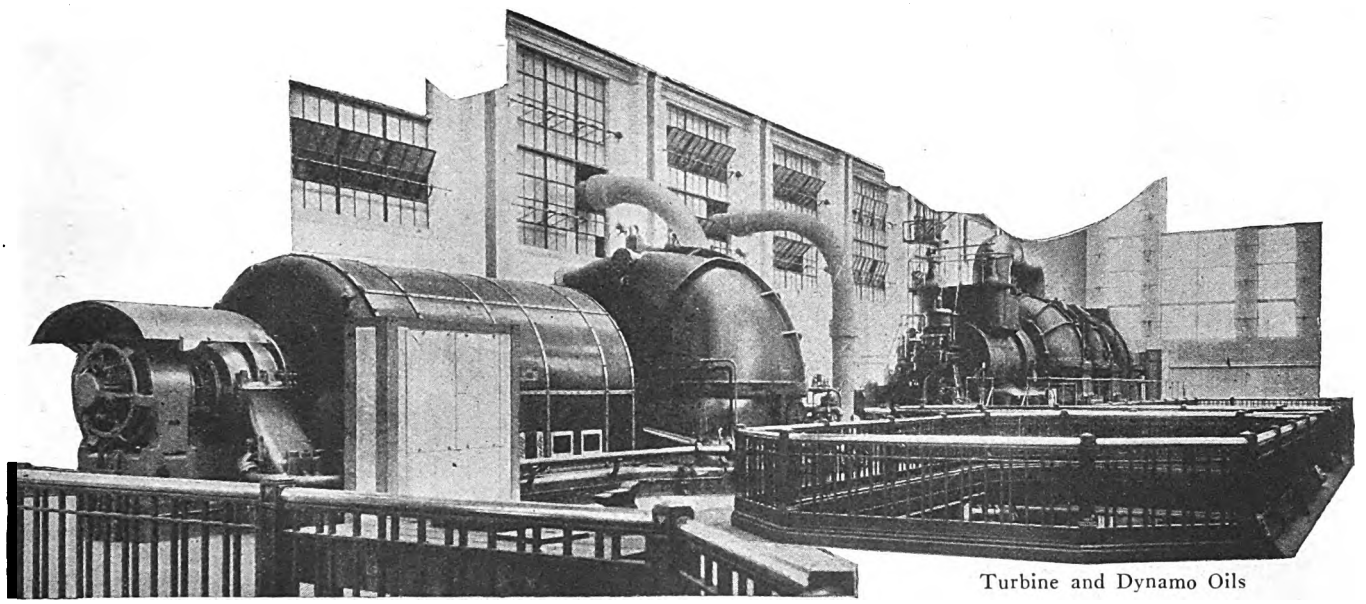


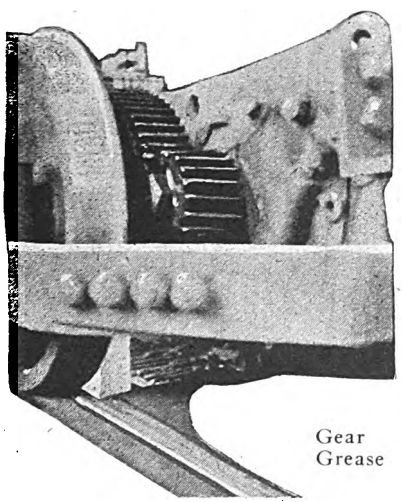
Turbine and Dynamo Oils

GALENA

all the way through

From power plant to track, from trolley wheel to truck, there are suitable grades and kinds of Galena Lubricants to render best and most economical service.

Contracts made with electric railways to supply their entire lubricating requirements. And Galena Service goes with this without cost.



Gear Grease

Track Grease

Leading electric railways in every section of the United States are using Galena lubrication.

Galena-Signal Oil Co.

Franklin, Pa.

NEW YORK CHICAGO

and offices in principal cities

Bearing Oil

Trolley Wheel Oil

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AGASOTE
TRADE MARK

PANTASOTE
TRADE MARK

Standard for Electric Railways

THE PANTASOTE COMPANY, INC.

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683 Atlantic Ave. Boston
Penobscot Bldg. Detroit
Monadnock Bldg. San Francisco

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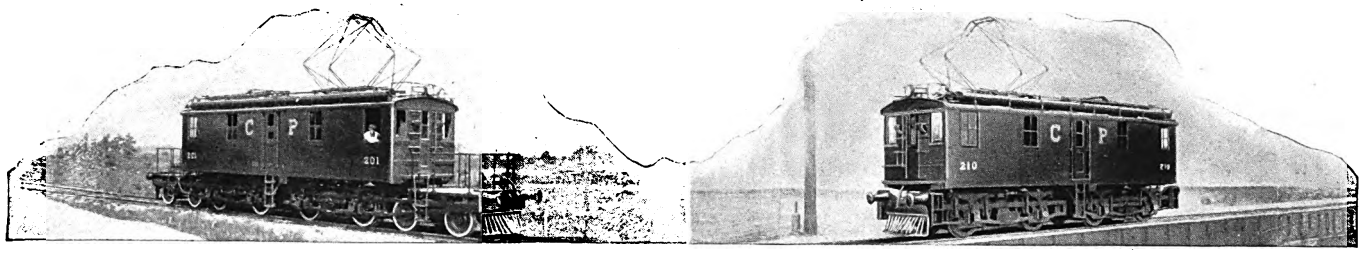
Paulista Electrification Results



Cost of Electric Operation 1/3 that of Steam

TOTAL COSTS ON THE BASIS OF A YEAR'S SERVICE OF 465,750 TRAIN MILES

	Cost per Train Mile	
	Steam	Electric
Operating Trains	63.09¢	19.30¢
Locomotive Repairs	6.83	2.18
Transmission Line Operation and Maintenance	—	0.46
Trolley Line Operation and Maintenance	—	1.03
Total	69.92¢	22.97¢

THE Paulista Railway was the first steam road in Brazil to adopt electric traction. It furnishes an interesting example of an electrification where the decision to electrify was made solely on these two considerations: greater economy in operation and general improvement in service.

The greatest factor compelling electrification was the high cost of fuel—both coal and wood. Coal is imported, and wood is growing more and more difficult to obtain, with prices increasing in proportion. Therefore, the economy to be gained from this source was established.

The initial electrified section, between Jundiahy and Campinas was 27.3 route miles of double track, the throat of traffic from the interior of Brazil. The use of 3000 volts, direct-current, was decided upon as being the best suited to local requirements, based on the experience with existing installations.

The initial equipment included 10 miles of 88,000-volt double transmission line, 4500-kw. substation equipment, the trolley and distribution system and 12 electric locomotives, built jointly by the General Electric Company and American Locomotive Company. Later the rail-

AMERICAN LOCOMOTIVE COMPANY

GENERAL ELECTRIC COMPANY

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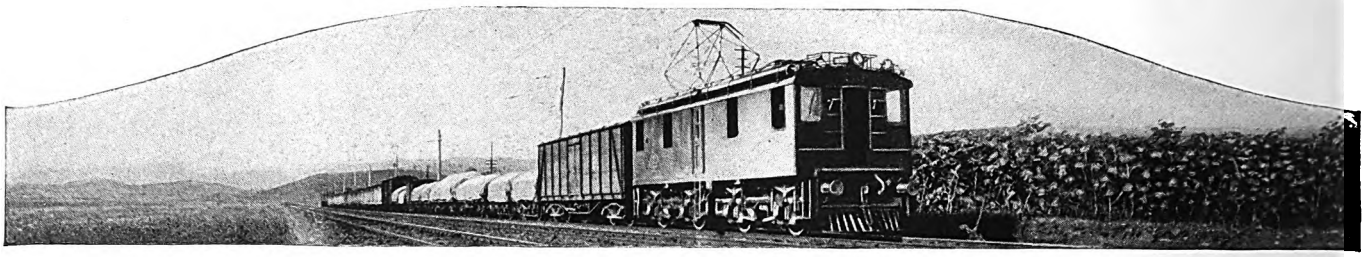
Paulista Electrification Results



Cost of Electric Power 1/4 the Cost of Coal

COST OF OPERATING TRAINS BASED ON 465,750 TRAIN MILES

	Steam		Electric	
	Total Cost	Per Train Mile	Total Cost	Per Train Mile
Coal, 20,000 tons metric, or electric power metered at power company lines	$238,095.	51.14¢	$47,381.	10.18¢
Transformation of power from 88,000 volts a-c. to 3,000 volts d-c.	—	—	8,343.	1.79
Engine drivers and firemen or assistants	29,762.	6.38	19,024.	4.08
Electricians, mechanics and helpers (running maintenance)	13,227.	2.84	2,931.	0.63
Locomotive wipers	2,679.	0.57	1,640.	0.34
Lubricants and miscellaneous material	10,089.	2.16	10,607.	2.28
Total	$293,852.	63.09¢	$89,926.	19.30¢

way purchased 4 additional locomotives. Power is supplied by the Sao Paulo Light & Power Company.

The changes in traffic since electrification are significant. When electric operation began, in 1921, the schedule provided for 16 passenger trains and 50 freight trains (including two of mixed service). With increases in both passenger and freight traffic during electric operation, the schedule was changed to 20 passenger trains and 28 freight trains. The reduction in number of freight trains resulted from increased tonnage per train and more regular movements of traffic.

Naturally, great savings are accomplished from the decreased train movements and the resulting reduction in expense of train and engine crews in the freight service as well as saving in stand-by losses over steam operation and the better economy of electric power.

Grades encountered reach 1.8 and 2 per cent, and are of sufficient length so that the average power regenerated amounts to 13.2 per cent. This is com-

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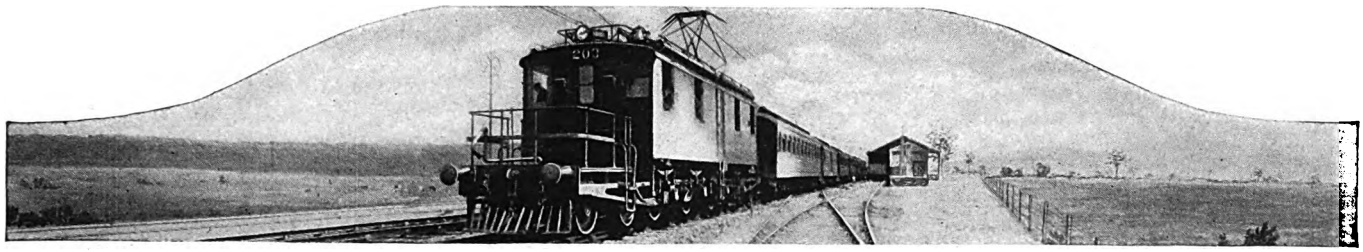
Paulista Electrification Results



Electric Locomotive Maintenance 1/3 that of Steam

COST OF LOCOMOTIVE REPAIRS AND HEAVY MAINTENANCE

	Steam		Electric	
	Total Cost 465,750 Train Miles	Per Train Mile	Total Cost 465,750 Train Miles	Per Train Mile
Labor	$13,512.	2.90¢	$6,250.	1.34¢
Material	18,303.	3.93	3,928.	0.84
Total	$31,815.	6.83¢	$10,178.	2.18¢

puted from the following tabulation of power consumption and power regenerated at the locomotives for one month's service. Less than 5 per cent of this energy,

Class of Service	Kw-hr. Motoring	Kw-hr. Regenerating	Per Cent Regenerating
Passenger	303,510	30,505	10.05
Freight	363,595	57,530	15.82
Total	657,105	88,035	—
Average per cent regeneration			13.2

that is, of the total regenerated power, is returned to the power company's lines, showing that the railway obtains almost full benefit from the regeneration. In addition to this economy, the saving in maintenance of braking apparatus is considerable.

Of especial interest is the comparison of power measured at the locomotives to that measured on the power company's lines. This ratio is .837, which shows the high economy of electric power that is made possible by regeneration.

The costs used here are based on the average rate of exchange over the period

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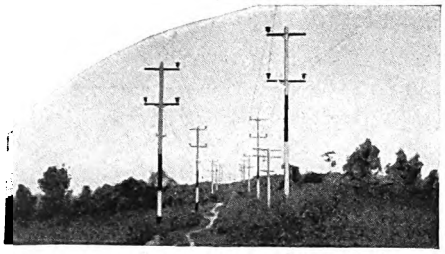
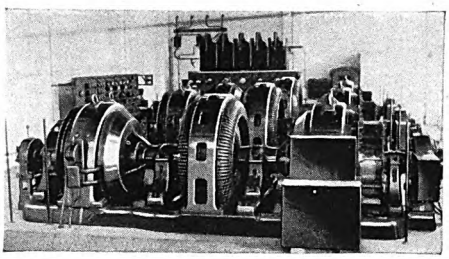
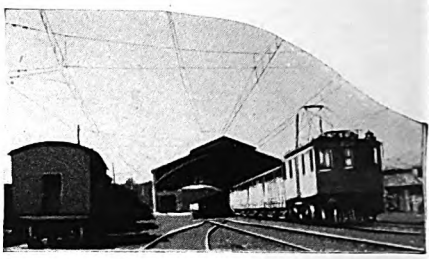
Paulista Electrification Results







Efficiency of Electric Operation—83%
Average Per Cent Regeneration—13.2

COST OF OPERATING AND MAINTAINING ELECTRIC SYSTEM

	10 Miles of 88,000-volt Transmission Line		71.4 Miles of Secondary Distribution System	
	Total Cost 465,750 Train Miles	Per Train Mile	Total Cost 465,750 Train Miles	Per Train Mile
Labor.....	$1,865.	0.40¢	$4,271.	0.91¢
Material.....	272.50	0.06	559.50	0.12
Total.....	$2,137.50	0.46¢	$4,830.50	1.03¢

for which the costs are figured. These costs are exact, but not strictly comparable with the cost of service in this country, due to the varying exchange. They are intended only to give a comparison of results with electric operation versus steam.

In consequence of the savings made by the initial installation, the Paulista Railway is electrifying 35 additional route miles of single track. For this extension the entire equipment was ordered from the General Electric Company. This includes a new substation of 4500-kw. ultimate capacity, together with high-tension and distribution equipment, also five 3000-volt direct-current switching locomotives, which, like the larger units, were built jointly by the General Electric and American Locomotive companies.

Contracts for the Paulista electrification are carried out by the International General Electric Company through the General Electric S. A. of Brazil.

General Electric Company
Schenectady, N. Y.

American Locomotive Company
New York, N. Y.

25-255

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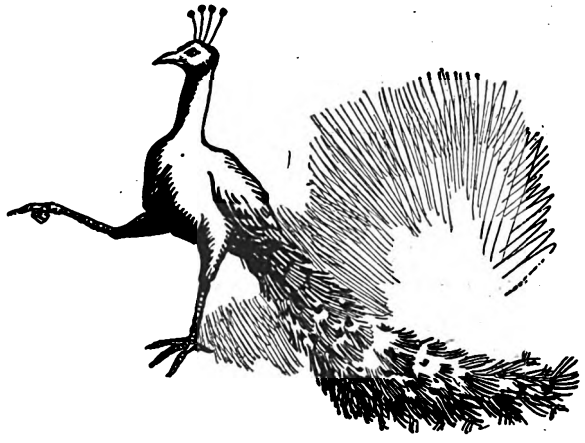


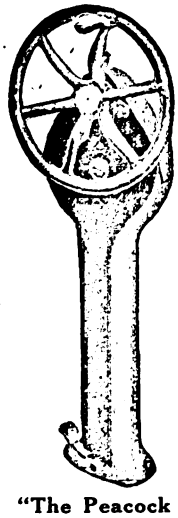
Like winding your watch!

Scarcely any habit we have in life is more regularly practiced than the act of winding our time pieces. Every time we reach the end of another day, we perform this act almost without realizing it.

Make hand brake practice a habit, too!

Train your motormen to similar regularity in the use of the hand brake. Teach them to make at least one hand brake stop every time they reach certain points on the trip. Then if the emergency ever arises when the hand brake is needed to prevent an accident, you can depend on *habit* to handle the situation, where otherwise the motorman might become panic-stricken.

But don't fail to provide adequate, reliable, and powerful hand brakes for your motormen to use.



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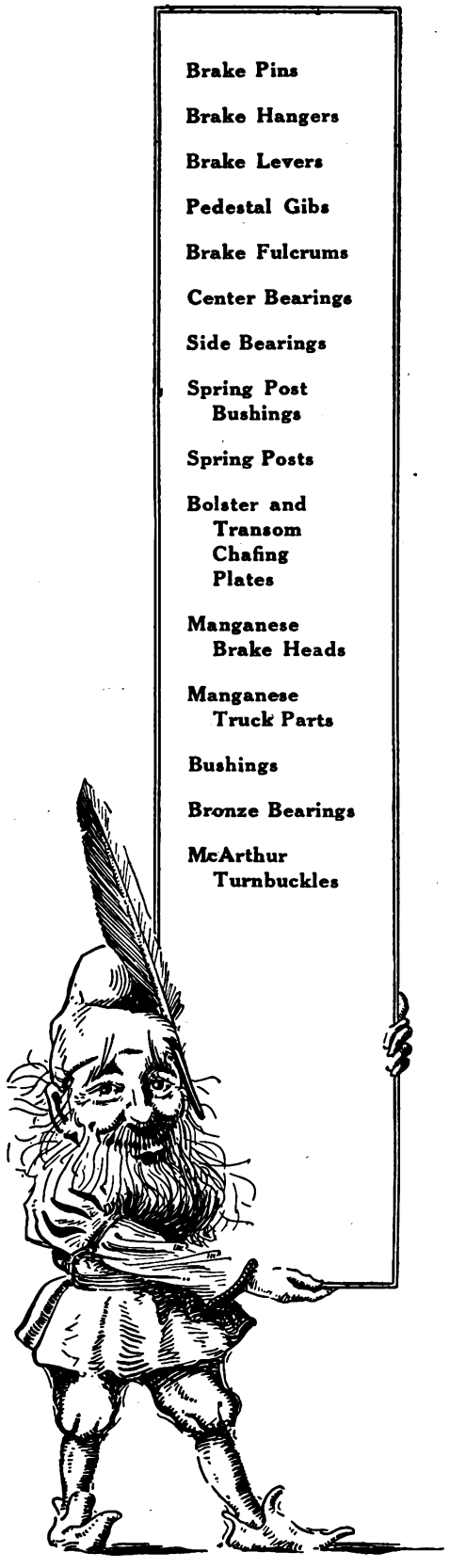

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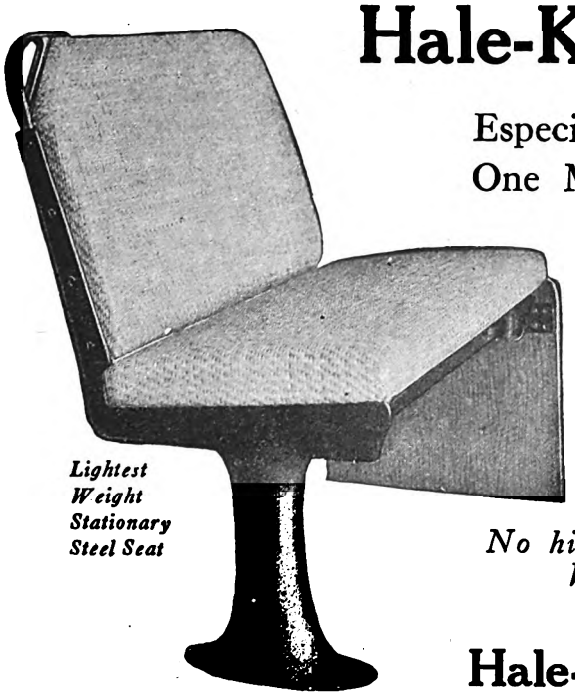

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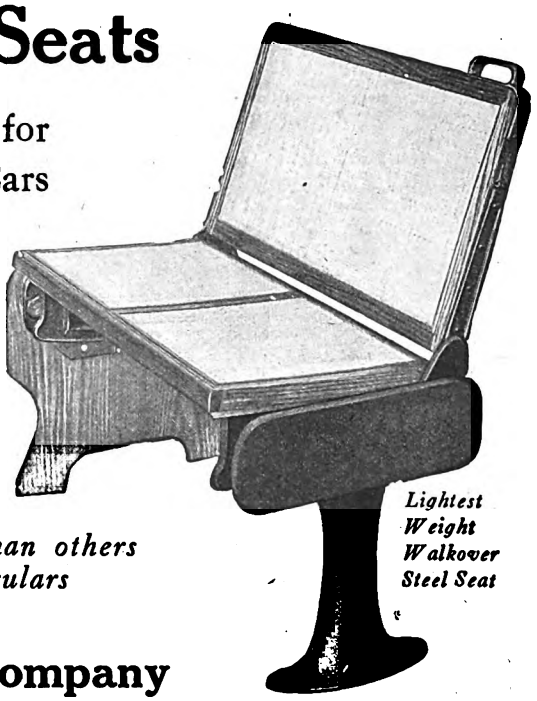

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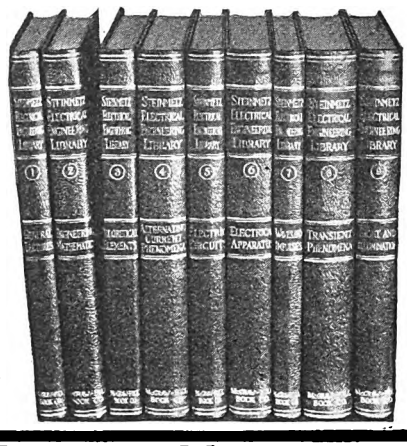

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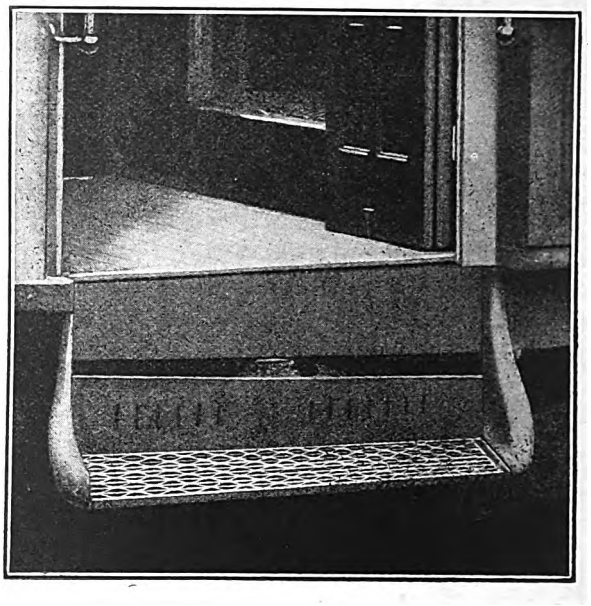

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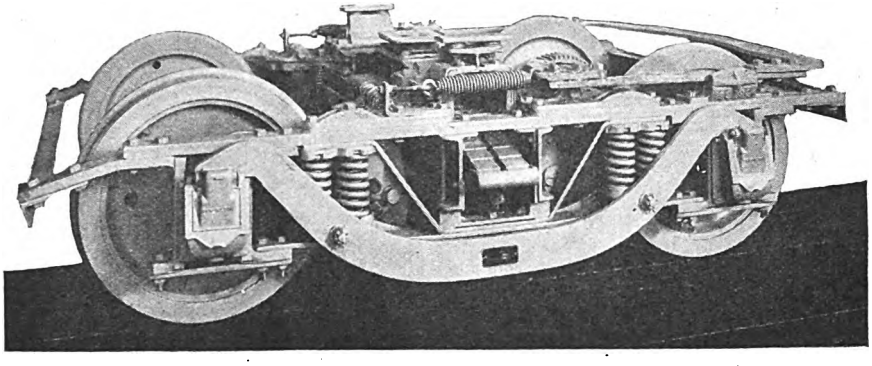

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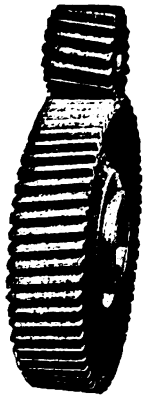

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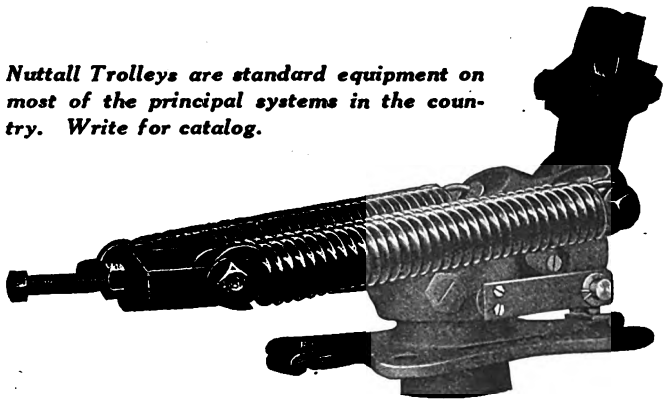

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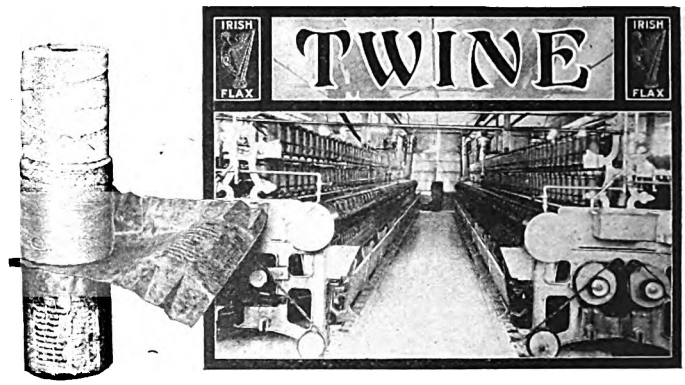

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Hartford & Springfield Street Railway, Warehouse Point, Conn. ...

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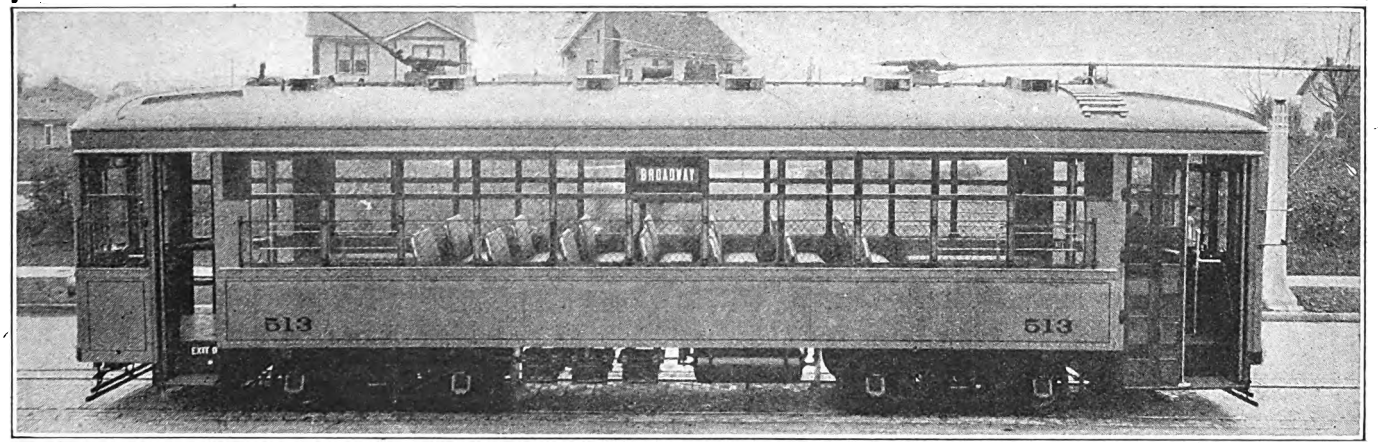
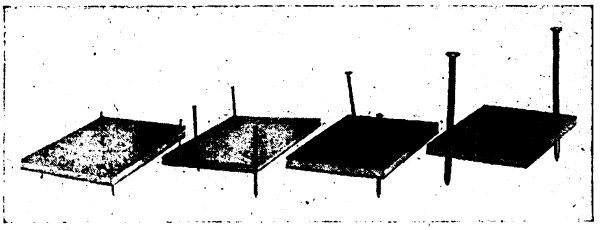


These two tests and others you can make, show why prominent car builders and operating companies throughout the country have adopted Haskelite as the superior material for roofs, headlinings, and interior trim. Its use contributes stiffness and lightness to the structure and is most economical of labor and finishing materials.



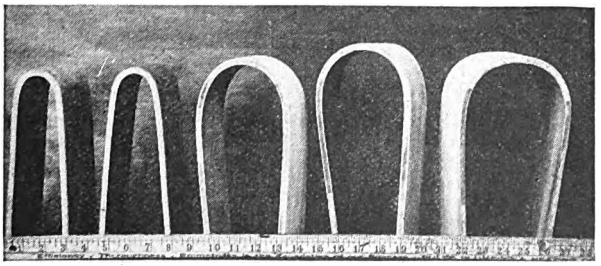
Note how HASKELITE resists splitting when nails are driven close to the edge. The very highest grade of waterproof glue holds the plies together as one piece.

Send for Samples of

HASKELITE

and make these tests yourself

HASKELITE can be boiled in water or oil, and bent to small radius curves. For roof panels and headlinings, it is moulded in steam-heated presses before shipping. The waterproof glue keeps the plies from separating under all conditions.



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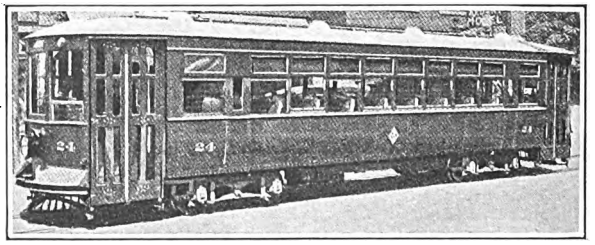
133 W. Washington St., Chicago, Ill.

Youngstown & Suburban cars have HASKELITE roofs and side panels of Plymetl, which is HASKELITE with steel surface.



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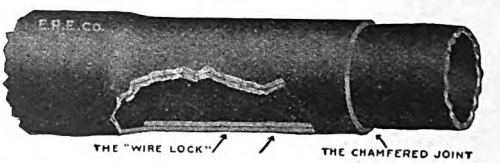

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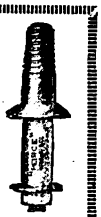

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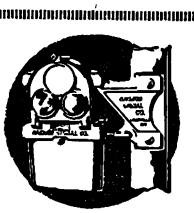

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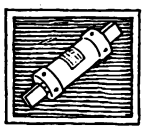
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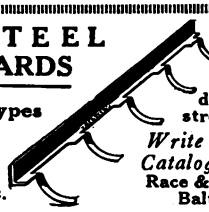

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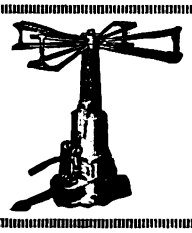

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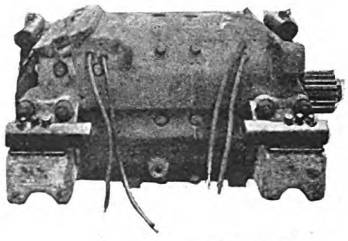

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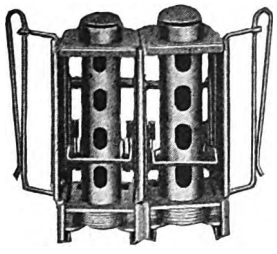

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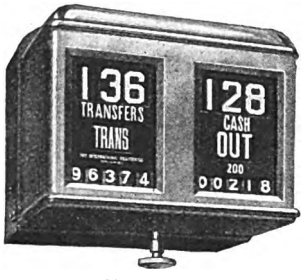

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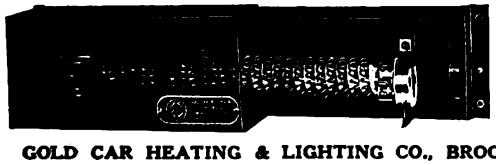

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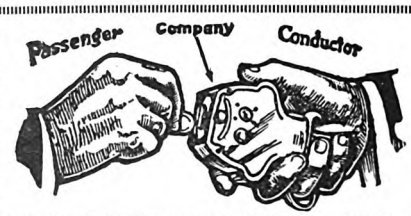

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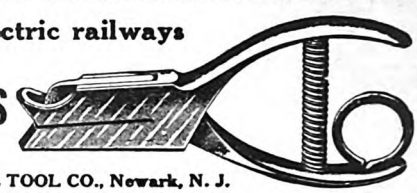

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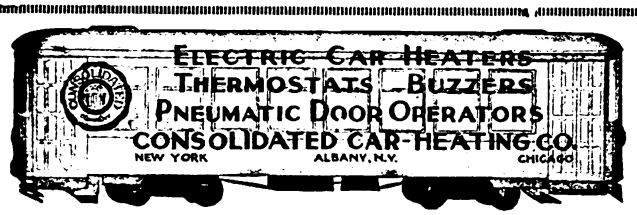

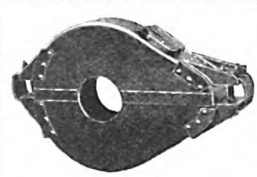

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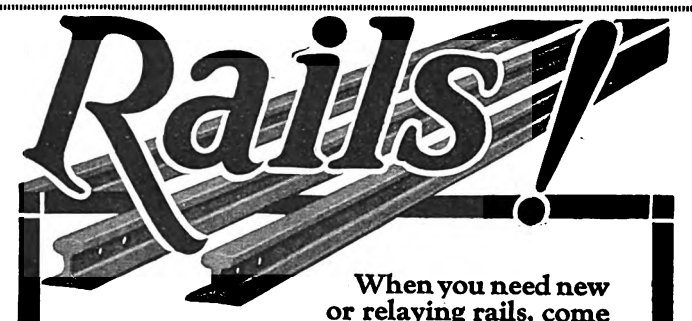

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1—Chicago Pneumatic Tool Company Air Compressor (Slide Valve) Steam Pipe 5 in.; 20 in. high pressure, 31 in. low pressure, 24-in. stroke. Air 16½ in. high pressure, 27 in. low pressure; 6-in. air line; 1580 cu. ft. of air per minute of 100 lbs.

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Offered, subject to prior sale, at $40 a thousand, f.o.b. cars Warwick, R. I.

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United Electric Railways Company
Providence, R. I.

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2 Sets Brill 27 M. C. B. 2 X Trucks

TEXAS ELECTRIC RAILWAY,
Dallas, Texas

FOR SALE

Boiler Feed Pumps

2—Worthington pot valve duplex, 14x8½ x15, fitted with brass rods, in good working condition, ready to operate 250 lb. pressure, can ship immediately.

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Lexington, Kentucky.

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WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Receivers & Aftercoolers
Ingersoll-Rand Co.

Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Anti-Climbers
Railway Improvement Co.

Armature Shop Tools
Elec. Service Supplies Co.

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Johnson & Co., J. R.
Laclede Steel Co.
St. Louis Car Co.
Westinghouse E. & M. Co.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co., The

Barges, Steel
American Bridge Co.

Bearings and Bearing Metals
Bemis Car Truck Co.
Brill Co., J. G., The
General Electric Co.
Gilbert & Sons B. F. Co., A.
More-Jones Brass & Metal Co.
St. Louis Car Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller Side
Baldwin Locomotive Works
Stucki Co., A.

Bells and Gongs
Brill Co., The J. G.
Consolidated Car Heati'g Co.
Elec. Service Supplies Co.
St. Louis Car Co.

Boilers
Babcock & Wilcox Co.

Bonding Apparatus
Amer. Steel & Wire Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Track-work Co.

Bonds, Rail
Amer. Steel & Wire Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Track-work Co.
Westinghouse E. & M. Co.

Book Publishers
McGraw-Hill Book Co.

Boxes, Switch
Johns-Pratt Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Brill Co., The J. G.
National Ry. Appliance Co
Westinghouse Tr. Br. Co.

Brake Shoes
Amer. Br. Shoe & Fdy. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.

Brakes, Brake Systems and Brake Parts
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.

Bridges, Steel
American Bridge Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
Morganite Brush Co.
U. S. Graphite Co.
Westinghouse E. & M. Co.

Brushes, Graphite
Morganite Brush Co.
U. S. Graphite Co.

Brush Holders
Anderson Mfg. Co., A. & J. M.

Brushes, Wire, Pneumatic
Ingersoll-Rand Co.

Buildings, Steel
American Bridge Co.

Buses, Motor
Brill Co., The J. G.
St. Louis Car Co.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.

Cables. (See Wires and Cables.)

Cambric Tapes, Yellow and Black Varnish
Irvington Varnish & Ins. Co.

Carbon Brushes (See Brushes Carbon)

Cars, Dump
Brill Co., J. G., The
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St. Louis Car Co.

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Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heati'g Co.
Westinghouse E. & M. Co.

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Kuhlman Car Co., G. C.
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National Ry. Appliance Co.
St. Louis Car Co.
Wason Mfg. Co.

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Brill Co., J. G., The
St. Louis Car Co.

Cars, Second Hand
Electric Equipment Co.
Transit Equipment Co.

Cars, Self-Propelled
Brill Co., J. G., The
General Electric Co.

Car Steps Safety
Irving Iron Works

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Castings, Brass, Composition or Copper
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More-Jones Brass & Metal Co.

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Bemis Car Truck Co.
St. Louis Car Co.

Castings, Malleable and Brass
Amer. Br. Shoe & Fdy. Co.
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St. Louis Car Co.

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Wood Co., Chas. N.

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Archbold-Brady Co.

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Pantasote Co., Inc.

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Haskelite Mfg. Co.

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General Electric Co.
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Anderson Mfg. Co., A. & J. M.
Elec. Ry. Equipment Co.
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Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

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St. Louis Car Co.

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Railway Improvement Co.

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Elec. Service Supplies Co.

Coils Armature and Field
General Electric Co.
Westinghouse E. & M. Co.

Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Coin Counting Machines
Cleveland Fare Box Co.
Intern'l Register Co.
Johnson Fare Box Co.

Coin Sorting Machines
Cleveland Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

Commutator Slotters
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Elec'l Mfg. Co.
General Electric Co.
Westinghouse E & M. Co.

Compressors, Air
Allis-Chalmers Mfg. Co.
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Tr. Br. Co.

Compressors, Air Portable
Ingersoll-Rand Co.

Concrete Flooring Surface
Irving Iron Works

Concrete Reinforcing Bars
Laclede Steel Co.

Condensor Papers
Irvington Varnish & Ins. Co.

Condensers
Allis-Chalmers Mfg. Co.
General Electric Co.
Ingersoll-Rand Co.
Westinghouse E. & M. Co.

Connectors, Solderless
Westinghouse E. & M. Co.

Connectors, Trailer Car
Consolidated Car Heat. Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Controllers or Parts
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General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.

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General Electric Co.
Westinghouse E. & M. Co.

Conveying Machinery
American Bridge Co.

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Anaconda Copper Mining Co.

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Elec. Service Supplies Co.
Internat'l Register Co., The
Roebling's Sons Co., John A.
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Samson Cordage Works

Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
Brill Co., The J. G.
Ohio Brass Co.
St Louis Car Co.
Westinghouse Tr. Br. Co.

Cranes
American Engineering Wks.

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossing, Frog & Switch
Ramapo Ajax Corp.

Crossing, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.

Crossings
Ramapo Ajax Corp.

Crossings, Track (See Track, Special Work)

Crossings, Trolley
Ohio Brass Co.

Curtains & Curtain Fixtures
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Elec. Service Supplies Co.
Morton Mfg. Co.
Pantasote Co., Inc.
St. Louis Car Co.

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Elec. Equipment Co.
Transit Equipment Co.

Derailing Devices (See also Track Work)

Derailing Switches
Ramapo Ajax Corp.

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Detective Service
Wish-Service, P. Edward

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General Electric Co.
Hale-Kilburn Co.
Nat'l Pneumatic Co., Inc.
Safety Car Devices Co.
St. Louis Car Co.

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General Electric Co.
Hale-Kilburn Co.
Morton Mfg. Co.

Doors, Folding Vestibule
Nat'l Pneumatic Co., Inc.
Safety Car Devices Co.

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Ingersoll-Rand Co.

Drills, Track
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Elec. Service Supplies Co.
Ingersoll-Rand Co.
Ohio Brass Co.

Dryers, Sand
Elec. Service Supplies Co.

Ears
Ohio Brass Co.

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Railway Track-work Co.

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Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Ong, Joe R.
Parsons, Klapp, Brinkerhoff & Douglas
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Wortham, Edwin

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Irving Iron Works

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Flooring, Open Steel
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Irving Iron Works

Flooring Ventilating
Irving Iron Works

Forgings
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Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.

Frogs, Track (See Track Work)

Frogs, Trolley
Ohio Brass Co.

Furnaces, Electric Steel Melting
American Bridge Co.

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General Electric Co.
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Lorain Steel Co.

Gong (See Bells and Gongs)

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Greases (See Lubricants)

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Ramapo Ajax Corp.

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Gold Car Heat. & Ltg. Co.
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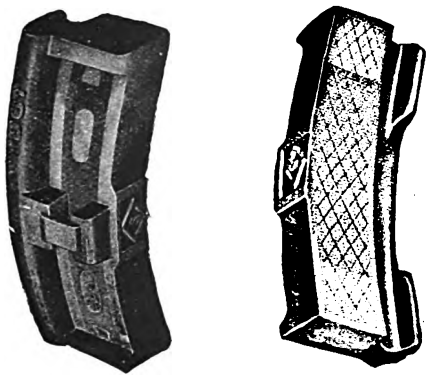

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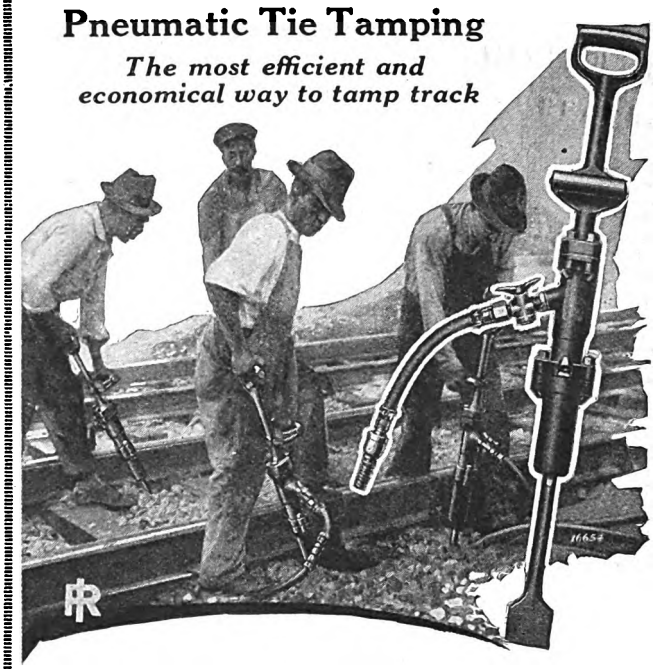

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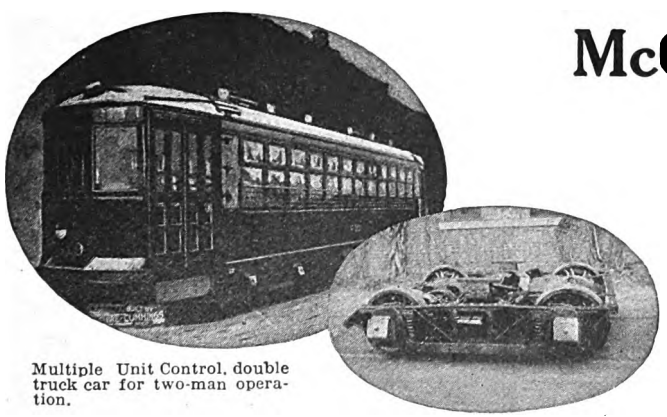

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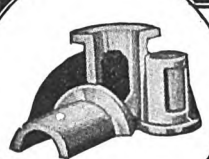

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Lapp Insulator Co., Inc.

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(See Rail Joints)

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St. Louis Car Co.

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Ohio Brass Co.

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Bethlehem Steel Co.

Manganese Steel Switches Frogs & Crossings
Bethlehem Steel Co.
Ramapo Ajax Corp.

Meters (See Instruments)

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Omnibuses (See Buses, Motor)

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General Electric Co.
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Ohio Brass Co.
Westinghouse Tr. Brake Co.

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Westinghouse Tr. Brake Co.

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Pneumatic Tools
Ingersoll-Rand Co.

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Bethlehem Steel Co.
Ohio Brass Co.

Poles, Metal Street
Elec. Ry. Equipment Co.
Hubbard & Co.

Pole Reinforcing
Hubbard & Co.

Poles & Ties Treated
Bell Lumber Co.

Poles, Ties, Posts, Piling & Lumber
Bell Lumber Co.
Southern Cypress Mfrs. Ass'n

Poles, Trolley
Bell Lumber Co.
Elec. Service Supplies Co.
Nuttall Co., R. D.

Poles, Tubular Steel
Elec. Ry. Equipment Co.
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Power Saving Devices
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Pumps
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Ingersoll-Rand Co.

Pumps, Vacuum
Ingersoll-Rand Co.

Punches, Ticket
Bonney-Vehslage Tool Co.
Intern'l Register Co., The
Wood Co., Chas. N.

Rail Braces & Fastenings
Ramapo Ajax Corp.

Rail Grinders (See Grinders)

Rail Joints
Carnegie Steel Co.

Rail Joints—Welded
Lorain Steel Co.

Rails, Steel
Bethlehem Steel Co.
Carnegie Steel Co.

Railway Paving Guards, Steel
Godwin Co., Inc., W. S.

Railway Safety Switches
Consolidated Car Heat. Co.
Westinghouse E. & M. Co.

Rail Welding
Railway Track-work Co.

Rattan
Brill Co., The J. G.
Elec. Service Supplies Co.
Hale-Kilburn Co.
Heywood-Wakefield Co.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

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Intern'l Register Co., The
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Rooke Automatic Rg. Co.
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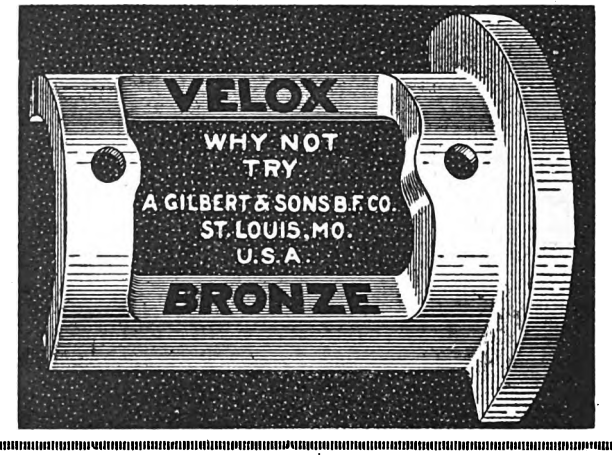

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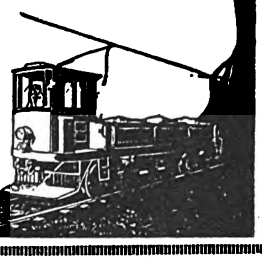

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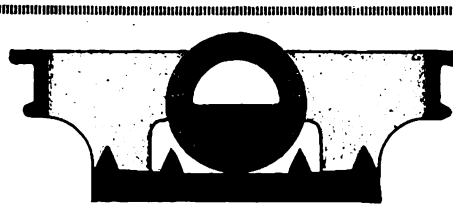

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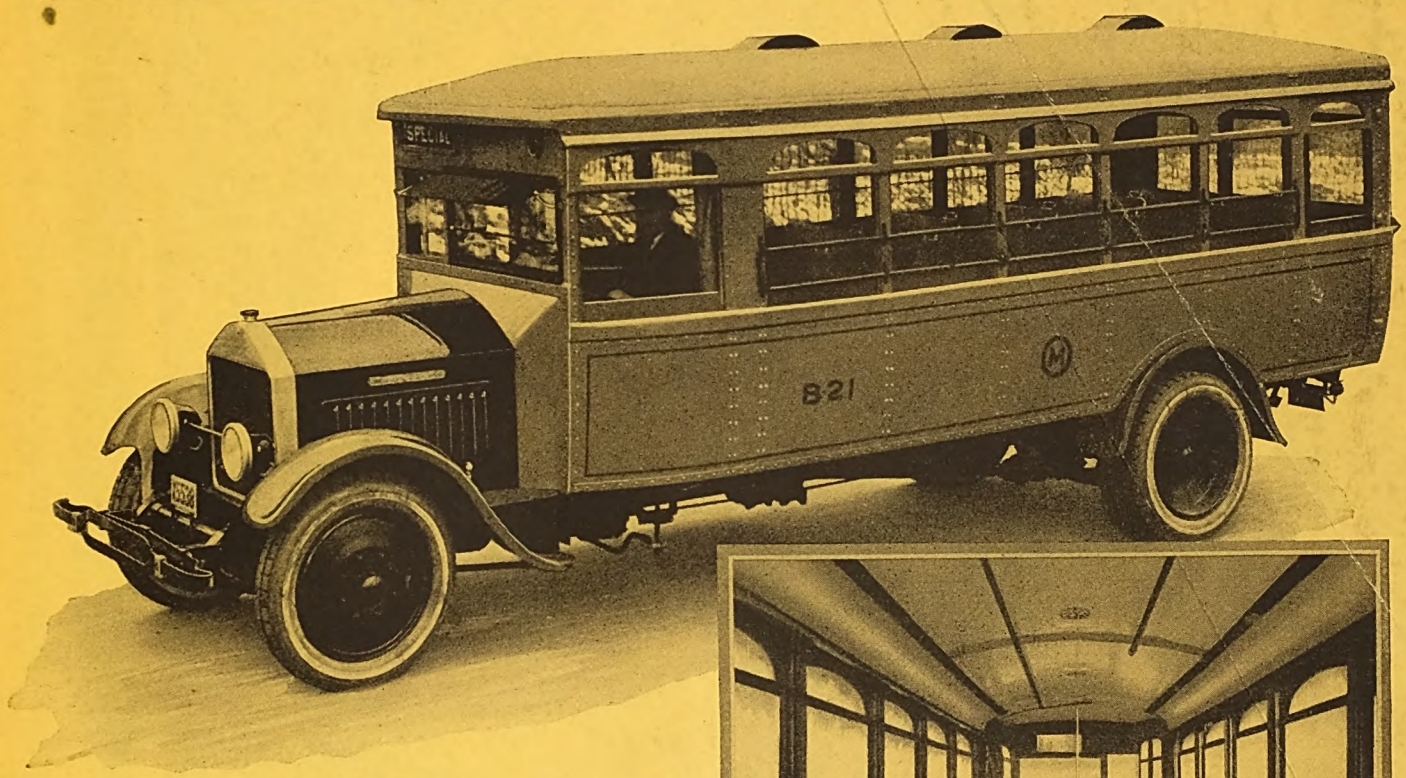

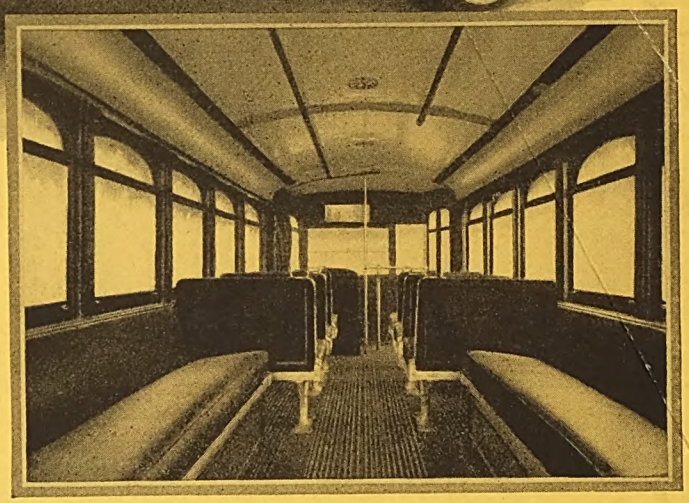

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